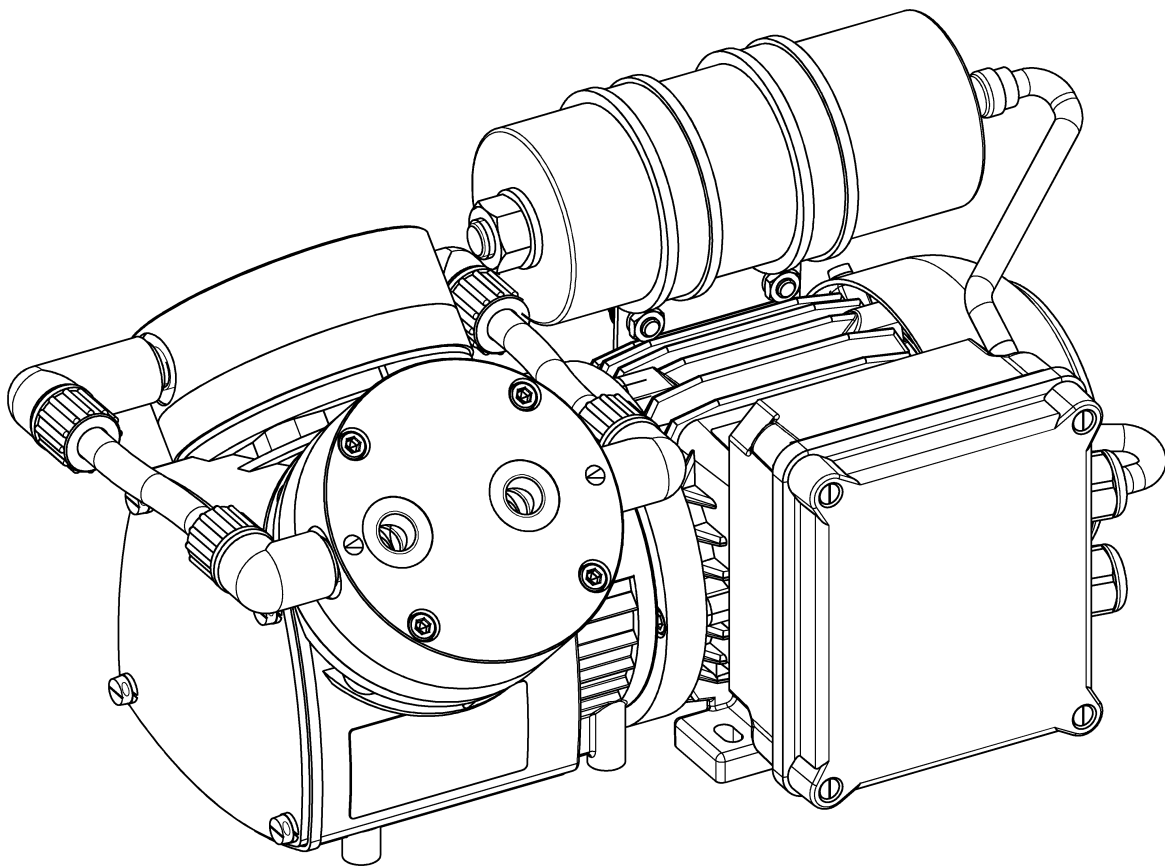


ATEX

**N026 EX
TRANSLATION OF ORIGINAL OPERATION AND
INSTALLATION INSTRUCTION
ENGLISH**

DIAPHRAGM PUMP



Notice!

Before operating the pump and the accessories, read the operating and installation instructions and observe the safety notices!

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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.

- In the event of uncertainties with regard to the content of the operating and installation instructions, please contact the manufacturer (contact data: see www.knf.com). Please have the type designation and serial number of the pump ready.
- Read the operating and installation instructions before you commission the pump.
- Give the operating and installation instructions to the next owner.
- Keep the operating and installation 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.

Motor The operating and installation instructions apply for pumps without motor.

- Also observe the operating instructions for the motor in the appendix.

1.2 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 or serious injury or serious damage are possible.
CAUTION	warns of a possibly dangerous situation	Minor injuries or damage are possible.

Tab. 1

Explanations of pictograms

Pictogram	Meaning
	Warning of hand injuries through crushing
	Warning of hot surface
	Warning of electrical voltage
	Warning of explosive materials
	Observe the operating instructions

Tab. 3

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.
Follow other sequentially numbered steps.

i This symbol indicates important information.

2 Use

2.1 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 4 *Technical data* and Chapter 2.3 *Use in potentially explosive areas*.

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.

The pump is suitable for transferring potentially explosive atmospheres and for operation in potentially explosive atmospheres.

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

Requirements for 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 4 *Technical data*) with the medium.

Risk of dangerous gas mixtures during pump operation if diaphragm breaks: Depending on the medium being transferred, breakage of the diaphragm can result in a dangerous mixture if the medium mixes with the air in the compressor housing or the surroundings.

Make certain that no risk of explosion arises even in extreme operating situations (temperature, pressure) and in the event of system breakdowns.

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

2.2 Improper use

The pumps are not suitable for use below ground.

The pumps are not suitable for transferring:

- Dusts
- Liquids
- Aerosols
- Biological and microbiological substances
- Explosives
- Fibers
- Food

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

This function can be made possible on a project basis upon consultation with KNF Customer Service.



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

This function can be made possible on a project basis upon consultation with KNF Customer Service.

2.3 Use in potentially explosive areas

In potentially explosive areas (zones), only operate pumps of the appropriate device category and temperature class.

The pumps have the following explosion protection designation:

Designation	Description
	Symbol for explosion-proof pumps
II	Device group (See Chapter 2.4.1 <i>Device groups</i>)
2/2G	Device category (See Chapter 2.4.2 <i>Device categories for gas</i>)
Ex	Symbol indicates that the device complies with one or more ignition protection types
H	Symbol for ignition protection type (See Chapter 2.4.5 <i>Ignition protection type</i>)
II B + H2	Explosion groups (see Chapter 2.4.3 <i>Explosion groups</i>)
T4	Temperature class (see Chapter 2.4.4 <i>Temperature classes</i>)
Gb	Equipment protection level (See Chapter 2.4.6 <i>Equipment protection level for gas</i>)
	Special operating conditions (See Chapter 2.4.7 <i>Special operating conditions</i>)

Tab. 5

An ignition hazard assessment in accordance with standards DIN EN ISO 80079-36 and DIN EN ISO 80079-37 was performed for the pumps. The protective goals were reached by applying ignition protection type constructional safety "c".

The explosion protection designation can also be found at the following location:

- Type plate of the pump

Motor The pump motor must have at least the same explosion protection as the pump.

2.4 Explanations of the explosion protection designation

2.4.1 Device groups

- Device group I Device group I applies for devices that are used in underground plants of mines as well as their underground systems that could be endangered by methane and/or combustible dusts.
- Device group II Device group II applies for devices that are used in other areas that could be endangered by an explosive atmosphere.

2.4.2 Device categories for gas

The device category describes the frequency and the duration of the occurrence of explosive atmospheres during operation.

Device category	Description
1G	Devices of this category are designed for use in areas in which an explosive atmosphere consisting of a mixture of air and gases, vapors or mists is present constantly or for long periods of time or often.
1D	Devices of this category are designed for use in areas in which an explosive atmosphere consisting of a dust/air mixture is present constantly or for long periods of time or often.
2G	Devices of this category are designed for use in areas in which it is to be expected that an explosive atmosphere consisting of gases, vapors or mists forms occasionally.
2/2G	Devices that extract from zone 1 and are designed for use in areas in which it is to be expected that an explosive atmosphere consisting of gases, vapors or mists forms occasionally.
2/-G	Devices that extract from zone 1 but are not designed for installation in a potentially explosive atmosphere (zone).
2D	Devices of this category are designed for use in areas in which it is to be expected that an explosive atmosphere consisting of a dust/air mixture forms occasionally.
3G	Devices of this category are designed for uses in areas in which it is to be expected that an explosive atmosphere resulting from gases, vapors or mists occurs, though in all likelihood occurs only seldom and for a very short length of time.
3D	Devices of this category are designed for uses in areas in which it is to be expected that an explosive atmosphere resulting from stirred-up dust occurs, though in all likelihood occurs only seldom and for a very short length of time.

Tab. 7

2.4.3 Explosion groups

Combustible gases and vapors are classified according to explosion groups (I, IIA, IIB and IIC) and temperature classes. The following table shows the classification of the most common combustible gases and vapors.

	T1	T2	T3	T4	T5	T6
I	Methane	–	–	–	–	–
IIA	Acetone Ethane Ethyl acetate Ammonia Ethyl chloride Benzene Acetic acid Carbon monoxide Methane Methanol Methyl chloride Naphthalene Phenol Propane Toluene	i-amyl acetate n-butane n-butyl alcohol Cyclohexanone 1,2-dichloroethane Acetic anhydride	Gasoline Diesel fuel Jet fuel Heating oils n-hexane	Acetaldehyde	–	–
IIB	Town gas	Ethylene Ethyl alcohol	Hydrogen sulfide	Ethyl ether	–	–
IIC	Hydrogen	Acetylene	–	–	–	Carbon disulfide

Tab. 9

The classification of gases and vapors into groups with respect to explosion group and temperature class applies for the transferred medium as well as for the pump surroundings.

Transferred medium The pump may only be used to transfer gases and vapors that belong to the respective explosion group and corresponding temperature class (or below) (see designation on the type plate) or that are not explosive and combustible.

Environment of the pump The pump may only be operated in an environment that contains an atmosphere that belongs to the respective explosion group and corresponding temperature class (or below) (see designation on the type plate) or that is not explosive and not combustible.

2.4.4 Temperature classes

- Maximum surface temperature** The maximum surface temperature is the highest temperature that is reached under the most unfavorable conditions of a surface of the pump.
- Ignition temperature** The maximum surface temperature of the pump must always be lower than the lowest ignition temperature of the gas or vapor/air mixture in which it is used.
- Temperature class** The maximum surface temperature arises from the design the pump and is specified as temperature class.

Temperature class	Max. surface temperature [°C]	Ignition temperature [°C]
T1	450	> 450
T2	300	> 300
T3	200	> 200
T4	135	> 135
T5	100	> 100
T6	85	> 85

Tab. 11

2.4.5 Ignition protection type

Designation	Description
h	Constructional safety "c"
h	Ignition source monitoring "b"
h	Liquid immersion "k"

Tab. 13

An ignition hazard assessment in accordance with standards DIN EN ISO 80079-36 and DIN EN ISO 80079-37 was performed for the pumps. The protective goals were reached by applying ignition protection type constructional safety "c".

2.4.6 Equipment protection level for gas

The equipment protection level describes the frequency and the duration of the occurrence of explosive atmospheres in an area.

Equipment protection level	Description*	Constructional safety
Ga	Devices with very high protection level for use in potentially explosive areas. With these devices, there is no risk of ignition during normal operation or in the event of foreseeable or infrequent faults/malfunctions.	Very high
Gb	Devices with high protection level for use in potentially explosive areas in which there is no risk of ignition during normal operation or in the event of foreseeable or infrequent faults/malfunctions.	High
Gc	Device with increased protection level for use in potentially explosive areas. There is no risk of ignition during normal operation. The devices have a number of additional protection measures which ensure that, in the event of commonly foreseeable faults in the device, no danger of ignition exists.	Increased

Tab. 15 *according to DIN EN ISO 80079-36

2.4.7 Special operating conditions

- The pumps may not be set up outdoors. Commissioning may only be performed with suitable weather- and corrosion-protection paneling.
- The pumps are to be set up so that they are not exposed to any UV radiation.

3 Safety

i Observe the safety notices in Chapters 7 *Installation and connection* and *Operation*.

The pumps are built in accordance with the generally recognized rules of technology and the occupational 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 purpose, safely and aware of the dangers and in observation of the operating instructions.

The components that are to be connected to the pumps must be designed according to the pneumatic data of the pumps.

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

Personnel Make sure that only specially trained personnel or trained and instructed personnel work on the pumps. This applies, in particular, for connection and servicing work.

Make sure that the personnel have read and understood the operating instructions, particularly the chapter on 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 as the pump heats up during operation.

When working on the pump, make certain that the pump is disconnected from mains and without power.

Make certain that no dangers arise from flow when gas connections are open, from noises or from hot, corrosive, dangerous and environmentally hazardous gases.

Classification of a pump environment When classifying a pump environment in a potentially explosive area (zone), observe the "Guideline for Preventing Danger from Explosive Atmospheres, with a Collection of Examples – Explosion Protection Guidelines – (EX-RL)".

If the situation relates to special cases or if doubt exists about the definition of the potentially explosive areas, inform the regulatory authorities and have them make the decision.

Use in potentially explosive environment The following applies for use in a potentially explosive environment consisting of gases, vapors and mists:


The lowest ignition temperature of the potentially explosive atmospheres that comes into question must be higher than the so-called "maximum surface temperature" of the pump.

According to DIN EN ISO 80079-36, the maximum surface temperature is the highest temperature that is achieved during operation under the most unfavorable conditions (but within the accepted tolerances) of a part or on a surface of the pump.

The maximum surface temperature is specified from the design of the pump and noted on the pump type plate as temperature class.

Working with hazardous media Upon breakage of the diaphragm and/or leaks, the transferred medium mixes with the air in the surroundings and/or in the pump housing. Make sure that a dangerous situation cannot arise as a result.

When transferring hazardous media, observe the safety regulations for the handling of these media.

Working with combustible media	<p>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.</p> <p>Note here that the temperature of the medium increases when the pump compresses the medium.</p> <p>Therefore, make certain that the temperature of the medium also remains 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 Chapter 4 <i>Technical data</i>.</p> <p>Make certain that the permissible ambient temperature (4 <i>Technical data</i>) is not exceeded.</p> <p>If applicable, also take into consideration external energy sources (e.g., radiation sources) that could add heat to the medium.</p> <p>In case of doubt, contact KNF Customer Service.</p>
Environmental protection	<p>Store and dispose of all replacement parts in accordance with environmental regulations. Observe the respective national and international regulations. This applies in particular to parts that are contaminated with toxic substances.</p>
EU/EC directives/standards	<p>See EC/EU Declaration of Conformity</p> 
Customer service and repairs	<p>The pumps are maintenance-free. KNF does, however, recommend periodically inspecting the pumps for noticeable changes to noises and vibrations.</p> <p>Only have repairs to the pumps performed by the responsible KNF Customer Service.</p> <p>Housings with live components may only be opened by specialist personnel.</p> <p>Use only original parts from KNF during servicing work.</p> <p>Only have repairs to the motors performed by the responsible KNF Customer Service.</p>

4 Technical data

4.1 Technical data

Pump materials

Assembly	Material AT	Material ST
Pump head	Aluminum	Stainless steel
Diaphragm	EPDM/PTFE-coated	EPDM/PTFE-coated
Valve	Stainless steel, PTFE*	Stainless steel, PTFE*

Tab. 17 *only for agreed-upon special versions

Assembly	Material AP	Material SP
Pump head	Aluminum	Stainless steel
Diaphragm	EPDM	EPDM
Valve	Stainless steel, EPDM*	Stainless steel, EPDM*

Tab. 19 *only for agreed-upon special versions

Pneumatic values

Parameter	Value N026	Value N026.1.2
Max. permissible operating pressure [bar rel]	2.5	2.0
Ultimate vacuum [mbar abs.]	100	100
Flow rate at atm. pressure [l/min]*	15.0	26.0

Tab. 21 *Liters in standard state (1013 mbar)

Other parameters

Parameter	Value
Permissible ambient temperature [°C]	+ 5 to + 40
Permissible media temperature [°C]	+ 5 to + 40
Dimensions -N026 -N026.1.2	See Fig. 3, Kapitel 7.1 <i>Installing the pump</i> See Fig. 4, Chapter 7.1 <i>Installing the pump</i>
Electrical data	See motor type plate
Gas tightness* of the pump head	< 6 x 10 ⁻³ mbar l/s
Relative air humidity	80% for temperatures to 31°C, decreasing linearly to 50% at 40°C

Tab. 23 **The gas tightness of the pump head is no longer ensured after the pump head is opened or after replacing diaphragm and valves. A leak test can be used to determine whether the original gas tightness is again achieved.

Weight

Pump type	Value [kg] Three-phase motor	Value [kg] Capacitor motor
N026ST	7.9	8.9
N026AT	6.6	7.6
N026.1.2ST	10.8	11.4
N026.1.2AT	8.3	9.3

Tab. 25

5 Design and function

Design

- 1 Pump outlet
- 2 Pump inlet
- 3 Capacitor
- 4 Type plate of the pump
- 5 Pump head
- 6 Motor

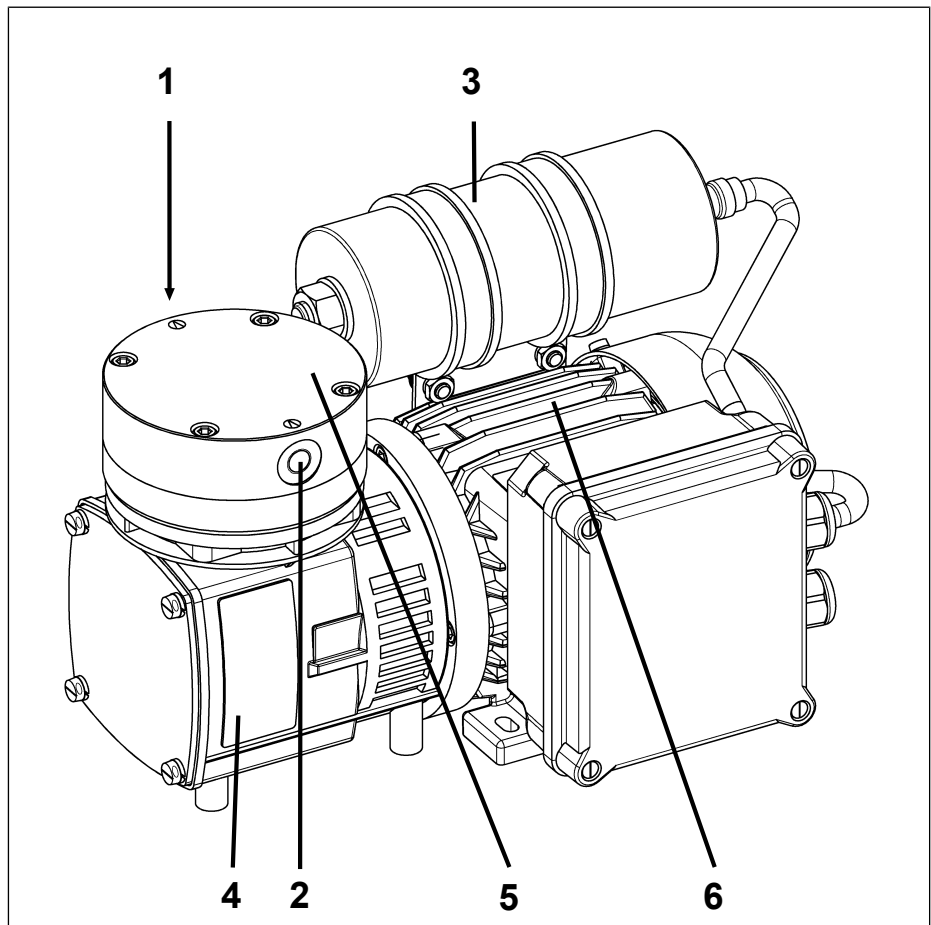


Fig. 1 Design N026 EX (with capacitor motor)

Function of a diaphragm pump

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

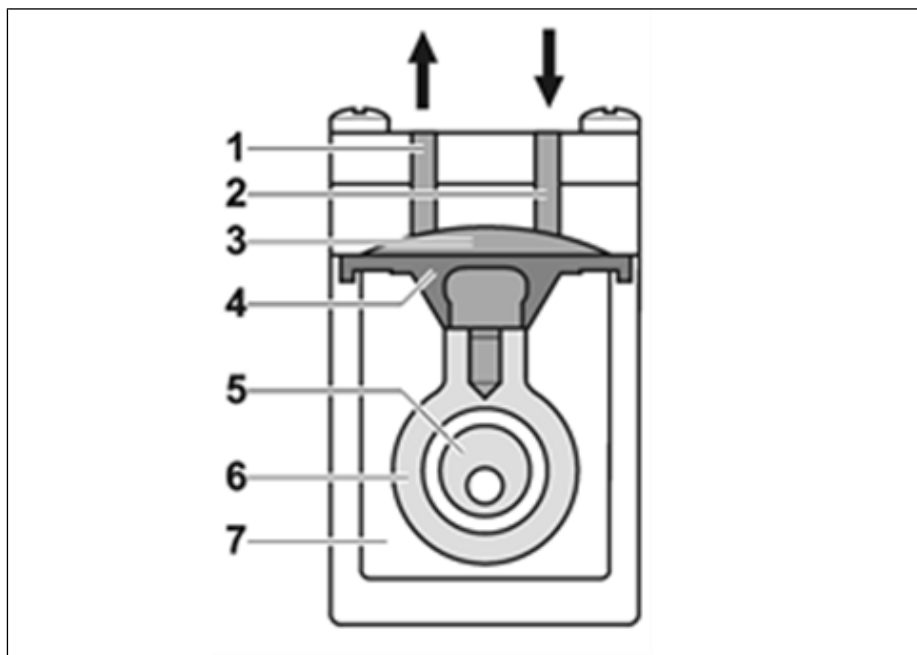


Fig. 2 Function of a diaphragm pump

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 hermetically separated from the pump drive (7) by the diaphragm.

6 Transport

General



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).



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 safeguards on the pump prior to commissioning.

Parameter

Parameter	Value
Storage temperature [°C]	+ 5 to + 40
Transport temperature [°C]	- 10 to + 60
Permissible humidity (non-condensing) [%]	30 to 85

Tab. 27 Transport parameters



Prior to commissioning, make sure that the pump has reached the ambient temperature (4 *Technical data*).

7 Installation and connection

The pumps are only to be installed in accordance with the operating parameters and conditions described in Chapter 4 *Technical data*.

→ Observe the safety notices (see Chapter Safety).



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 4 *Technical data*) with the medium.

7.1 Installing the pump

→ Before installing, store the pump at the installation location to allow it to reach the ambient temperature.

Mounting dimensions → For mounting dimensions, see the following figures:

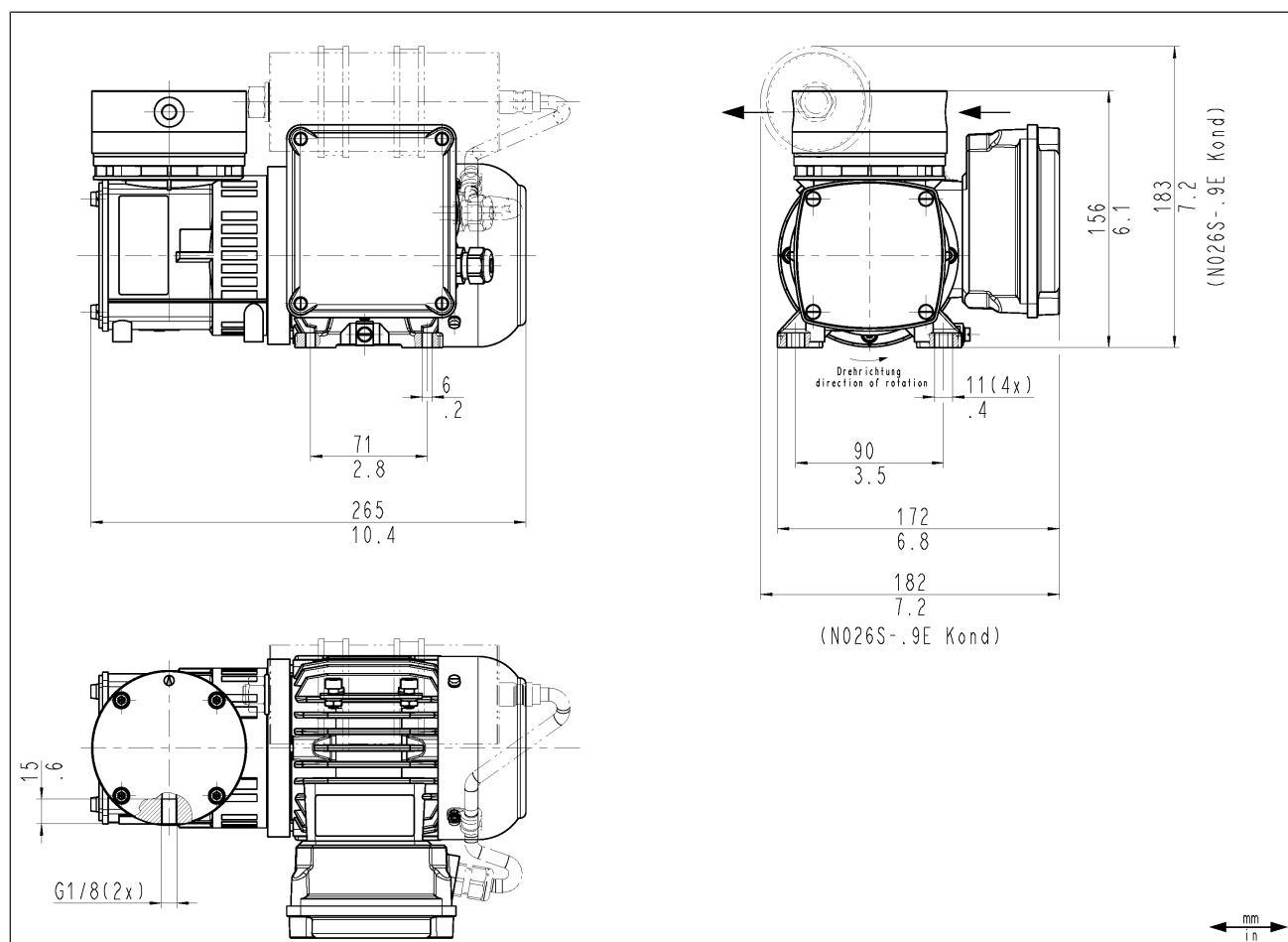


Fig. 3 Mounting dimensions N026 EX

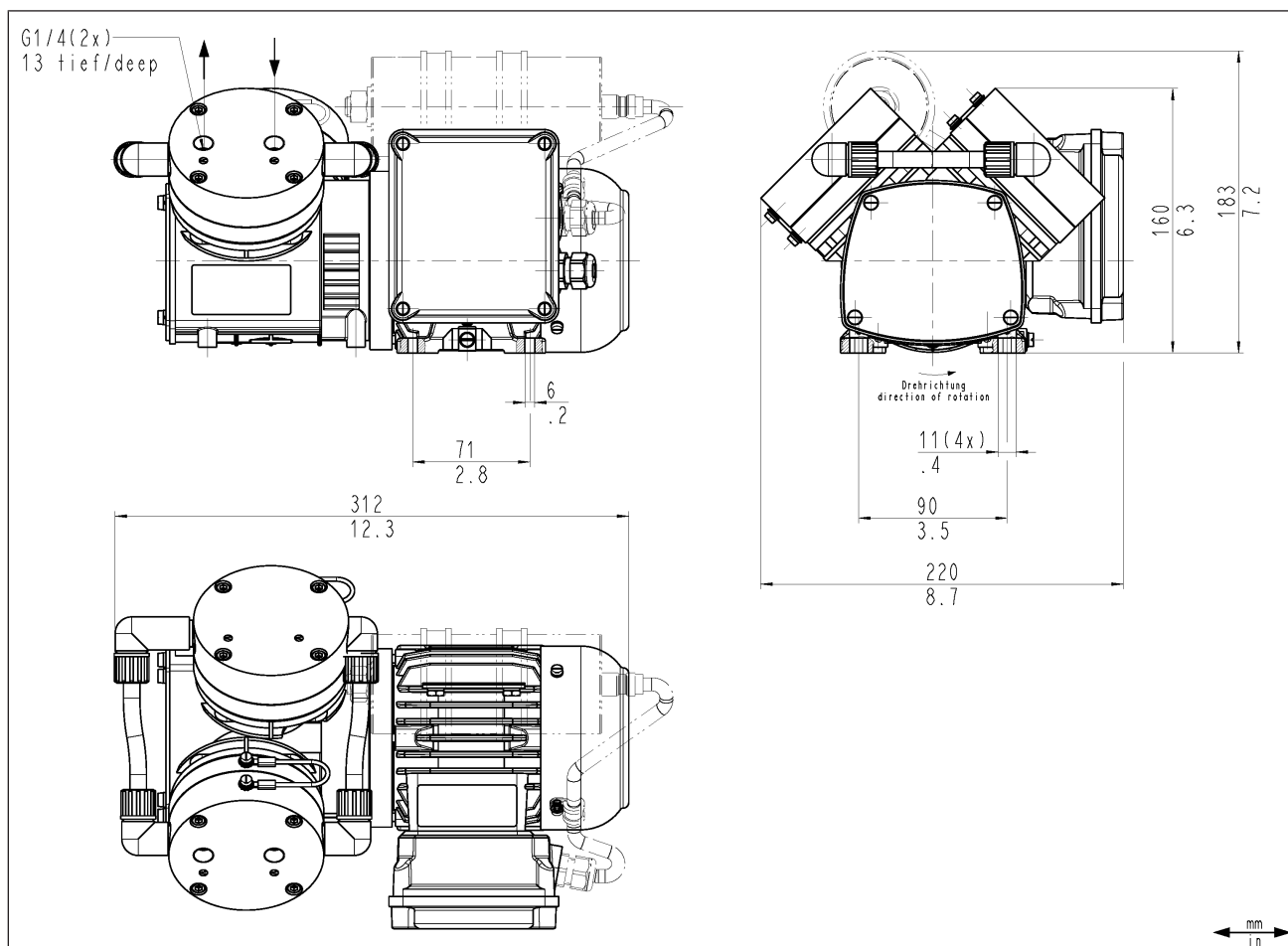


Fig. 4 Mounting dimensions N026.1.2 EX

Cooling air supply



Risk of explosion due to lack of cooling air supply

- Mount the pump so that the fan wheel of the pump can draw in sufficient cooling air.
- Ensure sufficient ventilation or heat dissipation in the vicinity of the pump.



Danger of burning on hot surfaces

Hot surfaces could occur if the pump overheats.

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

Immediate environment of the hot pump parts

- During installation, make sure that no combustible or thermally deformable objects are positioned in the immediate environment of the hot pump parts (head, motor).

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 contaminants.
- Make sure that the installation location is accessible for service.

- Make sure that access to moving parts is prevented.
- i** The IP protection class of the pump motor is specified on the type plate.
- Mount 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 vibration and impact.
- Installation position → The pump must be installed in the depicted installation position. Use metal screws to fasten the pump at the attachment points indicated in Chapter 7 *Installation and connection*.



Personal injury and/or property damage from vibrations

Pump vibrations, in combination with adjacent components, can result in crushing and/or damage to these components.

- Make sure that pump vibrations cannot lead to dangers in combination with adjacent components.

7.2 Electrical connection



Danger to life from electric shock

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



Risk of explosion from electrostatic charge

- Connect the pump so that the risk of ignition from electrostatic charge is avoided.
- Carefully ground the pump.

- When connecting to a power source, observe the applicable standards, directives, regulations and technical standards.
- When connecting to a power source, carefully read and observe the operating instructions for the motor.
- Install a device for separating the pump motor from the electrical mains in the electrical installation.
- It is recommended that an additional emergency-off system be installed.
- Potentially explosive atmospheres → Only place the electrical equipment in potentially explosive areas that is necessary there for the operation of the pump.
- Take lightning protection measures.
- Fastening the connection cables → Fasten the connection cables so that

- the cables do not come into contact with movable or hot parts.
- the cables cannot be worn or damaged on sharp corners or edges
- no tensile and pressure forces are exerted on the connection point of the cables (strain relief)

7.3 Pneumatic connection



Personal injury or property damage through ejected plugs

If not removed, the plugs on the pressure side of the pump can be ejected during operation by the resulting overpressure.

→ Remove the plugs during installation.

→ Wear appropriate personal protective equipment.

- | | |
|------------------------|--|
| Connected components | → Only connect components to the pump that are designed for the pneumatic data and thermal requirements of the pump. (see Chapter 4 <i>Technical data</i>). |
| Pressure relief device | → Protect the compressors by means of a pressure relief device between the pressure-side connections of the compressor and the first shut-off valve. |



Risk of explosion during pressure limitation resulting from the medium mixing with the environment

→ Make certain that there is no risk of explosion posed by the medium mixing with the environment.

- | | |
|----------------|--|
| Pump discharge | → If the pump is used as a vacuum pump, safely (with respect to medium and noise) drain the hot pump discharge that may, under certain circumstances, occur at the pneumatic outlet of the pump. |
| Decoupling | → KNF recommends mechanically decoupling the pump from the pipe system, e.g., through the use of flexible hoses or pipes. In this way it is possible to prevent the transfer of possible pump vibrations and noises to the system. |

Connecting the pump



Risk of injury from mixing up suction side and pressure side

Mixing up the suction side and pressure side can result in breakage of connected components on the suction side and pressure side.

→ Observe the marking of inlet and outlet on the pump head.

1. Remove the protective plugs from the gas connection threads.
2. Connect the suction line and the pressure line (for mounting dimensions, see Chapter 4 *Technical data*).

3. Lay the suction line and the pressure line at a downward angle to prevent condensate from running into the pump.

8 Operation

8.1 General



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

Some pump parts may be hot during or after operation of the pump.

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



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 pumps in accordance with the operating parameters and operating conditions described in Chapter 4 *Technical data* and in Chapter 2.3 *Use in potentially explosive areas*.
- Ensure the proper use of the pumps (See Chapter 2.1 *Proper use*).
- Eliminate the possibility of improper use of the pumps (see Chapter *Improper use*).
- Observe safety notices (Chapter *Safety*).
- The pumps are built-in devices. Before they are commissioned, it must be ensured that the machines or systems into which the pumps were installed comply with the relevant provisions.



Risk of pump head bursting due to excessive pressure increase

- Do not exceed the maximum permissible operating pressure (see 4 *Technical data*).
- 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.



Risk of explosion from elevated ambient temperature

- Monitor the ambient temperature (compression heat, motor heat).
- Ensure sufficient cooling air supply.



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).



Risk of dangerous gas mixtures during pump operation if diaphragm breaks

If the diaphragm should break, the medium will mix with the air in the compressor housing or in the surroundings.

- Stop pump immediately.
- Replace the diaphragm prior to further operation (see Chapter 9 *Servicing*).



Because the diaphragm is a wear part, diaphragm breakage may occur at any time.

Pump standstill

- When the pump is at a pump standstill, establish normal atmospheric pressure in the lines.

Vapors as medium → The service life of the diaphragm can be extended by preventing the formation of condensate in the pump. Therefore, only perform work with saturated or nearly saturated vapors with a warm pump.

i Operation with open suction-side gas connection can result in contaminants and objects being drawn in.

8.2 Information on switching the pump on and off

Switching on the pump

i The pump must not be started up against pressure or vacuum during switch-on. This also applies during operation after a brief power failure.

→ Ensure that normal atmospheric pressure is present in the lines when switching on.

Switching off the pump

→ KNF recommends: When transferring aggressive media, flush the pump before switching off (see Chapter 9.2.1 *Flushing the pump*) to extend the service life of the diaphragm.

→ Establish normal atmospheric pressure in the lines (relieve pump pneumatically).

Recommissioning → Before recommissioning, observe the applicable standards, guidelines, regulations and technical standards at the electrical connection.

Inspecting the pump → Inspect the pump periodically for external damage or leakage.

9 Servicing

9.1 Servicing schedule



WARNING

Risk of explosion from wear

- Have the connecting rod bearing replaced by KNF according to servicing schedule.
- Have the motor bearing replaced by KNF according to servicing schedule.



WARNING

Risk of explosion if original parts are not used

If original parts are not used, the pump loses its explosion protection properties. Furthermore, the function of the pump and its safety are lost. The validity of the CE conformity is rendered void if original parts are not used.

- Use only original parts from KNF during servicing work.

Component	Servicing interval
Pump	→ Inspect the pump periodically for external damage or leakage
Diaphragm and reed valves or valve plate(s)	→ At the latest, replace when the pump flow rate decreases
Connecting rod bearing	→ Have replaced after 17,000 operating hours or after no more than 24 months
Motor bearing	→ Have replaced after 17,000 operating hours or after no more than 24 months
Gas connections	→ Inspect the pump periodically for external damage or leakage

Tab. 29

9.2 Cleaning

9.2.1 Flushing the pump



Risk of explosion by flushing the pump with air

- In potentially explosive areas or when using the pump with explosive media, only permit specialist to flush the pump with inert gas.

- Before switching off the pump under atmospheric conditions, flush for several minutes with inert gas.

i If there is no risk of explosion, flushing can also be performed with air.

9.2.2 Cleaning the pump



Risk of explosion from electrostatic charging of the components

- Only clean the pump with a damp cloth.

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

9.3 Changing diaphragm and reed valves/valve plate(s)

The sequence of work steps varies depending on pump version:

- Pump models with reed valves, see Chapter 9.3.1 *Pump models with reed valves*
- Pump models with valve plates, see Chapter 9.3.2 *Pump models with valve plate*

In case of doubt, please contact KNF Customer Service (have serial number of the pump ready).

9.3.1 Pump models with reed valves

- Requirements → Disconnect the motor from mains and ensure that it is voltage-free.
- Free the pump of hazardous materials.

Spare parts

Spare part*	Position designation**	Number per pump head
Diaphragm	(F)	1
Reed valve (stainless steel)	(M)	2
O-ring	(B)	2

Tab. 31 *According to spare parts list, Chapter 11.1 Spare parts

**According to Fig. 5

Tool and material	Quantity	Tool/material
	1	Allen key, 4 mm
	1	Screwdriver blade width 4.5 mm
	1	Adjustable face spanner wrench for nuts with two holes or KNF wrench for retainer plate (see <i>11.2 Accessories</i>).
		Thread locker (DELO ML 5249 or comparable product)
	1	Pencil

Tab. 33

Information on the procedure

→ Always replace diaphragm, reed valves and O-rings together to maintain the performance of the pump.

With multi-headed pumps, parts may be interchanged between the individual pump heads.

→ Replace the diaphragm and reed valves of the individual pump heads in sequence.



Risk of explosion from formation of potentially explosive atmosphere

Leaky connections can result in dangerous explosive atmospheres.

- Make sure that diaphragm, valve plates/seals, and O-ring are installed undamaged, cleanly and correctly.
- Check the pneumatic connections of the pump for leaks.
- Work with care during service work.
- Replace defective parts immediately.



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.

Work steps



The following item numbers refer to Fig. 5.

1. Only for two-headed pumps:
Open the pneumatic connection between the two heads; loosen one of the union nuts to do this; take care not to kink the connecting hose.
2. Removing the housing cover (H):



Risk of explosion from damage

If the housing cover is bent or if the paint is damaged, there is no risk of explosion.

→ Perform the work steps carefully and without the use of force.

Loosen the fastening screws (G) of the housing cover (H) and remove the housing cover.

3. On a pump head, mark housing (A), intermediate plate (D) and head plate (C) with a continuous line made with a pencil. This helps avoid incorrect assembly later.
4. Loosen the four hexagon socket head cap screws (Y) and remove the head plate (C) and the intermediate plate (D) from the housing.
5. Remove the O-rings (B) from the head plate (C).
6. Loosen the valve fastening screws (W) in the head plate and the intermediate plate and remove the reed valves (M).
7. Use wrench for retainer plate to loosen the retainer plate (E) counter-clockwise; remove the retainer plate and the diaphragm (F).
8. Check all parts for soiling and clean the parts necessary.
9. Mounting the new reed valves (M):
10. Check the pretension of the reed valves; to do this, hold the reed valves lengthwise between two fingers and press the reed valves together very lightly.
11. Place the reed valves (M) on the valve seat of the head plate (C). The slight curvature of the reed valve caused by the pretension must face the head plate (C).
12. Tighten the valve fastening screw (W) with a screwdriver.
13. Place the reed valve (M) on the valve seat of the intermediate plate (D). The slight curvature of the reed valve caused by the pretension must face the intermediate plate (D).
14. Place the washer (X) on the valve fastening screw (W). Then tighten the valve fastening screw (W) with a screwdriver.
15. Check whether the reed valves are properly seated.
16. Insert the new O-rings (B) in the head plate (C).
17. Mount the diaphragm with the retainer plate.
18. Place the retainer plate (E) on the new diaphragm (F). The smooth side of the diaphragm must face upward.
19. Apply a small amount of thread locker to the thread of the retainer plate (DELO ML 5249 or comparable product).
20. Turn the flywheel (I) to move the connecting rod (K) to the middle position.
21. Place the new diaphragm with the retainer plate on the connecting rod (K).
22. Screw in the retainer plate (E) clockwise with the wrench for retainer plate and hand tighten.
23. Place the intermediate plate (D) on housing according to the pencil marking.
24. Place the head plate (C) on the intermediate plate (D) according to the pencil marking.
25. Uniformly tighten the hexagon socket head cap screws (Y) crosswise.
26. Check the pump for smooth running by turning the flywheel (I).

27. For two-headed pumps:
Perform work steps 3 to 15 on the second head.
28. Remount the housing cover (H).
29. Only for two-headed pumps: Remount the pneumatic connection.

30. Checking the pump head (pump heads) and the pneumatic connections for leaks:

- i** To ensure the required gas tightness of the pump following servicing, a leak test is to be performed.



Risk of explosion from leaks

- Before recommissioning the pump, check the pump heads and pneumatic connections for leaks. Leaks may lead to a risk of explosion.



Risk of injury and poisoning from leaks

- Before recommissioning the pump, check the pump heads and pneumatic connections for leaks. Leaks may lead to poisoning, chemical burns or similar injuries.

-
- i** Before recommissioning, observe the applicable standards, guidelines, regulations and technical standards at the electrical connection.

- A** Housing
- B** O-ring
- C** Head plate
- D** Intermediate plate
- E** Retainer plate
- F** Diaphragm
- G** Fastening screw
- H** Housing cover
- I** Flywheel
- K** Connecting rod
- M** Reed valve (stainless steel)
- W** Valve fastening screw
- X** Washer
- Y** Hexagon socket head cap screws

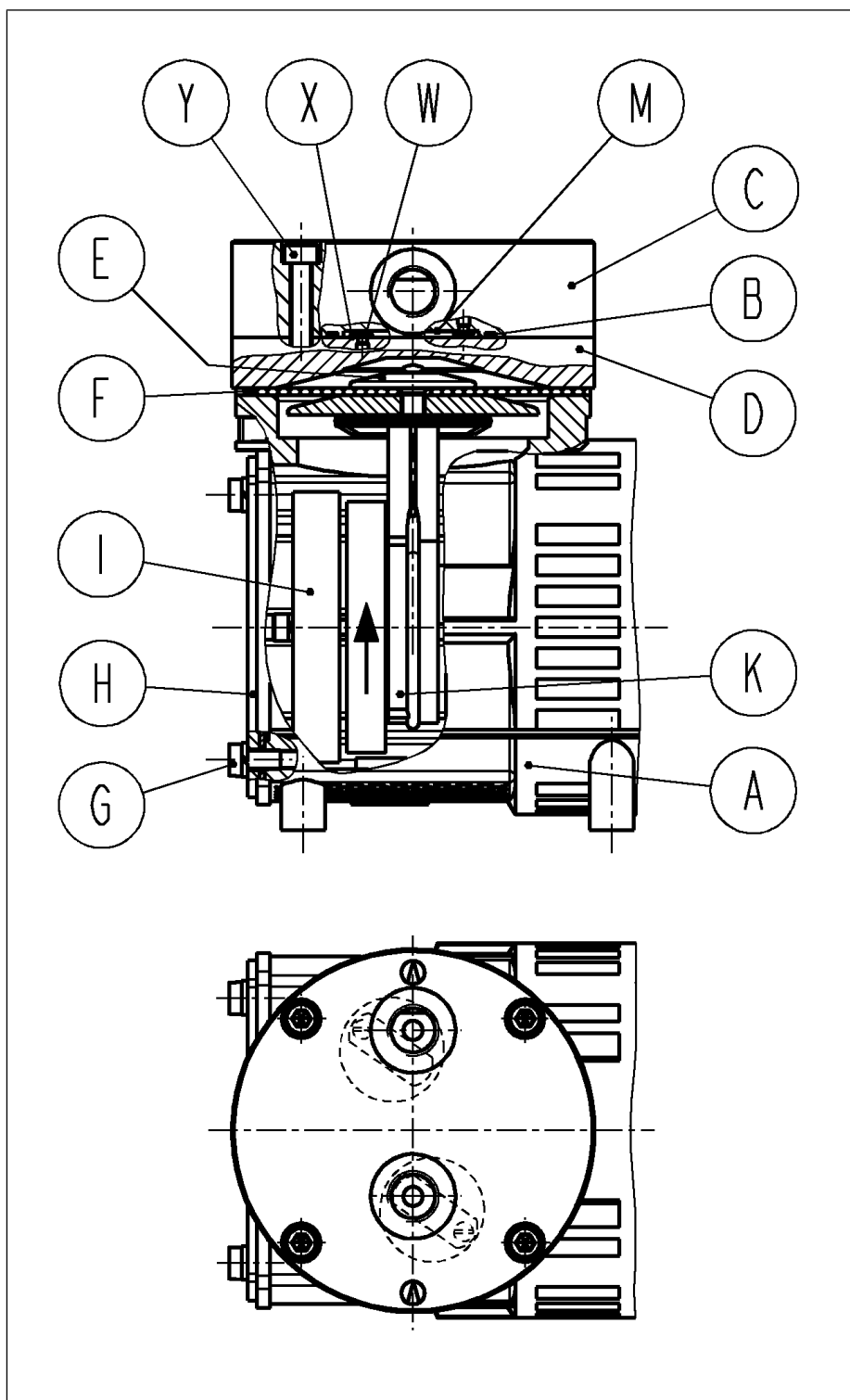


Fig. 5 Pump parts for pump models with smooth heads and reed valves (stainless steel, symbolic)

9.3.2 Pump models with valve plate

- Requirements
- Disconnect the motor from mains and ensure that it is voltage-free.
 - Free the pump of hazardous materials.

Spare parts

Spare part*	Position designation**	Number per pump head
Diaphragm	(F)	1
Valve plate	(Z)	1
O-ring	(B)	1

Tab. 35 *According to spare parts list, Chapter 11.1 Spare parts

**According to Fig. 6

Tool and material

Quantity	Tool/material
1	Allen key, 4 mm
1	Screwdriver blade width 4.5 mm
1	Adjustable face spanner wrench for nuts with two holes or KNF wrench for retainer plate (see 11.2 Accessories).
	Thread locker (DELO ML 5249 or comparable product)
1	Pencil

Tab. 37

Information on the procedure

→ Always replace diaphragm, valve plates and O-rings together to maintain the performance of the pump.

With multi-headed pumps, parts may be interchanged between the individual pump heads.

→ Replace the diaphragm and valve plates of the individual pump heads in sequence.



Risk of explosion from formation of potentially explosive atmosphere

Leaky connections can result in dangerous explosive atmospheres.

- Make sure that diaphragm, valve plates/seals, and O-ring are installed undamaged, cleanly and correctly.
- Check the pneumatic connections of the pump for leaks.
- Work with care during service work.
- Replace defective parts immediately.



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.

Work steps

i The following item numbers refer to Fig. 6.

1. Only for two-headed pumps:
Open the pneumatic connection between the two heads; loosen one of the union nuts to do this; take care not to kink the connecting hose.
2. Removing the housing cover (H):



Risk of explosion from damage

If the housing cover is bent or if the paint is damaged, there is no risk of explosion.

- Perform the work steps carefully and without the use of force.

Loosen the fastening screws (G) of the housing cover (H) and remove the housing cover.

3. On a pump head, mark housing (A), intermediate plate (X) and head plate (W) with a continuous line made with a pencil. This helps avoid incorrect assembly later.
4. Loosen the six hexagon socket head cap screws (Y) and remove the head plate (W), valve plate (Z) and intermediate plate (X) from the housing.
5. Only AT and ST versions:
Remove the O-ring (B) from the head plate (W).
6. Use a wrench for retainer plate to loosen the retainer plate (E) counter-clockwise; remove the retainer plate and the diaphragm (F).
7. Check all parts for soiling and clean the parts necessary.

8. Only AT and ST versions:
Insert the new O-ring (B) in the head plate (W).
9. Mounting the diaphragm with the retainer plate:
10. Place the retainer plate (E) on the new diaphragm (F). The smooth side of the diaphragm must face upward.
11. Apply a small amount of thread locker to the thread of the retainer plate (DELO ML 5249 or comparable product).
12. Turn the flywheel (I) to move the connecting rod (K) to the middle position.
13. Place the new diaphragm with the retainer plate on the connecting rod (K).
14. Screw in the retainer plate (E) clockwise with the wrench for retainer plate and hand tighten the screws.
15. Place the intermediate plate (X) on the housing according to the pencil marking.
16. Place the valve plate (Z) on the intermediate plate (X).
17. Place the head plate (W) on the intermediate plate (X) according to the pencil marking.
18. Uniformly tighten the hexagon socket head cap screws (Y) crosswise.
19. Check the pump for smooth running by turning the flywheel (I).
20. For two-headed pumps:
Perform work steps 3 to 14 on the second head.
21. Remount the housing cover (H).
22. Only for two-headed pumps: Remount the pneumatic connection.

23. Checking the pump head (pump heads) and pneumatic connections for leaks:

- i** To ensure the required gas tightness of the pump following servicing, a leak test is to be performed.



Risk of explosion from leaks

- Before recommissioning the pump, check the pump heads and pneumatic connections for leaks. Leaks may lead to a risk of explosion.



Risk of injury and poisoning from leaks

- Before recommissioning the pump, check the pump heads and pneumatic connections for leaks. Leaks may lead to poisoning, chemical burns or similar injuries.

-
- i** Before recommissioning, observe the applicable standards, guidelines, regulations and technical standards at the electrical connection.

- A** Housing
- B** O-ring (only AT/ST versions)
- E** Retainer plate
- F** Diaphragm
- G** Fastening screw
- H** Housing cover
- I** Flywheel
- K** Connecting rod
- W** Head plate
- X** Intermediate plate
- Y** Hexagon socket head cap screws
- Z** Valve plate (elastomer)

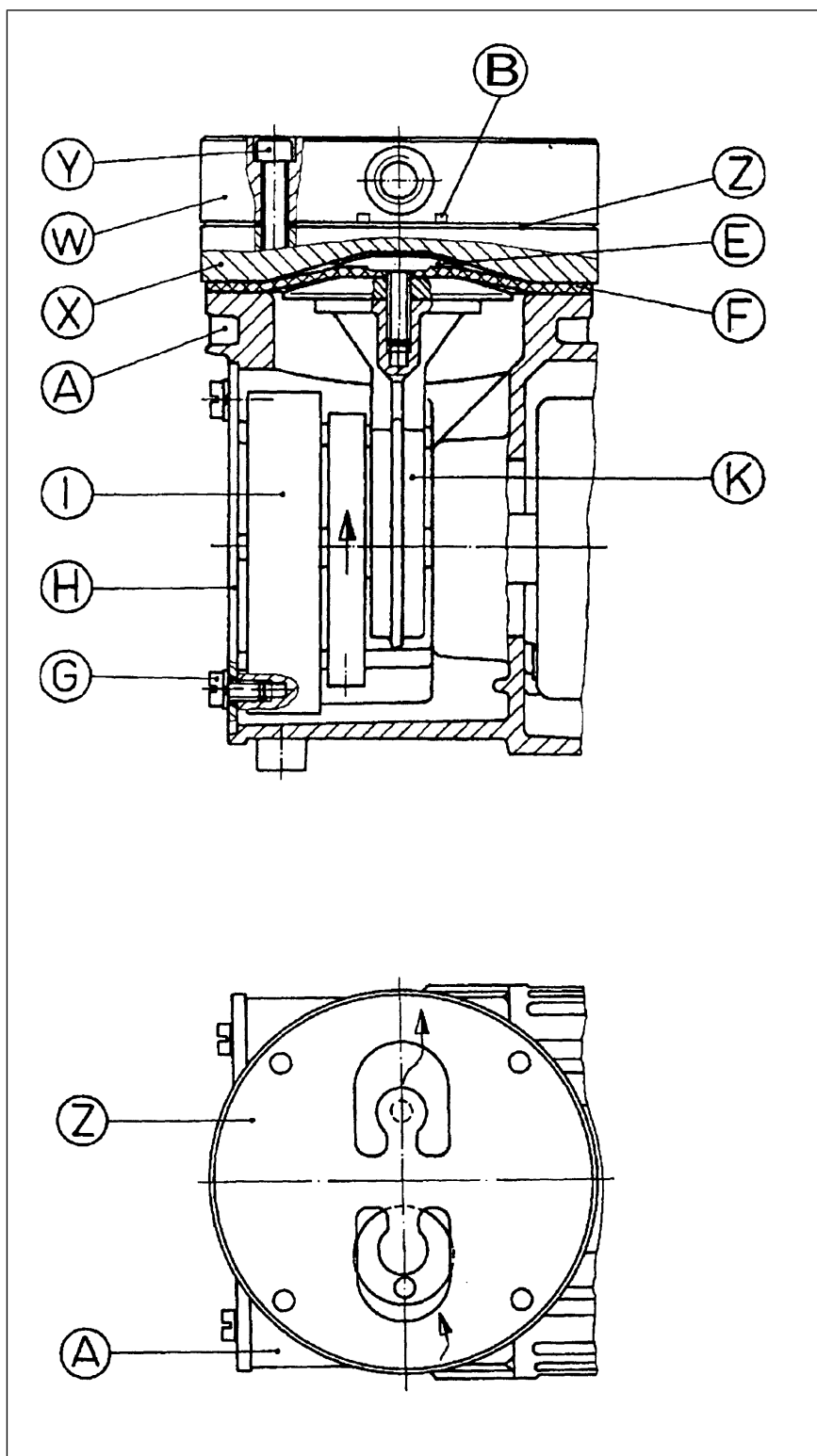


Fig. 6 Pump parts for pump models with smooth heads and valve plate (elastomer, symbolic)

10 Troubleshooting



Danger to life from electric shock

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

- Allow the pump to cool before troubleshooting.
- Check the pump (see following tables).
- Also observe the operating instructions for the motor when troubleshooting.

Pump does not transfer	
Cause	Fault remedy
Pump is not connected to the electrical mains.	→ Connect the pump to the electrical mains.
No voltage in the electrical mains.	→ Check the room fuse and switch on if necessary.
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). → Install the pump at the highest location in the system.
Diaphragm or reed valves/valve plate are worn.	→ Change the diaphragm and the reed valves/valve plate (see Chapter 9 <i>Servicing</i>).

Tab. 39

Flow rate, pressure or vacuum too low	
The pump does not achieve the flow rate specified in the technical specifications or in the data sheet.	
Cause	Fault remedy
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). → Install the pump at the highest location in the system.
There is overpressure on the pressure side and at the same time vacuum or pressure above atmospheric pressure on the suction side.	→ Change the pneumatic conditions.
Pneumatic lines or connection parts have insufficient cross section or are throttled.	→ Disconnect the pump from the system to determine the output values. → Eliminate throttling (e.g., valve) if necessary. → Use lines or connection parts with larger cross section if necessary.
Leaks occur at connections, lines or pump head.	→ Eliminate the leaks.
Connections or lines are completely or partially plugged.	→ Check the connections and lines. → Remove parts and particles that are causing the plugging.
Head parts are soiled.	→ Clean the head components.
Working diaphragm broken	→ Stop pump immediately.
Diaphragm or reed valves/valve plate are worn.	→ Change the diaphragm and the reed valves/valve plate (see Chapter 9 <i>Servicing</i>).
Pump exhibiting changed running noises and vibrations.	→ Stop pump immediately. → Contact KNF Customer Service.

Tab. 41

Pump exhibiting changed running noises and vibrations.	
Cause	Fault remedy
Pump bearing worn or defective.	→ Determine the cause. → Contact KNF Customer Service.
Motor worn or defective.	→ See operating instructions for motor.
Coupling worn or defective.	→ See operating instructions for coupling.

Tab. 43

Fault cannot be rectified

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

1. Flush the pump with air at atmospheric pressure for a few minutes (if necessary for safety reasons: with inert gas) to free the pump head of dangerous or aggressive gases (see Chapter 9.2.1 *Flushing the pump*).
2. Clean the pump (see Chapter 9.2.2 *Cleaning the pump*).
3. Send the pump together with completed Health and Safety Clearance and Decontamination Form to KNF, stating the nature of the transferred medium.

11 Spare parts and accessories

11.1 Spare parts

The spare parts necessary for a pump depend on the head version and the type of valves (valve plate or reed valves). In case of doubt, please contact KNF Customer Service (have serial number of the pump ready).

Pump models

Pumps with heads in AT and ST versions with reed valves

Spare part	Position*	Order number
Diaphragm	F	055758
O-ring	B	063789
Reed valve	M	001288

Tab. 45 *see Chapter 9.3.1 Pump models with reed valves

Pumps with heads in AP and SP versions with reed valves

Spare part	Position*	Order number
Diaphragm	F	003913
O-ring	B	118963
Reed valve	M	001288

Tab. 47 *see Chapter 9.3.1 Pump models with reed valves

Pumps with heads in AT and ST versions with valve plate

Spare part	Position*	Order number
Diaphragm	F	055758
O-ring	B	012143
Valve plate	Z	012440

Tab. 49 *see Chapter 9.3.2 Pump models with valve plate

Pumps with heads in AP and SP versions with valve plate

Spare part	Position*	Order number
Diaphragm	F	003913
Valve plate	Z	007759

Tab. 51 *see Chapter 9.3.2 Pump models with valve plate

11.2 Accessories

Description	Order number
Wrench for retainer plate	018812

Tab. 53

12 Returns

Prerequisite for repairing a pump by KNF is a completed Decontamination Form.

This is made available on the KNF website as a download.

- To find the form, select your country on the overview page (www.knf.com).

You can find the Decontamination Form in the download area.

If you have questions, please contact your sales partner (contact data: see www.knf.com).

13 Appendix

13.1 Declaration of Conformity

For further information, see also

- Konformitätserklärung N026 EX.pdf

EG / EU – Konformitätserklärung / EC / EU declaration of conformity

Hiermit erklärt der Hersteller:

Herewith the manufacturer:

KNF Neuberger GmbH, Alter Weg 3, D-79112 Freiburg

dass folgende Membranpumpen,

declares that the following diaphragm pumps:

(Seriennummer siehe Typenschild / Serial number see type label)

N026AT.9E EX

N026ST.9E EX

N026.1.2AT.9E EX

N026.1.2ST.9E EX

allen einschlägigen Bestimmungen folgender Richtlinien entspricht:

is in conformity with the following Directives:

Richtlinie 2006/42/EG Maschinen

Directive 2006/42/EC machinery

Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten

Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Richtlinie 2014/30/EU über elektromagnetische Verträglichkeit

Directive 2014/30/EU about the electromagnetic compatibility

Folgende harmonisierte Normen wurden angewandt:

The following harmonized standards have been used:

DIN EN 1012-2: 2011-12

DIN EN 50581: 2013-02

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:

Authorised person to compile the relevant technical documentation:

R. Köpfer, Product Qualification, KNF Neuberger GmbH, Alter Weg 3, D-79112 Freiburg

Die Membranpumpen, fallen ebenso in den Anwendungsbereich der folgenden Richtlinie:

The diaphragm pumps falling in the scope of the following Directive as well:

Richtlinie 2014/34/EU für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

Directive 2014/34/EC relating to equipment and protective systems intended for use in potentially explosive atmospheres.

Die zugehörigen Konformitätserklärungen für den:

The corresponding conformity declaration for:

nichtelektrischen Pumpenteil: siehe Seite 2/4 dieser Erklärung

non-electrical part of the pump: see page 2/4 of this declaration

elektrischer Teil - Motor: siehe Seite 3/3 beiliegendes Dokument des Motorenherstellers

electrical part – motor: see page 3/3 enclosed document of motor supplier

EU – Konformitätserklärung / EU declaration of conformity

Hiermit erklärt der Hersteller:

Herewith the manufacturer:

KNF Neuberger GmbH, Alter Weg 3, D-79112 Freiburg

dass folgende Membranpumpen – nichtelektrischer Pumpenteil,
declares that the following diaphragm pumps – non-electrical part:
(Seriennummer siehe Typenschild / Serial number see type label)

N026AT.9E EX
N026ST.9E EX
N026.1.2AT.9E EX
N026.1.2ST.9E EX

Kennzeichnung:

Marking:



II 2/2G Ex h IIB+H2 T4 Gb

allen einschlägigen Bestimmungen folgenden Richtlinie entspricht:

is in conformity with the following Directive:

Richtlinie 2014/34/EU für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

Directive 2014/34/EC relating to equipment and protective systems intended for use in potentially explosive atmospheres.

Entsprechend Artikel 13 (1) b) ii) der RL2014/34/EU ist die technische Dokumentation bei der notifizierten Stelle Physikalisch-Technische Bundesanstalt PTB, Nr. 0102 hinterlegt

According to article 13 (1) b) ii) of the directive 2014/34/EU, the technical documentation is deposited at the Physikalisch-Technische Bundesanstalt PTB, notified body no. 0102.

Folgende harmonisierte Normen wurden angewandt:

The following harmonized standards have been used:

DIN EN ISO 80079-36: 2016-12

DIN EN ISO 80079-37: 2016-12

DIN EN 1127-1: 2011-10



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EG/EU – Konformitätserklärung / EC declaration of conformity
 Richtlinien 2014/34/EU und 2011/65/EU / Directive 2014/34/EU and 2011/65/EC

Hiermit erklärt der Hersteller: / Herewith the manufacturer:

KNF Neuberger GmbH, Altar Weg 3, D-79112 Freiburg

des Elektromotors (Seriennummer siehe Typenschild): / of the electric motor (serial number see type label):


M56EX (Motor / motor)

Dass der Motor den grundlegenden Anforderungen folgender Richtlinien entspricht / declares that the motor corresponds to the basic requirements of the following directives:

EU-Richtlinie 2014/34/EU für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen / EC directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres.

EU-Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmte gefährliche Stoffe in Elektro- und Elektronikgeräten/ EC directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Der Motor erfüllt die Anforderungen der Zündschutzart erhöhte Sicherheit "e" und ist wie folgt gekennzeichnet: / The partly completed machinery fulfils the requirements of the type of protection by increased safety "e" and is marked as follows:

 II 2G Ex eb IIC T4 Gb (Drehstrommotor / Three phase motor)

Bei Anbau eines Kondensators in der Zündschutzart Sandkapselung "q" mit eigener Zulassung und Kennzeichnung ist der Motor wie folgt gekennzeichnet. / With a capacitor with protection class powder filling „q“ with own permission and marking the motor is marked as follows.

 II 2G Ex eb IIC T3 Gb (Kondensatormotor / Capacitor motor)

Entsprechend Artikel 13 (1) b) i) der RL2014/34/EU wurde der Motor geprüft von der TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München, notifizierte Stelle Nr. 0123 mit der EG-Baumusterprüfbescheinigungsnummer / According to article 13 (1) b) i) of the directive 2014/34/EU, the motor was tested by the TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München, notified body no. 0123 with the EC type examination certificate number:

TPS 12 ATEX 1 612 X

Für die Überwachung des QS-Systems ist verantwortlich die TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München. Benannte Stelle Nr. 0123 / For the supervision of the QS-System the TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München is responsible. Notified body no. 0123

Folgende harmonisierte Normen bzw. technische Spezifikationen wurden angewandt: / The following harmonized standards have been used:

EN 60079-0: 2012 + A11:2013	EN 55014-1: 2006 + A1:2009 + A2:2011	EN 61000-3-3: 2013
EN 60079-7: 2015	EN 55014-2: 2015	EN 50581: 2012
EN 60034-1: 2010 + Cor.:2010	EN 61000-3-2: 2014	

Da diese Motoren Einbaugeräte sind, müssen die Netzanschlüsse und Einrichtungen zum Trennen und Ausschalten des Motors sowie Überstrom- und Überlastschutzeinrichtungen beim entsprechenden Einbau berücksichtigt werden. / As these motors are OEM-models the power supplies and the equipments for disconnecting and switching-off the motor respectively have to be considered when mounting as well as over-current and overload protective gear.

Darüber hinaus muss beim Einbau ein Berührungsschutz gegen bewegte und heiße Teile, soweit vorhanden, vorgesehen werden. / In addition a protection against mechanical parts in motion and hot parts, if existing, has to be provided when mounting.

Freiburg, 31.01.2019

Ort, Datum (TT.MM.JJJJ)
place, date (dd.mm.yyyy)

CO R&D


ppa. S. Schreiber

1/1

13.2 Motor

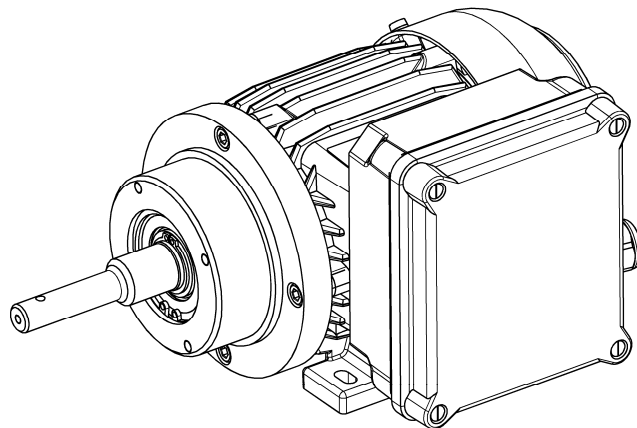
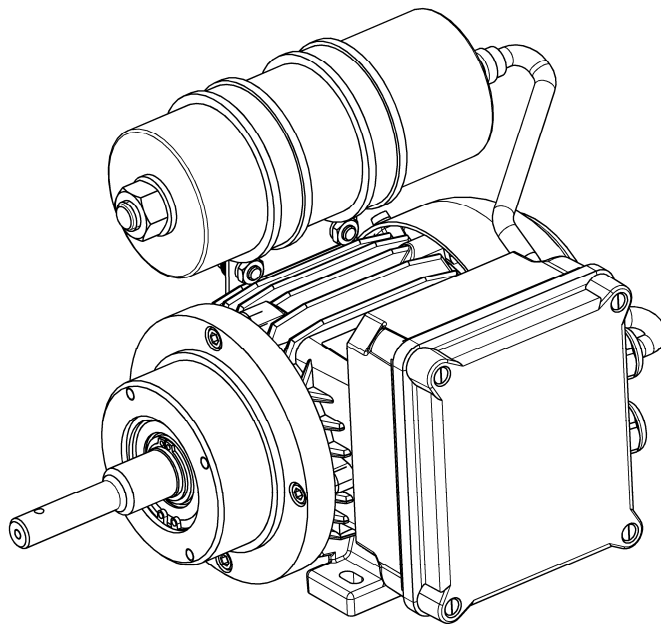
For further information, see also

- BA M56Ex 007.pdf
- Konformitätserklärung Motor M56 EX
- Kondensator_Süko.pdf

OEM

M 56 EX
TRANSLATION OF ORIGINAL OPERATING AND
INSTALLATION INSTRUCTIONS ENGLISH

KNF-MOTOR





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www.knf.com

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1. About this document

1.1. Using the operating and installation instructions

- ➔ If anything is unclear, please contact the manufacturer (see first page for the address) and reference the model and motor number.

The operating and installation instructions are part of the motor.

- ➔ Pass on the operating and installation instructions to the next owner.

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
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.

i This symbol refers to important information.

2. Use

2.1. Proper use

The motor is intended as a drive for diaphragm pumps manufactured by KNF Neuberger.

Owner's responsibility

Operating parameters and conditions

Only install and operate the motor under the operating parameters and conditions described in Chapter 0, Technical data, and Section 2.3, Use in hazardous areas.

Make sure that even when extreme operating conditions occur and in the case of system malfunctions, there is no risk of explosion.

Conformity of the end product

The motor is intended for installation in another machine. Operating is prohibited until the conformity of the end product with the guideline 2006/42/EC has been established.

2.2. Improper use


The motor may not be used in potentially explosive atmospheres that are not covered by the motor's explosion protection marking.

2.3. Use in hazardous areas

In hazardous areas (zones), only operate motors of the corresponding equipment category and temperature class.

If the explosion protection of the device into which the motor is installed differs from that of the motor, the device combination may only be used in accordance with the weaker explosion protection.

The motor has the following explosion protection marking:

Marking	Description
	Symbol for explosion-proof motors
II	Equipment group (see Section 2.4.1)
2 G	Equipment category (see Section 2.4.2)
Ex	manufactured according to EN60079-0 ff.
eb	Type of protection/Protection level (see Section 2.4.5)
IIC	Explosion group (see Section 2.4.4)
T3	Temperature class (see Section 2.4.3) of capacitor motor
T4	Temperature class (see Section 2.4.3) of 3-phase motor
Gb	Equipment protection level (see Section 2.4.6)

Tab. 2

The explosion protection marking is also applied at the following location:

- Motor type plate

2.4. Explanations on explosion-protection marking

2.4.1. Equipment groups

Equipment group I	Equipment group I applies to products for use in underground plants of mines and their above-ground systems which can be endangered by methane and/or flammable dusts.
Equipment group II	Equipment group II applies to products for use in the remaining areas which can be endangered by an explosive atmosphere.

2.4.2. Equipment categories for gas

The equipment category describes the frequency and duration of the occurrence of explosive atmospheres in an area.

Equipment category	Description*	Design safety
1	Equipment for areas in which it is to be expected that a dangerous explosive atmosphere will occur constantly, over longer periods or frequently.	Very high
2	Equipment for areas in which it is to be expected that a dangerous explosive atmosphere will occur occasionally.	High
3	Equipment for areas in which it is not to be expected that a dangerous explosive atmosphere will occur. However, if it does occur, then only seldom and only briefly.	Normal

Tab. 3

*in accordance with 2014/34/EU

2.4.3. Temperature classes

Maximum surface temperature	The maximum surface temperature is the highest temperature reached by a motor surface under the most unfavorable conditions.
Ignition temperature	The maximum motor surface temperature must always be lower than the lowest ignition temperature of the gas or vapor-air mixture in which it is used.
Temperature class	The maximum surface temperature results from the motor design and is specified as the temperature class.

Temperature class	Max. surface temperature [°C]	Ignition temperature [°C]
T1	450	> 450
T2	300	> 300
T3	200	> 200
T4	135	> 135
T5	100	> 100
T6	85	> 85

Tab. 4

2.4.4. Explosion groups

Flammable gases and vapors are classified according to explosion groups (I, IIA, IIB and IIC) and temperature classes. Tab. 5 (capacitor motor) and Tab. 6 (3-phase motor) show the classification of the most common flammable gases and vapors.

Classification of the most common flammable gases and vapors for capacitor motor						
	T1	T2	T3	T4	T5	T6
I	Methane	–	–	–	–	–
IIA	Acetone Ethane Ethyl acetate Ammonia Ethyl chloride Benzole Acetic acid Carbon monoxide Methane Methanol Methyl chloride Naphthalene Phenol Propane Toluene	i-Amyl acetate n-Butane n-Butyl alcohol Cyclohexanon 1.2-Dichloroethane Acetic acid-anhydride	Gasoline Diesel fuel Jet fuel Heating oil n-Hexane	Acetaldehyde	–	–
IIB	City gas	Ethylene Ethyl alcohol	Hydrogen sulfide	Ethyl ether	–	–
IIC	Hydrogen	Acetylene	–	–	–	Carbon disulfide

Tab. 5

Classification of the most common flammable gases and vapors for 3-phase motor						
	T1	T2	T3	T4	T5	T6
I	Methane	–	–	–	–	–
IIA	Acetone Ethane Ethyl acetate Ammonia Ethyl chloride Benzole Acetic acid Carbon monoxide Methane Methanol Methyl chloride Naphthalene Phenol Propane Toluene	i-Amyl acetate n-Butane n-Butyl alcohol Cyclohexanon 1.2-Dichloroethane Acetic acid-anhydride	Gasoline Diesel fuel Jet fuel Heating oil n-Hexane	Acetaldehyde	–	–
IIB	City gas	Ethylene Ethyl alcohol	Hydrogen sulfide	Ethyl ether	–	–
IIC	Hydrogen	Acetylene	–	–	–	Carbon disulfide

Tab. 6

Motor environment

The motor may only be operated in an environment which contains an atmosphere which is not explosive or belongs to the explosion groups II A, II B or II C and the temperature class T3 or below (capacitor motor; marked range in Tab. 5) or T4 or below (3-phase motor; marked range in Tab. 6).

2.4.5. Types of protection

Marking	Description
d	Flameproof enclosure
e	Increased safety
i	Intrinsic safety
p	Pressurization
m	Encapsulation
o	Oil immersion
q	Sand filling

*Tab. 7***2.4.6. Equipment protection level**

Marking	Description
Ga	Device with a “very high” protection level
Gb	Device with a “high” protection level
Gc	Device with “extended” protection level

Tab. 8

3. Safety

i Note the safety precautions in sections 6. *Installation and connection*, and 7. *Operation*.

The motor is 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 motor or other property.

Only use the motor 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 Make sure that only trained and instructed personnel or specially trained personnel work on the motor. 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.

Work on motor Work on motor which could affect the explosion prevention and protection must be performed only by the motor manufacturer. Such work includes, for example

- Repairs to the stator or rotor winding and on the terminals,
- Repairs to the ventilation system,
- Disassembly of motors and parts

Working in a safety-conscious manner Observe the accident prevention and safety regulations when performing any work on the motor and during operation.

Classifying motor environment When classifying a motor environment in a hazardous area (zone), observe the "Guidelines for the Avoidance of Dangers due to Explosive Atmospheres with Collection of Examples – Explosion Protection Guidelines – (EX-RL)".


In as much as special cases are concerned or there is doubt as to the specification of the hazardous areas, inform the supervisory authorities and have them decide.

Use in hazardous environment For use in hazardous environments containing combustible gases, vapours and aerosols the lowest ignition temperature of a possible hazardous atmosphere must be higher than the so-called "maximum surface temperature" of the motor.

The maximum surface temperature is defined in EN 60079-0 as the highest temperature obtainable in operation under the least favourable conditions (but within recognized tolerances) by any part or surface of the motor.

The maximum surface temperature is determined by the construction of the motor and indicated on the type-plate as the temperature class.


Thermal motor protection switch The motor may be used with a typical thermal motor protection switch (see Chapter 6. *Installation and connection*) only in continuous operation with unloaded and infrequent starts, in which no significant startup heating occurs.

Customer service and repairs	<p>Only have repairs to the motor carried out by the KNF Customer Service responsible.</p> <p>Use only genuine parts from KNF for servicing work; this applies especially to seals. Exception: standard, commercially available and equivalent parts.</p>
Environmental protection	<p>Store all replacement parts in a protected manner and dispose of them properly in accordance with the applicable environmental protection regulations. Observe the respective international regulations.</p>
EC Directives / Standards	<p>See EC-declaration of conformity</p>
	
Customer service and repairs	<p>Only have repairs to the pumps carried out by the KNF Customer Service responsible.</p> <p>Use only genuine parts from KNF for servicing work.</p>

4. Technical data

Electrical data: see motor type plate.

The motor has the following explosion protection marking:

Marking	Description
	Symbol for explosion-proof motors
II	Equipment group
2 G	Equipment category
Ex	manufactured according to EN60079-0 ff.
eb	Type of protection/Protection level
IIC	Explosion group
T3	Temperature class of capacitor motor
T4	Temperature class of 3-phase motor
Gb	Equipment protection level

Tab. 9

i For explanation of explosion protection marking see section 2.4.

The motor has a „e” type of protection („increased safety”).

Permissible ambient temperature: - 20 °C to + 40 °C

Permissible altitude above sea level for operation: 1000 m

The motor may be used only for the type of operation indicated on the output plate. If no type of operation is indicated on the output plate, S1 applies (continuous operation).

5. Design

- 1 Motor shaft
- 2 Terminal box cover
- 3 Cable gland (M 16 x 1.5)
- 4 Cable gland (M 16 x 1.5)
- 5 Capacitor
- 6 Capacitor mounting clamp (collar band)
- 7 Base plate
- 8 Type plate
- 9 Fan cover

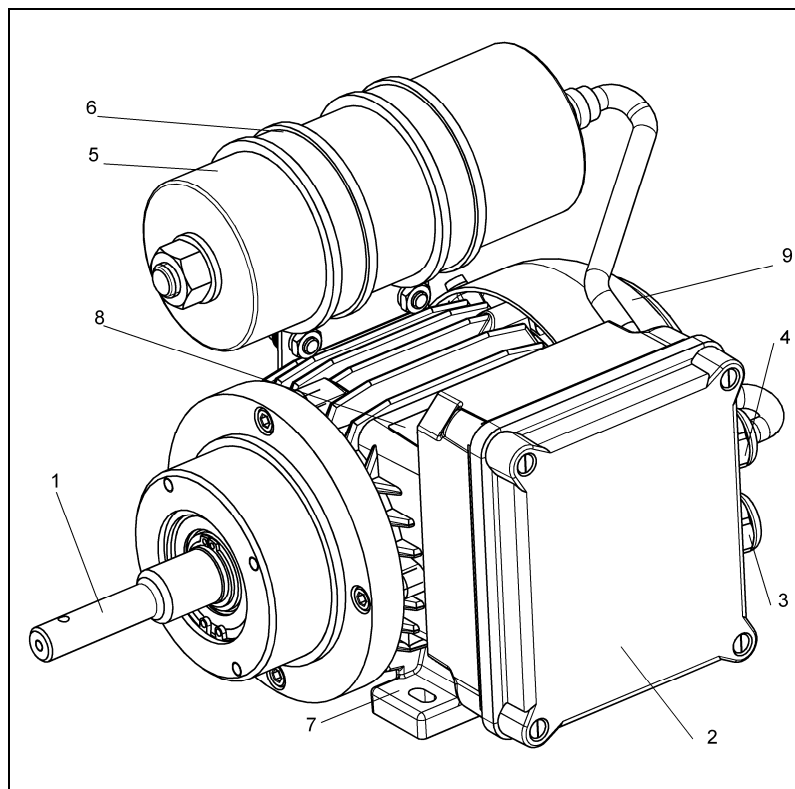


Fig. 1: KNF capacitor motor M 56 Ex

- 1 Motor shaft
- 2 Terminal box cover
- 3 Cable gland (M 16 x 1.5)
- 4 Closing plug (M 16 x 1.5)
- 5 Base plate
- 6 Type plate
- 7 Fan cover

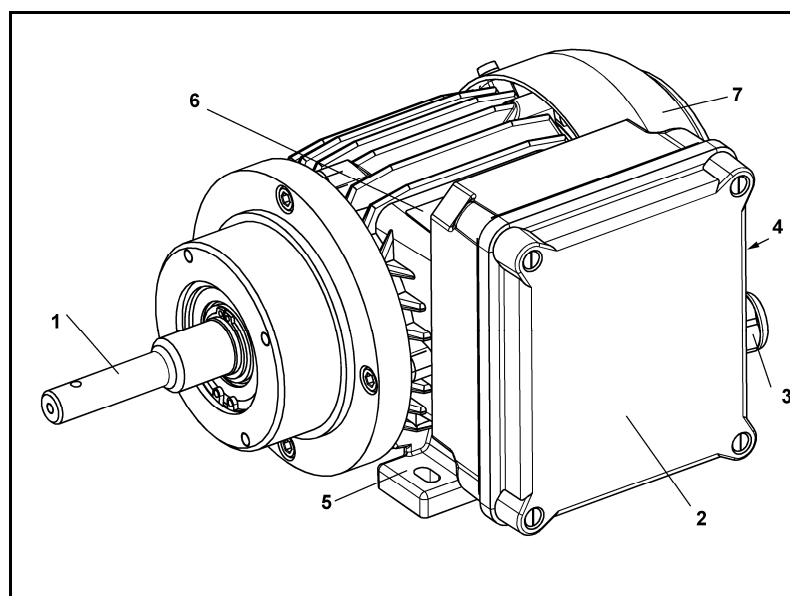


Fig. 2: KNF 3-phase motor M 56 Ex

6. Installation and connection

- Only install and operate the motor under the operating parameters and conditions described in Chapter 4, Technical data, and Section 2.3, Use in hazardous areas.
- Observe the safety precautions (see Chapter 3).

6.1. Installation

- Before installation, store the motor at the installation location for 3 hours to bring it up to room temperature.

Cooling air supply



Danger of explosion from insufficient cooling

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

WARNING → Ensure sufficient ventilation and heat dissipation around the motor.

Installation location

- Make sure that the installation location is dry and the motor is protected against rain, splash, hose and drip water.
- Protect the motor from dust.
- Protect the motor from vibrations and jolts.

6.2. Electrical connection



Extreme danger from electrical shock!

- Only have the motor connected by an authorized specialist.

DANGER → Only have the motor connected when the power supply is disconnected.

General hints

- The customary national and international regulations on the set-up of electrical systems in potentially explosive atmospheres must be observed.
- The motor may only be connected to the electrical supply, if it is certain that it can be safely operated in the potentially explosive atmosphere that is present.
- The general safety and commissioning notes apply to the electrical wiring.
- Connection of the motor to the electrical supply must be carried out by a person qualified to do so, who is authorized to connect electrical equipment in hazardous environments.
- Area A per EN 60034-1 (voltage $\pm 5\%$, frequency $\pm 2\%$) must be maintained so that the temperature is kept within the permissible limits. Exceptions are permitted only if they are indicated on the motor output plate.
- Only electrical equipment that is absolutely necessary for operating the motor should be located in the hazardous area.
- The installation, or additional measures, must protect the motor against water as well as against electrical, chemical, thermal,

or mechanical effects, so that in operation the protection against explosion remains effective.

- When selecting cables and wiring, the general requirements for use in potentially explosive atmosphere must be met (see EN 60079-14). In particular, cables and wiring must be chosen to withstand the expected mechanical, chemical, and thermal conditions.
- When routing cables and wiring, and making connections, the necessary conditions and safety measures must be observed (see EN 60079-14).
- The cable fittings must be tested for potentially explosive atmosphere and approved with an EC-Type Examination Certificate.
- The motor must be installed so that there is no danger of ignition from an electrostatic charging.
- If there is danger from an atmospheric discharge, protection against lightning must be arranged.
- When they are triggered, protection and monitoring devices must disconnect the equipment from all external conductors, and not reconnect automatically.

Requirements for installation and electrical connection of the motors

In addition to the requirements listed above and the instructions for installation (see below) the following points must be observed for installation and electrical connection of the motors:

- The customer must arrange to protect the motor against excessive heating as a result of overload (in compliance with EN 60079-14) by means of a current-dependent delayed protection switch with current-dependent allpole triggering (as per EN 60947). The protection device must be set for the highest rated motor current (see type plate).
- Protective equipment must be included which protects the motor even if an outer conductor fails.
- Current-protected motors may only be used continuously, with unloaded and infrequent starts, which do not produce significant heating.
- Additional overload protection by a direct monitoring device with temperature sensors (PTCs) may be used, if this is certified and specified on the type plate. Connect the temperature sensors by means of foreseen additional terminals in the main terminal box or via an additional terminal box. **If a continuity test of the temperature sensors is required, do not apply voltages greater than 2.5 V!**
- The overload protection by means of a current-dependent delayed triggering must be chosen so that the time delay for triggering the motor protector is less than the safe locked-rotor time t_E . The time delay may be read from the characteristic curve of the protection switch for the I_A/I_N ratio of the protected motor. The ratio I_A/I_N may be read from the motor type-plate.

Connecting motor

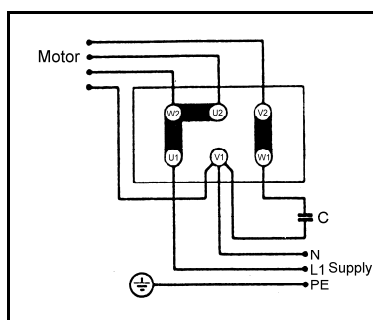


Fig. 3: Circuit diagram single-phase capacitor motor

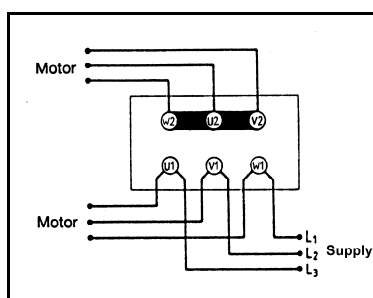


Fig. 4: Circuit diagram 3-phase motor (Y connection)

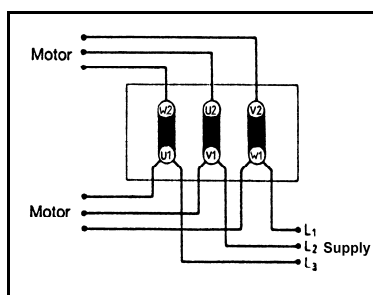


Fig. 5: Circuit diagram 3-phase motor (Δ connection)

Select the excessive current protection equipment such that the motor is protected even when the rotor is blocked.

- ➔ The motors may not be used at variable speed with a frequency converter unless motor, converter, and monitoring device have been tested and approved together, are marked as such, and the permissible operating conditions are listed in the joined EC Type Examination Certificate.

1. Compare the supply data with the data on the motor-plate. For operating current see type plate.

i The voltage must not vary more than + 5 % and - 5 % from that shown on the type-plate.

2. Open terminal box cover (see Fig. 1/2, page 11 and Fig. 2/2, page 11).

3. Connect the mains cables to the connections.

i The terminal-block connections are to be made as shown in fig. 3 (single-phase capacitor motor) and figs. 4 and 5 (3-phase motor).

For connection to the mains supply, the terminal box contains a terminal board and a screwed cable gland with a M 16 x 1.5 thread (Fig. 1/3, page 11, and Fig. 2/3, page 11). The clamping range of this screwed cable gland is between 5 and 10 mm.

The maximum conductor cross-section that can be connected to the connector is 2.5 mm².

At least 7 mm of the insulation must be stripped off each individual cable strand.

Connect the leads to the anti-twist slotted terminals (max. 2.5 mm²) as shown in fig. 6, or with prefabricated cable lugs (max. 2.5 mm²). If you use cable lugs, within the potentially explosive atmosphere only crimping may be used to connect the lead. Soldering is permitted only if the connection is made away from the potentially explosive atmosphere.

Observe creep and air gaps as per EN 60079-0/60079-7.

Tighten the screws of the connectors with a torque of 3 Nm. They must not be able to work loose by themselves.

Take care to make the proper connections in the terminal box.

4. Connect the earth (ground) wire to the motor.

i For connecting the protective ground lead, a screw (4 mm²) with an anti-twist terminal clip is located in the terminal box (fig. 7). The VDE grounding symbol indicates this screw.

Before connecting, the protective ground lead must be stripped off about 20 mm.

An additional grounding screw of the same kind is located at the bottom of the housing.

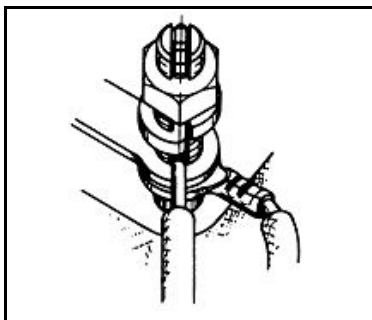


Fig. 6: Connection to the slotted terminals

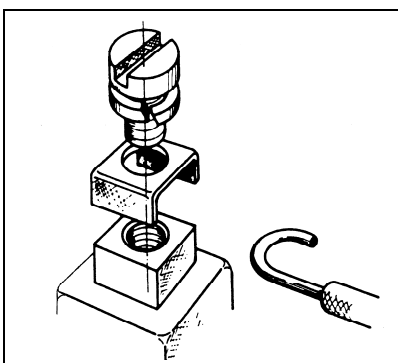


Fig. 7: Protective ground lead connection

5. Close the terminal box cover.



→ Keep the inside of the terminal box clean.

→ The seals must be unblemished and correctly seated.

6. Tighten the clamping screw (compression screw) on the cable gland with a torque of 2.5 Nm.

7. Close open bores in the terminal box with certified plugs.

7. Operation

- ➔ Only operate the motor under the operating parameters and conditions described in Chapter 0, Technical data, and in Section 2.3, Use in hazardous areas.
- ➔ Make sure the motor is used properly (see section 2.1).
- ➔ Make sure the motor is not used improperly (see section 2.2).
- ➔ Observe the safety precautions (see Chapter 3).

**WARNING**

Danger of explosion due to increased ambient temperature!

- ➔ Monitor ambient temperature (compression heat, motor heat).
- ➔ Ensure sufficient supply of cooling air.

**WARNING**

Danger of serious damage to persons or property

Changes from normal operation (higher power consumption, temperatures or vibration, unusual noises or odors, triggered monitoring devices) are an indication that function has been affected.

- ➔ In case of any deviations from normal operation, switch off the motor, then determine and remedy the cause.
-

8. Servicing

Servicing schedule



WARNING

Danger of explosion due to wear!

- Have motor bearings replaced by KNF Neuberger according to servicing schedule (see table 10).

Component	Servicing interval
Motor bearings	- Have them replaced after 17,000 operating hours or 24 months at the latest
Lead-through, connection or lead-in parts	- Inspect regularly - In case of damage, the damaged parts must be replaced by original spare parts in perfect order.

Tab. 10

- Maintenance on the motor must be performed under observance of the relevant national regulations "Ordinance Concerning Electrical Equipment in Potentially Explosive Areas" as well as the safety advisories and descriptions in these instructions.
- Components such as terminals, cable glands and plugs may be replaced only by equivalent parts having the EC-Type Examination Certificate.

9. Troubleshooting



Extreme danger from electrical shock!

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

DANGER → Make sure the motor is de-energized and secure.

1. Check the motor (see Tab. 11).
2. Also see the pump operating and installation instructions for troubleshooting.

Fault				Possible Cause	Remedy
Motor does not ramp up	Motor is too warm	Significant drop-off in speed	Protection device trips		
				Load moment too high	Check motor and load moment
				Mains voltage too low	Check mains
				Phase interruption	Check connection network
				Faulty connection	Note wiring diagram and motor type-plate
				Overload	Compare motor type-plate specifications
				Switches too often	Verify rated operation mode
				Insufficient ventilation	Inspect ventilation paths, check turn direction
				Ventilation paths dirty	Clean
				Winding or terminal short circuited	Measure isolation resistance
				Start time has been exceeded	Check start-up conditions

Tab. 8

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).

If the motor is attached to a pump, observe the operating and installation instructions for the pump.

Send the motor, together with completed Health and Safety Clearance and Decontamination Form (Chapter 12), to KNF stating the nature of the transferred medium.

10. Spare parts



WARNING

Danger of explosion when using inappropriate parts

→ With the exception of standard, commercially available and equivalent parts (e.g. roller bearings), only original replacement parts may be used; this applies also to seals.

10.1. Spare parts

The replacement parts required for a given motor depend on the motor type (Capacitor motor or three phase motor). In case of doubt, please ask KNF's customer service (have the serial number of your motor handy).

10.1.1. Capacitor motors

Position-No.*	Ident-No.	Description
070	001849	Bearing
170	001850	Bearing
190	049001	Cable gland (M 16 x 1.5)
200	005498	Fan cover
220	008634	Cable lug
260	005493	Collar band
270	052602	Terminal box seal
290	052601	Cover seal
810	When ordering, please indicate voltage and frequency	Capacitor
820	When ordering, please indicate voltage and frequency	Collar band

Tab. 12

* According to figs. 8 and 9

10.1.2. Three-phase motors

Position-No.*	Ident-No.	Description
070	001849	Bearing
120	008634	Cable lug
180	001850	Bearing
200	005498	Fan cover
220	049001	Cable gland (M 16 x 1.5)
240	052602	Terminal box seal
260	052601	Cover seal
270	052605	Screw plug (M 16 x 1.5)

Tab. 13

* According to figs. 10 and 11

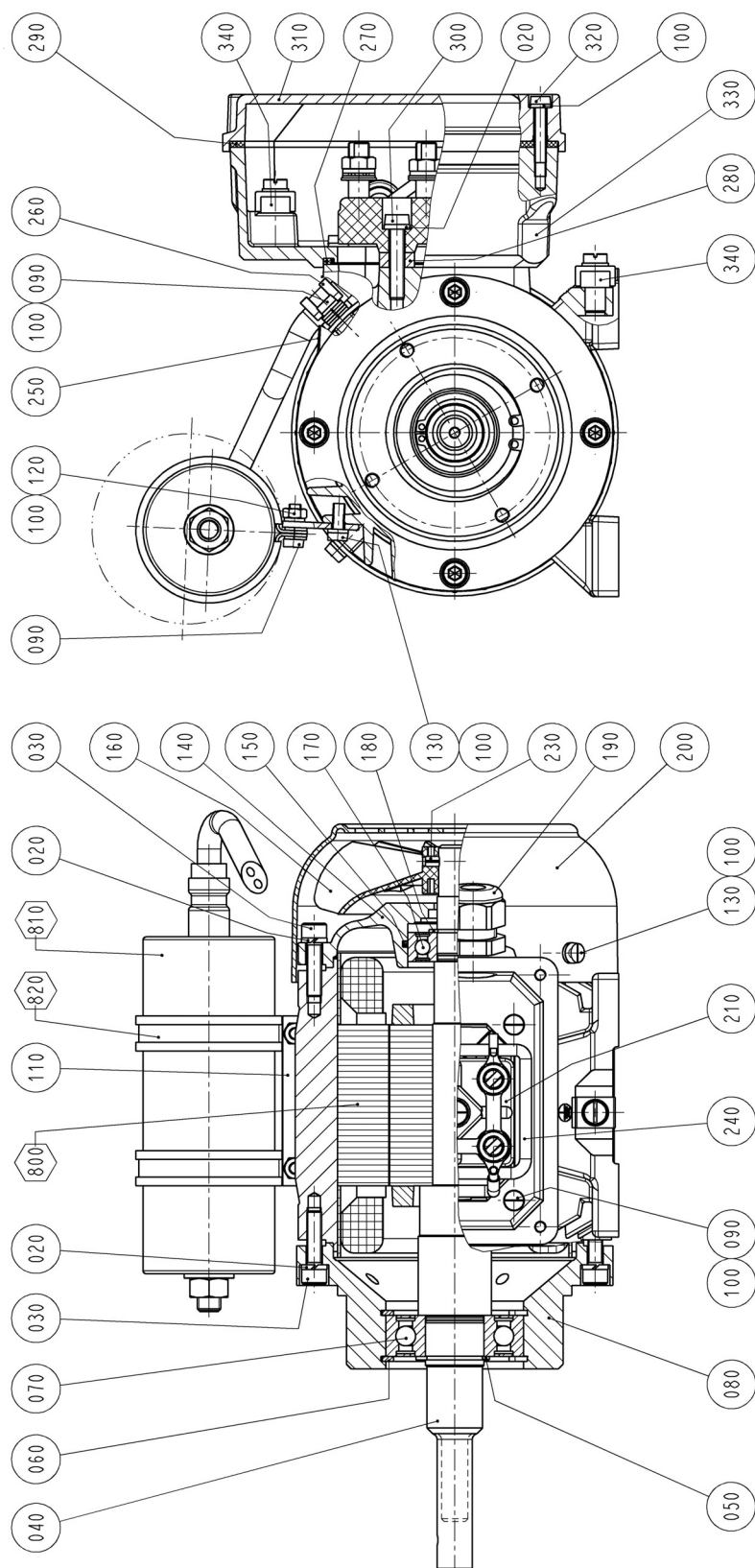
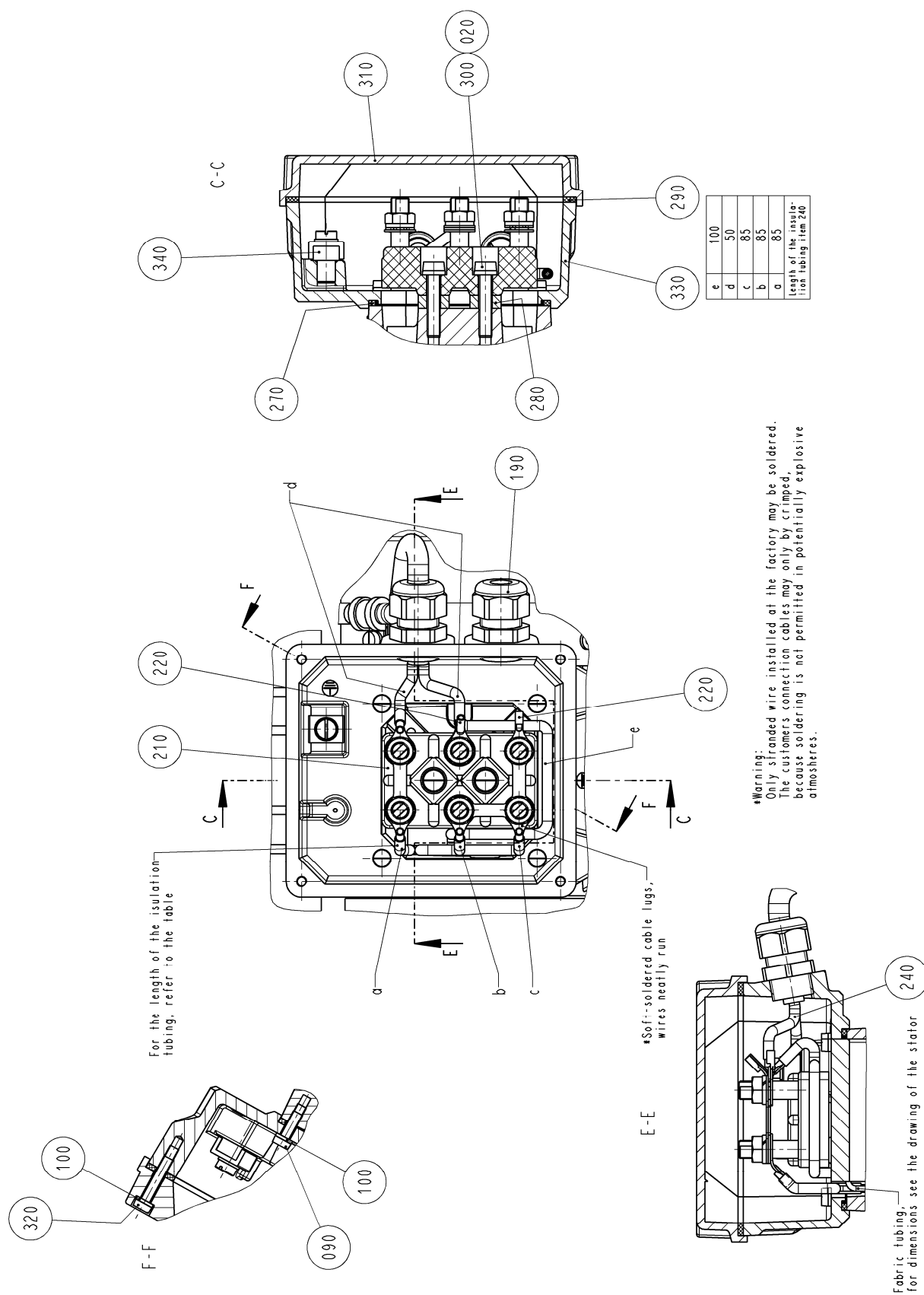


Fig. 8: Explosion-proof capacitor motor



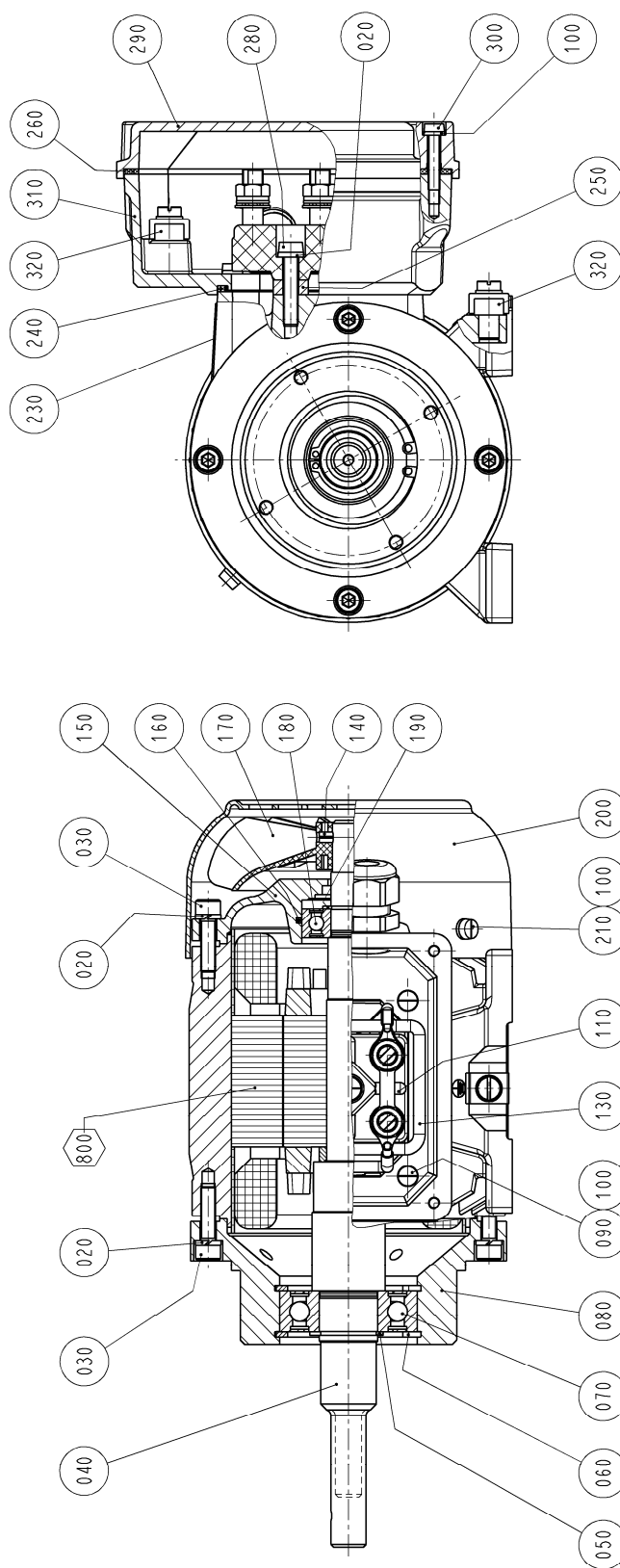
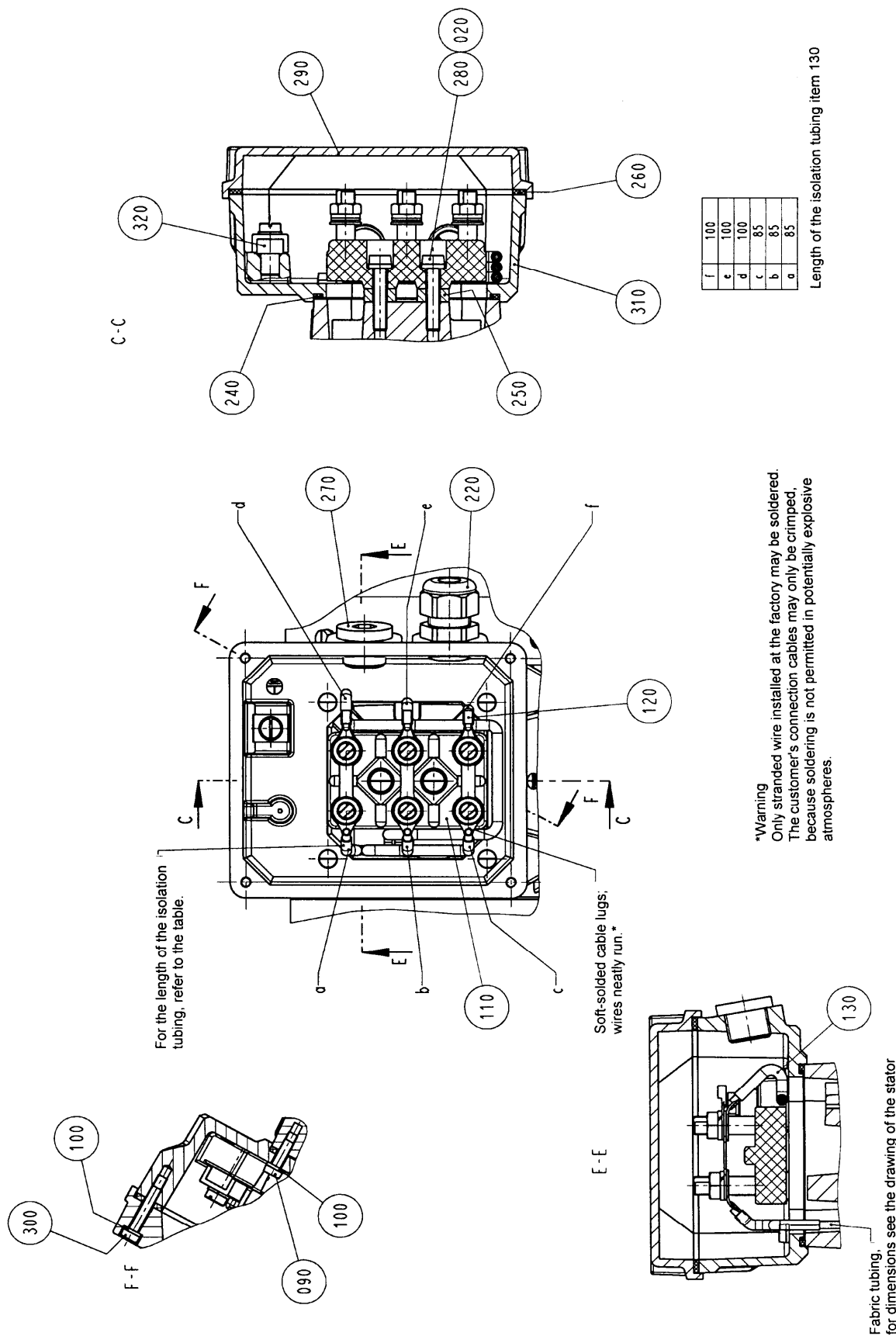


Fig. 10: Explosion-proof 3-phase motor



11. Returns

Motors 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 motors 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

To ensure worker safety, work may not be started on motors 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.

12. Health and safety clearance and decontamination form


 Form Rev. 02 / download: 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.

Pumped media:

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

Find your local KNF partner on www.knf.com

EG/EU – Konformitätserklärung / EC declaration of conformity
Richtlinien 2014/34/EU und 2011/65/EU / Directive 2014/34/EU and 2011/65/EC

Hiermit erklärt der Hersteller: / Herewith the manufacturer:

KNF Neuberger GmbH, Alter Weg 3, D-79112 Freiburg

des Elektromotors (Seriennummer siehe Typenschild): / of the electric motor (serial number see type label):


M56EX (Motor / motor)

Dass der Motor den grundlegenden Anforderungen folgender Richtlinien entspricht / declares that the motor corresponds to the basic requirements of the following directives:

EU-Richtlinie 2014/34/EU für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen / EC directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres.


EU-Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmte gefährliche Stoffe in Elektro- und Elektronikgeräten/ EC directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Der Motor erfüllt die Anforderungen der Zündschutzart erhöhte Sicherheit "e" und ist wie folgt gekennzeichnet: / The partly completed machinery fulfils the requirements of the type of protection by increased safety "e" and is marked as follows:

 II 2G Ex eb IIC T4 Gb

(Drehstrommotor / Three phase motor)

Bei Anbau eines Kondensators in der Zündschutzart Sandkapselung "q" mit eigener Zulassung und Kennzeichnung ist der Motor wie folgt gekennzeichnet. / With a capacitor with protection class powder filling „q“ with own permission and marking the motor is marked as follows.

 II 2G Ex eb IIC T3 Gb

(Kondensatormotor / Capacitor motor)

Entsprechend Artikel 13 (1) b) i) der RL2014/34/EU wurde der Motor geprüft von der TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München, notifizierte Stelle Nr. 0123 mit der EG-Baumusterprüfbescheinigungsnummer / According to article 13 (1) b) i) of the directive 2014/34/EU, the motor was tested by the TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München, notified body no. 0123 with the EC type examination certificate number:

TPS 12 ATEX 1 612 X

Für die Überwachung des QS-Systems ist verantwortlich die TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München. Benannte Stelle Nr. 0123 / For the supervision of the QS-System the TÜV-SÜD Product Service GmbH, Ridlerstr. 65, D-80339 München is responsible. Notified body no. 0123

Folgende harmonisierte Normen bzw. technische Spezifikationen wurden angewandt: / The following harmonized standards have been used:

EN 60079-0: 2012 + A11:2013	EN 55014-1: 2006 + A1:2009 + A2:2011	EN 61000-3-3: 2013
EN 60079-7: 2015	EN 55014-2: 2015	EN 50581: 2012
EN 60034-1: 2010 + Cor.:2010	EN 61000-3-2: 2014	

Da diese Motoren Einbaugeräte sind, müssen die Netzanschlüsse und Einrichtungen zum Trennen und Ausschalten des Motors sowie Überstrom- und Überlastschutzeinrichtungen beim entsprechenden Einbau berücksichtigt werden. / As these motors are OEM-models the power supplies and the equipments for disconnecting and switching-off the motor respectively have to be considered when mounting as well as over-current and overload protective gear.

Darüber hinaus muss beim Einbau ein Berührungsschutz gegen bewegte und heiße Teile, soweit vorhanden, vorgesehen werden. / In addition a protection against mechanical parts in motion and hot parts, if existing, has to be provided when mounting.

Freiburg, 31.01.2019

Ort, Datum (TT.MM.JJJJ)
place, date (dd.mm.yyyy)

CO R&D


ppa. S. Schreiber

**Explosionsgeschützte
Motorkondensatoren****Explosion protected
motor capacitors****Atmosphères explo-
sibles / condensateurs de
moteur****Ausführung
Version
Séries****Typ 24****Zweck dieser Anleitung**

Bei Arbeiten in explosionsgefährdeten Bereichen hängt die Sicherheit von Personen und Anlagen von der Einhaltung aller relevanten Sicherheitsvorschriften ab.

Das Montage- und Wartungspersonal, welches in solchen Anlagen arbeitet, trägt deshalb eine besondere Verantwortung. Die Voraussetzung dafür ist die genaue Kenntnis der geltenden Vorschriften und Bestimmungen.

Diese Anleitung fasst kurz die wichtigsten Sicherheitsmaßnahmen zusammen. Sie ergänzt die entsprechenden Vorschriften, zu deren Studium das verantwortliche Personal verpflichtet ist.

Purpose of these instructions

When working in hazardous areas, the safety of personnel and plant depends on complying with safety regulations.

Assembly and maintenance staff working on such plant therefore have a particular responsibility. The prerequisite for this is precise knowledge of the current rules and regulations.

These instructions summarise the most important safety measures. They supplement the corresponding regulations, which the staff responsible must study.

Objectif du présent mode d'emploi

Au cours des travaux dans les zones à risque d'explosion, la sécurité des hommes et des équipements est liée au respect de toutes les consignes de sécurité.

Le personnel chargé du montage et de la maintenance sur ces équipements possède à cet égard une grande responsabilité et doit connaître parfaitement les prescriptions et dispositions légales en vigueur.

Le présent mode d'emploi résume de façon concise les mesures de sécurité les plus importantes. Il ne peut en aucun cas se substituer aux prescriptions correspondantes, dont l'étude par le personnel responsable demeure obligatoire.

Änderungen vorbehalten

Subject to alterations

Sous réserve de modifications



SÜKO Kondensatorenbau
Robert-Bosch-Straße 2
72411 Bodelshausen
☎ 07471/71037 / Fax 07471/9595700

Betriebsanleitung	Operating instruction	Mode d'emploi
1 Sicherheitshinweise	1 Safety instructions	1 Consignes de sécurité
Verwenden Sie die Kondensatoren nur für den zugelassenen Einsatzzweck. Fehlerhafter oder unzulässiger Einsatz sowie das Nichtbeachten der Hinweise dieser Betriebsanleitung schließen eine Gewährleistung unsererseits aus.	Only use the capacitors for the approved use. Incorrect or impermissible use as well as the non-observance of the directions in these operating instructions invalidate our warranty.	Utilisez les condensateurs uniquement pour leur utilisation autorisée. Une utilisation erronée ou interdite ainsi qu'un non respect des remarques de cette notice d'utilisation exclut toute garantie de notre part.
Umbauten und Veränderungen an den Kondensatoren, die den Explosionsschutz beeinträchtigen, sind nicht gestattet.	Modifications or changes to the capacitors that impair explosion protection are not permitted.	Les transformations et modifications sur condensateurs influençant sur la protection contre l'explosion ne sont pas autorisées.
Der Kondensator darf nur im unbeschädigten und sauberen Zustand betrieben und eingebaut werden.	The capacitor may only be operated and fitted in an undamaged and clean condition.	Le condensateur ne pourra être utilisé que s'il n'est pas endommagé et qu'il est en parfait état.



Beachten Sie bitte folgendes bei Errichtung und Betrieb des Gerätes:
Observe the following during setting-up and operation:
Lors du montage et du fonctionnement, observer:

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> • die nationalen Sicherheitsvorschriften • die nationalen Unfallverhütungsvorschriften | <ul style="list-style-type: none"> • the national safety regulations • the national accident prevention | <ul style="list-style-type: none"> • les prescriptions de sécurité nationales • les prescriptions nationales en matière de prévention des accidents |
| <ul style="list-style-type: none"> • die nationalen Montage- und Errichtungsvorschriften • die allgemein anerkannten Regeln der Technik • die Sicherheitshinweise dieser Betriebsanleitung • die Kennwerte der Typ- und Datenschilder | <ul style="list-style-type: none"> • national mounting and installation requirements • the generally recognized technical regulations • the safety guidelines in these operating instruction • the characteristic values on the rating and date plates | <ul style="list-style-type: none"> • les prescriptions nationales de montage • les règles généralement reconnues de la technique • les consignes de sécurité du présent mode d'emploi • les valeurs nominales figurant sur les plaques signalétiques de type et de spécifications |
| <ul style="list-style-type: none"> • das Gerätesicherheitsgesetz | <ul style="list-style-type: none"> • the equipment safety legislation | <ul style="list-style-type: none"> • la législation sur la sécurité des appareils en vigueur |
| <ul style="list-style-type: none"> • die Prüfbescheinigungen und die darin enthaltenen besonderen Bedingungen | <ul style="list-style-type: none"> • the test certificates and the special conditions outlined in them | <ul style="list-style-type: none"> • les certificats d'essais et les conditions particulières auxquels ils se rapportent |

Beschädigungen können den Explosionsschutz aufheben.

Damage may eliminate the explosion protection.

Pour d'autres conditions d'utilisation différentes des conditions standard, veuillez prendre contact auprès du fabricant.



Prüfbescheinigungen senden wir Ihnen auf Anfrage gerne zu.
We will be pleased to send you test certificates on request.
Les certificats de contrôle peuvent vous être envoyés sur demande.

Betriebsanleitung	Operating instruction	Mode d'emploi
2 Anwendung Die Kondensatoren sind nach der EU-Richtlinie 2014/34 EU (zugelassen und entsprechen den Europäischen Normen für den Explosionsschutz. Der Einsatz ist in allen explosionsgefährdeten Bereichen der Zonen 1 und 2 zugelassen.	2 Application The capacitors are approved in accordance with EC Directive 2014/34/EC and comply with the European standards for explosion protection. They are approved for use in all hazardous areas of zones 1 and 2.	2 Domaine d'application Les condensateurs sont homologués conformément à la directive 2014/34/UE et répondent aux normes européennes pour la protection contre l'explosion. Ils peuvent être utilisés dans tous les secteurs à risque de déflagration des zones 1 et 2.
3 Technische Daten Explosionsschutz: ⊕ II 2G Ex q IIC T6 Gb Prüfungsschein: SEV 10 ATEX 0154 X Schutzart: IP 54 <u>Umgebungstemperatur:</u> -20°C...+50°C <u>Elektrische Daten:</u> Bemessungsspannung:280...470V Bemessungsfrequenz: 50/60 Hz Kapazität: 1.....55µF Konformität:nach RL 2014/34/EU CE1258	3 Technical data Ex-protection: ⊕ II 2G Ex q IIC T6 Gb Test certificate. SEV 10 ATEX 0154 X Degree of protection: IP 54 <u>Ambient temperature:</u> -20°C...+50°C <u>Electrical data:</u> Rated voltage: 280...470V Rated frequency : 50/60Hz capacitance: 1.....55µF Conformity:after RL 2014/34/EC CE1258	3 Caractéristiques techniques Ex- protection : ⊕ II 2G Ex q IIC T6 Gb Certificat de test: SEV 10 ATEX 0154 X Indice de protection: IP 54 <u>Température ambiante:</u> -20°C ... +50°C <u>Caractéristiques techniques</u> Tension admissible: 280...470V Fréquence : 50/60Hz Capacité: 1.....55µF Conformité: après RL 2014/34/UE CE1258
4 Normenkonformität Dieser explosionsgeschützte Kondensatoren entspricht dem Stand der Technik. Er wurde gem. EN 29001 (ISO 9001) entwickelt, gefertigt und geprüft Er entspricht unter anderem folgenden Bestimmungen und Normen: EN 1127-1:2011 EN 60079-0:2014 EN 60079-5:2015	4 Conformity with standards This explosion proof capacitor conforms to the latest technical standards.It has been developed, manufactured and tested in accordance with EN 29001 (ISO 9001). The specifications and standards it meets include the following: EN 1127-1:2011 EN 60079-0:2014 EN 60079-5:2015	4 Conformité aux normes Ce condensateur protégé contre les explosions correspondent à l'état de la technique.Il a été développé, fabriqué et contrôlé selon la norme EN 29001 (ISO 9001) Il correspond notamment aux dispositions et normes suivantes EN 1127-1:2011 EN 60079-0:2014 EN 60079-5:2015
5 Erdung Eine zusätzliche Erdung des Kondensatorenbeckers kann über den am Gehäuseboden befindlichen Gewindebolzen M12erfolgen.	5 Grounding An additional earth for the capacitor can be made via the M12 threaded bolt located on the base of the housing.	5 mise à la terre Il est possible de faire une mise à la terre supplémentaire du bocal du condensateur en utilisant la tige fileté M12 située sur le fond du boîtier.
6 Inbetriebnahme	6 Commissioning	6 Mise en service

Betriebsanleitung	Operating instruction	Mode d'emploi
<p>Bevor Sie den Kondensator in Betrieb nehmen, stellen Sie sicher, dass</p> <ul style="list-style-type: none"> • der Kondensator vorschriftsmäßig installiert wurde • der Anschluss ordnungsgemäß ausgeführt wurde • der Kondensator nicht beschädigt ist 	<p>Before operating the capacitor, ensure that</p> <ul style="list-style-type: none"> • the capacitor has been correctly installed • the connection has been made properly • the capacitor is undamaged 	<p>Avant de faire fonctionner le condensateur, assurez-vous que</p> <ul style="list-style-type: none"> • le condensateur a été correctement installé • le raccordement électrique est conforme • le condensateur n'est pas endommagé
<p>7 Besondere Bedingungen „X“</p> <p>Die Ex-Motorkondensatoren dürfen nur für feste Installation verwendet werden. Vom Betreiber muss eine zusätzliche Klemmverbindung des Kabels (Leitung) montiert werden um sicherzustellen, dass Zug und Drehung nicht an die Klemmen übertragen werden.</p>	<p>7 Special conditions 'X'</p> <p>The explosion engine capacitors may only be used for fixed installation. The operating company must fit an additional cable (line) clamping connector in order to ensure that no traction or rotation gets transferred to the clamps.</p>	<p>7 Special conditions 'X'</p> <p>Les condensateurs des moteurs à explosion ne doivent être utilisés que pour des installations fixes. L'exploitant doit équiper ceux-ci d'un attache-câble supplémentaire (sur le câble) afin d'assurer que les forces de traction et de torsion ne soient pas transmises aux bornes</p>
<p>8 Instandhaltung</p> <p>8.1 Reparatur und Instandhaltung</p> <p>Der Zustand der über den Entlüftungsöffnungen vorhandenen Klebeabdeckung ist in geeigneten Zeitabständen zu überprüfen. Bei Beschädigungen ist diese zu erneuern!</p> <p>Wartungs-, Reparatur- und Instandsetzungsarbeiten am Kondensator dürfen nur von dazu befugtem und entsprechend geschultem Personal durchgeführt werden. Vor dem Beginn dieser Arbeiten muss der Kondensator spannungsfrei geschaltet werden.</p>	<p>8 Maintenance</p> <p>8.1 Repairs and maintenance</p> <p>The condition of the adhesive covering over the venting apertures is to be inspected at suitable intervals. In case of damage, these must be replaced..</p> <p>Servicing, repair and corrective maintenance work on the capacitor is only to be carried out by specifically authorised and appropriately trained personnel. The capacitor must be disconnected before the work begins.</p>	<p>8 Entretien et maintenance</p> <p>8.1 Réparation et maintenance</p> <p>L'état des protections collées situées au-dessus des ouvertures d'aération doit être contrôlé à intervalles réguliers. Les condensateurs avec des En cas de dommages, ceux-ci doivent être remplacés. Les travaux d'entretien, de réparation et de maintenance sur le condensateur ne pourront être effectués que par du personnel formé à cet effet. Avant le début des travaux, il faut mettre le condensateur hors tension.</p>



Dieses Gehäuse wurde dauerhaft verschlossen und kann nicht repariert werden !
This casing has been permanently sealed and cannot be repaired !
Ce boîtier a été scellé de manière durable et ne peut pas être réparé !



Beachten Sie die geltenden nationalen Bestimmungen im Einsatzland!
Please observe the valid national regulations in the country of use!
Observer les prescriptions nationales en vigueur dans le pays d'installation!

**Explosionssgeschützte
Motorkondensatoren****Explosion protected
motor capacitors****Atmosphères explo-
siblesen condensateurs de
moteur****Ausführung
Version
Séries****Typ 27****Zweck dieser Anleitung**

Bei Arbeiten in explosionsgefährdeten Bereichen hängt die Sicherheit von Personen und Anlagen von der Einhaltung aller relevanten Sicherheitsvorschriften ab.

Das Montage- und Wartungspersonal, welches in solchen Anlagen arbeitet, trägt deshalb eine besondere Verantwortung. Die Voraussetzung dafür ist die genaue Kenntnis der geltenden Vorschriften und Bestimmungen.

Diese Anleitung fasst kurz die wichtigsten Sicherheitsmaßnahmen zusammen. Sie ergänzt die entsprechenden Vorschriften, zu deren Studium das verantwortliche Personal verpflichtet ist.

Purpose of these instructions

When working in hazardous areas, the safety of personnel and plant depends on complying with safety regulations.

Assembly and maintenance staff working on such plant therefore have a particular responsibility. The prerequisite for this is precise knowledge of the current rules and regulations.

These instructions summarise the most important safety measures. They supplement the corresponding regulations, which the staff responsible must study.

Objectif du présent mode d'emploi

Au cours des travaux dans les zones à risque d'explosion, la sécurité des hommes et des équipements est liée au respect de toutes les consignes de sécurité.

Le personnel chargé du montage et de la maintenance sur ces équipements possède à cet égard une grande responsabilité et doit connaître parfaitement les prescriptions et dispositions légales en vigueur.

Le présent mode d'emploi résume de façon concise les mesures de sécurité les plus importantes. Il ne peut en aucun cas se substituer aux prescriptions correspondantes, dont l'étude par le personnel responsable demeure obligatoire.

Änderungen vorbehalten

Subject to alterations

Sous réserve de modifications



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Betriebsanleitung	Operating instruction	Mode d'emploi
1 Sicherheitshinweise	1 Safety instructions	1 Consignes de sécurité
Verwenden Sie die Kondensatoren nur für den zugelassenen Einsatzzweck. Fehlerhafter oder unzulässiger Einsatz sowie das Nichtbeachten der Hinweise dieser Betriebsanleitung schließen eine Gewährleistung unsererseits aus.	Only use the capacitors for the approved use. Incorrect or impermissible use as well as the non-observance of the directions in these operating instructions invalidate our warranty.	Utilisez les condensateurs uniquement pour leur utilisation autorisée. Une utilisation erronée ou interdite ainsi qu'un non respect des remarques de cette notice d'utilisation exclut toute garantie de notre part.
Umbauten und Veränderungen an den Kondensatoren, die den Explosionsschutz beeinträchtigen, sind nicht gestattet.	Modifications or changes to the capacitors that impair explosion protection are not permitted.	Les transformations et modifications sur condensateurs influençant sur la protection contre l'explosion ne sont pas autorisées.
Der Kondensator darf nur im unbeschädigten und sauberen Zustand betrieben und eingebaut werden.	The capacitor may only be operated and fitted in an undamaged and clean condition.	Le condensateur ne pourra être utilisé que s'il n'est pas endommagé et qu'il est en parfait état.



Beachten Sie bitte folgendes bei Errichtung und Betrieb des Gerätes:
Observe the following during setting-up and operation:
Lors du montage et du fonctionnement, observer:

- | | | |
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|---|--|--|

Beschädigungen können den Explosionsschutz aufheben.

Damage may eliminate the explosion protection.

Pour d'autres conditions d'utilisation différentes des conditions standard, veuillez prendre contact auprès du fabricant.



Prüfbescheinigungen senden wir Ihnen auf Anfrage gerne zu.
We will be pleased to send you test certificates on request.
Les certificats de contrôle peuvent vous être envoyés sur demande.

Betriebsanleitung	Operating instruction	Mode d'emploi
2 Anwendung Die Kondensatoren sind nach der EU-Richtlinie 2014/34 EU (zugelassen und entsprechen den Europäischen Normen für den Explosionsschutz. Der Einsatz ist in allen explosionsgefährdeten Bereichen der Zonen 1 und 2 zugelassen.	2 Application The capacitors are approved in accordance with EC Directive 2014/34/EC and comply with the European standards for explosion protection. They are approved for use in all hazardous areas of zones 1 and 2.	2 Domaine d'application Les condensateurs sont homologués conformément à la directive 2014/34/UE et répondent aux normes européennes pour la protection contre l'explosion. Ils peuvent être utilisés dans tous les secteurs à risque de déflagration des zones 1 et 2.
3 Technische Daten Explosionsschutz: ⊗ II 2 G Ex q IIC T6 Gb ⊗ II 2 D Ex tb IIIC T 65°C Db Prüfungsschein: SEV 17 ATEX 0165 X IECEx SEV 17.0021 X Schutzart: IP 54 <u>Umgebungstemperatur:</u> -20°C...+50°C <u>Elektrische Daten:</u> Bemessungsspannung: 280...470V Bemessungsfrequenz: 50/60 Hz Kapazität: 1.....55µF Konformität: nach RL 2014/34/EU CE1258	3 Technical data Ex-protection: ⊗ II 2 G Ex q IIC T6 Gb ⊗ II 2 D Ex tb IIIC T 65°C Db Test certificate. SEV 17 ATEX 0165 X IECEx SEV 17.0021 X Degree of protection: IP 54 <u>Ambient temperature:</u> -20°C...+50°C <u>Electrical data:</u> Rated voltage: 280...470V Rated frequency : 50/60Hz capacitance: 1.....55µF Conformity: after RL 2014/34/EC CE1258	3 Caractéristiques techniques Ex- protection : ⊗ II 2 G Ex q IIC T6 Gb ⊗ II 2 D Ex tb IIIC T 65°C Db Certificat de test: SEV 17 ATEX 0165 X IECEx SEV 17.0021 X Indice de protection: IP 54 <u>Température ambiante:</u> -20°C ... +50°C <u>Caractéristiques techniques</u> Tension admissible: 280...470V Fréquence : 50/60Hz Capacité: 1.....55µF Conformité: après RL 2014/34/UE CE1258
4 Normenkonformität Dieser explosionsgeschützte Kondensatoren entspricht dem Stand der Technik. Er wurde gem. EN 29001 (ISO 9001) entwickelt, gefertigt und geprüft Er entspricht unter anderem folgenden Bestimmungen und Normen:	4 Conformity with standards This explosion proof capacitor conforms to the latest technical standards. It has been developed, manufactured and tested in accordance with EN 29001 (ISO 9001). The specifications and standards it meets include the following: EN 60079-0 EN 60079-5 EN 60079-31	4 Conformité aux normes Ce condensateur protégé contre les explosions correspond à l'état de la technique. Il a été développé, fabriqué et contrôlé selon la norme EN 29001 (ISO 9001) Il correspond notamment aux dispositions et normes suivantes
5 Erdung Eine zusätzliche Erdung des Kondensatorenbeckens kann über den am Gehäuseboden befindlichen Gewindebolzen M12 erfolgen.	5 Grounding An additional earth for the capacitor can be made via the M12 threaded bolt located on the base of the housing.	5 mise à la terre Il est possible de faire une mise à la terre supplémentaire du bocal du condensateur en utilisant la tige filetée M12 située sur le fond du boîtier.

Betriebsanleitung	Operating instruction	Mode d'emploi
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6 Inbetriebnahme

Bevor Sie den Kondensator in Betrieb nehmen, stellen Sie sicher, dass

- der Kondensator vorschriftsmäßig installiert wurde
- der Anschluss ordnungsgemäß ausgeführt wurde
- der Kondensator nicht beschädigt ist

6 Commissioning

Before operating the capacitor, ensure that

- the capacitor has been correctly installed
- the connection has been made properly
- the capacitor is undamaged

6 Mise en service

Avant de faire fonctionner le condensateur, assurez-vous que

- le condensateur a été correctement installé
- le raccordement électrique est conforme
- le condensateur n'est pas endommagé

7 Besondere Bedingungen „X“

Die Ex-Motorkondensatoren dürfen nur für feste Installation verwendet werden. Vom Betreiber muss eine zusätzliche Klemmverbindung des Kabels (Leitung) montiert werden um sicherzustellen, dass Zug und Drehung nicht an die Klemmen übertragen werden.

7 Special conditions 'X'

The explosion engine capacitors may only be used for fixed installation. The operating company must fit an additional cable (line) clamping connector in order to ensure that no traction or rotation gets transferred to the clamps.

7 Special conditions 'X'

Les condensateurs des moteurs à explosion ne doivent être utilisés que pour des installations fixes. L'exploitant doit équiper ceux-ci d'un attache-câble supplémentaire (sur le câble) afin d'assurer que les forces de traction et de torsion ne soient pas transmises aux bornes

8 Instandhaltung

8.1 Reparatur und Instandhaltung

Wartungs- und Instandhaltungsarbeiten am Kondensator dürfen nur von dazu befugtem und entsprechend geschultem Personal durchgeführt werden. Vor dem Beginn dieser Arbeiten muss der Kondensator spannungsfrei geschaltet werden.

8 Maintenance




8.1 Repairs and maintenance

Servicing, repair and corrective maintenance work on the capacitor is only to be carried out by specifically authorised and appropriately trained personnel. The capacitor must be disconnected before the work begins.

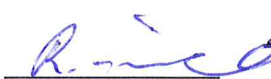
8 Entretien et maintenance

8.1 Réparation et maintenance


Les travaux d'entretien, de réparation et de maintenance sur le condensateur ne pourront être effectués que par du personnel formé à cet effet. Avant le début des travaux, il faut mettre le condensateur hors tension.

	Dieses Gehäuse wurde dauerhaft verschlossen und kann nicht repariert werden ! This casing has been permanently sealed and cannot be repaired ! Ce boîtier a été scellé de manière durable et ne peut pas être réparé !
	Vor UV – Licht (Sonnenlicht) schützen Protect from UV light (sunlight Protéger de la lumière UV (lumière du soleil)
	Beachten Sie die geltenden nationalen Bestimmungen im Einsatzland! Please observe the valid national regulations in the country of use! Observer les prescriptions nationales en vigueur dans le pays d'installation!

EG-Baumusterprüfbescheinigung SEV 10 ATEX 0154 X

<p>Wir (we; nous)</p> <p>SÜKO Kondensatorenbau GmbH, Robert-Bosch-Straße 2, 72411 Bodelshausen</p> <p>erklären in alleiniger Verantwortung, dass das Produkt Motorkondensator Typ 24</p> <p>hereby declare in our sole responsibility, that the product Motor-capacitor series 24</p> <p>déclarons de notre seule responsabilité, que le produit Condensateur de moteur type 24</p> <p>auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokumenten übereinstimmt.</p> <p>which is the subject of this declaration, is in conformity with the following standard(s) or normative documents.</p> <p>auquel cette déclaration se rapporte, est conforme aux norme(s) ou aux documents normatifs suivants.</p>	
<p>Bestimmungen der Richtlinie terms of the directive prescription de la directive</p>	<p>Titel und/oder Nr. sowie Ausgabedatum der Norm title and/or No. and date of issue of the standard titre et/ou No. ainsi que date d'émission des normes</p>
<p>2014/34EU ; Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen</p> <p>2014/34EC; Equipment and protective systems intended for use in potentially explosive atmospheres</p> <p>2014/34CE; Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles</p>	<p>EN 1127-1:2011</p> <p>EN 60079-0:2014</p> <p>EN 60079-5:2015</p>
<p>Bodelshausen, 07.06.2016</p> <p>Ort und Datum Place and date lieu et date</p> <p></p> <p>Geschäftsführer Manager Gérant</p>	

EG-Baumusterprüfbescheinigung IECEx SEV 17.0021X / SEV 17 ATEX 0165 X

<p>Wir (we; nous)</p> <p>SÜKO Kondensatorenbau GmbH, Robert-Bosch-Straße 2, 72411 Bodelshausen</p> <p>erklären in alleiniger Verantwortung, dass das Produkt Motorkondensator Typ 27</p> <p>hereby declare in our sole responsibility, that the product Motor-capacitor series 27</p> <p>déclarons de notre seule responsabilité, que le produit Condensateur de moteur type 27</p> <p>auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokumenten übereinstimmt.</p> <p>which is the subject of this declaration, is in conformity with the following standard(s) or normative documents.</p> <p>auquel cette déclaration se rapporte, est conforme aux norme(s) ou aux documents normatifs suivants.</p>	
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<p>Bodelshausen, 13.03.2018</p> <p>Ort und Datum Place and date lieu et date</p> <p></p> <p>Geschäftsführer Manager Gérant</p>	

KNF worldwide

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