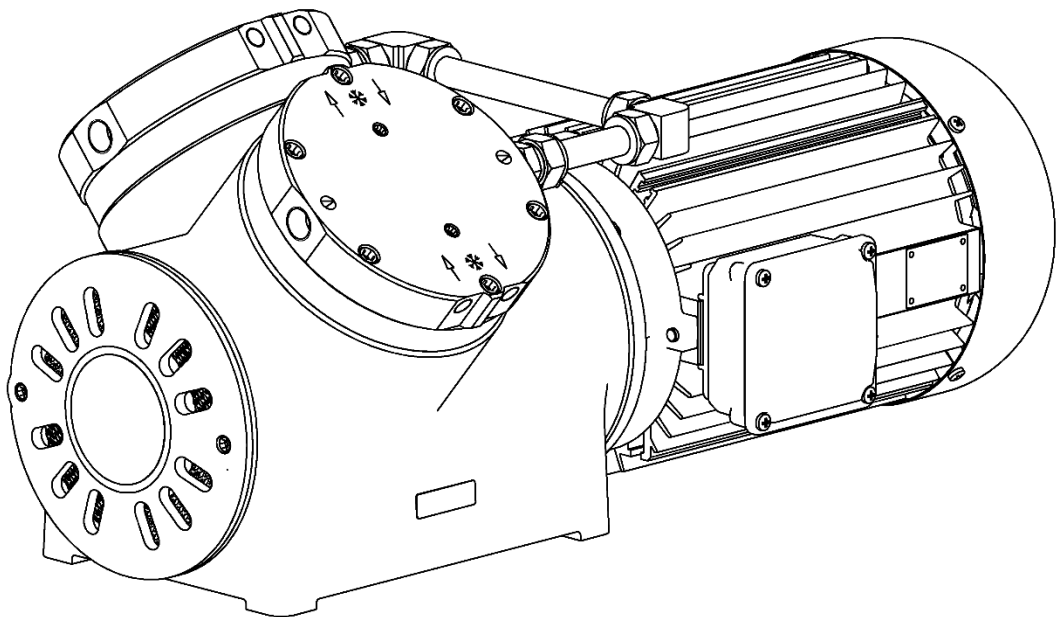


OEM

**N 2400.15
TRANSLATION OF ORIGINAL OPERATING AND
INSTALLATION INSTRUCTIONS
ENGLISH**

DIAPHRAGM PUMP



Note!

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

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

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

Contents	Page
1. About this document	3
2. Use	5
3. Safety	7
4. Technical Data	10
5. Design and function	13
6. Transportation	15
7. Installation and connection	18
8. Operation	25
9. Servicing	27
10. Troubleshooting	33
11. Spare parts and accessories	35
12. Returns	36

1. About this document

1.1. Using the Operating and Installation Instructions

The Operating and Installation Instructions are part of the pump.

- In several Chapters of these Operating and Installation Instructions there will be referred to the Operating Instruction of the motor manufacturer. It is attached to these Operating and Installation Instruction.
- Always keep the Operating and Installation Instructions handy in the work area.
- Pass on the Operating and Installation Instructions to the next owner.

i Compliance with the Operating and Installation Instructions is essential for the safe and reliable operation of the pump. Failure to do so may result in severe or potentially life-threatening injury and/or serious damage.

Project pump

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

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

1.2. Symbols and markings

Warning



A danger is located here.

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

WARNING Warning, indicates the danger level.

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

Danger levels

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

Tab. 1

Other information and symbols

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

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

i This symbol refers to important information.

2. Use

2.1. Proper use

The pumps are exclusively intended for transferring gases and vapors.

Owner's responsibility

Operating parameter and conditions

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

Protect the compressors with a pressure relief device between the pressure side of the compressor and the first shut-off valve.

Only complete pumps may be taken into service.

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

The gas-tightness of the connections between the application pipes and the pump (or the pump connection) must be checked regularly; with leaky connections, there is a danger that hazardous gases or vapors may escape from the pump system.

Requirements for transferred medium

Before using a medium, check whether the medium can be transferred danger-free in the specific application case.

Before using a medium, check the compatibility of the components in contact with the medium (see 4 Technical Data) with the medium.

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

Frequency converter

The pumps are provided for the operation with frequency converter in the speed range 500 – 1500 min⁻¹(50 Hz) or 600 – 1800 min⁻¹ (60 Hz) respectively (see Chapter 7.2).

2.2. Improper use

The pumps may not be operated in an explosive atmosphere.

The pumps are not suitable for transferring:

- Dusts
- Liquids
- Aerosol
- Biological and microbiological substances
- Fuel
- Explosive and combustible materials
- Fibers
- Oxidizing agent
- Foodstuffs.

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

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

3. Safety

i Note the safety precautions in chapters 7. Installation and connection, and 8. Operation.

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

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

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

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

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

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

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

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

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

Make sure that there are no hazards due to flow with open gas connections, noises or hot gases.

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

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

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

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

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

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

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

Hence, make sure the temperature of the medium is sufficiently below the ignition temperature of the medium, even when it is compressed to the maximum permissible operating pressure of the pump. The maximum permissible operating pressure of the pump is stated in the technical specifications (Chapter 4).

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

In case of doubt, consult the KNF customer service.

Environmental protection

Store all replacement parts in a protected manner and dispose of them properly in accordance with the applicable environmental protection regulations. Observe the respective national and international regulations. This especially applies to parts contaminated with toxic substances.

Waste equipment must not be disposed of with household waste. Proper disposal and recycling helps to protect natural resources and the environment. The end user is obliged to dispose of old equipment in accordance with national and international regulations. Alternatively, KNF products (old devices) are also taken back by KNF at a charge (see chapter 12 Returns).

EU/EC Directives / Standards

For the purposes of the Machinery Directive 2006/42/EC, pumps are “partly completed machinery”, and are therefore to be regarded as not ready for use. Partly completed machinery may not be commissioned until such time as it has been determined that the machine in which the partly completed machinery is to be assembled is in conformity with the provisions of the Machinery Directive 2006/42/EC. The following essential requirements of Annex I of Directive 2006/42/EC (general principles) are applied and observed:

- General Principles No. 1

As these partly completed machinery are OEM-models the power supplies and the equipment for disconnecting and switching-off the partly completed machinery respectively have to be considered when mounting as well as over-current and overload protective gear.

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

The protection objectives of Directive 2011/65/EU have been met.

The following standards were taken as a basis:

- EN IEC 63000
- See operating instruction motor

Customer service and repairs

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

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

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

Use only genuine parts from KNF for servicing work.

4. Technical Data

Pump materials

N 2400.15 SPE

Assembly	Material
Head plate, intermediate plate	Stainless Steel
Diaphragm	EPDM
Reed valves/valve stopper	Stainless Steel
Retainer plate	Stainless Steel
O-ring	EPDM
Interstage cooler	Aluminum

Tab. 2

N 2400.15 STE

Assembly	Material
Head plate, intermediate plate	Stainless Steel
Diaphragm	PTFE coated
Reed valves/valve stopper	Stainless Steel
Retainer plate	Stainless Steel
O-ring	FPM
Pneumatic head connection	Stainless Steel

Tab. 3

Pneumatic values

N 2400.15 SPE

Parameter	Value
Max. permissible operating pressure [bar rel*]:	
-permanent operation	12.0
-intermittent	16.0
Ultimate vacuum [mbar abs.]	<100
Delivery rate [l/min]**	130.0

Tab. 4

*bar rel related to 1013hPa

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

N 2400.15 STE

Parameter	Value
Max. permissible operating pressure [bar rel*]	
-permanent operation	12.0
-intermittent	16.0
Ultimate vacuum [mbar abs.]	<100
Delivery rate [l/min]**	120.0

Tab. 5

*bar rel related to 1013hPa

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

Pneumatic Connections

Pump type	Value
N 2400.15 SPE	G 1/2
N 2400.15 STE	G 1/2

Tab. 6

Connection water cooling

Pump type	Value
N 2400.15 SPE	Tube ID 9mm
N 2400.15 STE	Tube ID 9mm

Tab. 7

Electrical data

Parameter	Value
Electrical data	See type plate pump
Protection class Motor	IP 55
Protection class Pump	See Type plate pump
Maximum permitted mains voltage fluctuations	See operating instructions of the motor

Tab. 8

PTC sensors

i The pumps are fitted as standard with PTC sensors to protect against overloading (see operating instructions of the motor).

Weight

Pump type	Value
N 2400.15 SPE	Ca. 83 kg
N 2400.15 STE	Ca. 79 kg

Tab. 9

Other parameters

Parameter	Value
Permissible ambient temperature	+ 5°C to + 40°C
Permissible media temperature	+ 5°C to + 40°C
Dimensions N 2400.15 SPE	See Fig. 6, Chapter 7.1
Dimensions N 2400.15 STE	See Fig. 7, Chapter 7.1
Maximum permissible ambient relative humidity	80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C.
Max. altitude of site: [m above sea level]	2000
Gas-tightness* of pump head*: - .9-version: - .13-version:	< 6 x 10 ⁻³ mbar l/s** < 6 x 10 ⁻⁶ mbar l/s**

Tab. 10

**After opening the pump head or replacing the diaphragms and reed valves the gas-tightness is no longer guaranteed. A leak test is able to verify that the original standard of gas-tightness has been achieved.*

**Values valid for helium leak test*

5. Design and function

Design N 2400.15 SPE

- 1 Pneumatic pump inlet
- 2 Pneumatic pump outlet
- 3 Connection water cooling
- 4 Interstage cooler
- 5 Fan cover
- 6 Motor
- 7 Terminal box (electrical connection)
- 8 Union nut

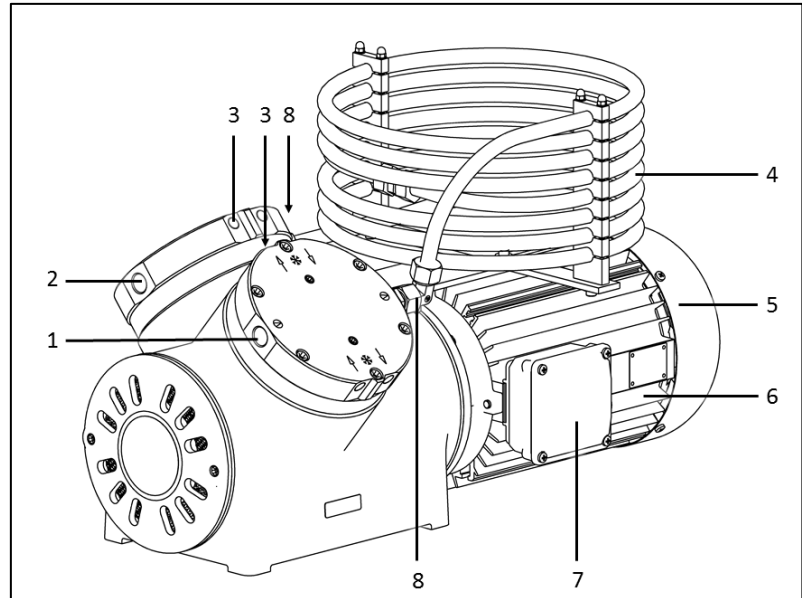


Fig. 1: Diaphragm N 2400.15 SPE

Design N 2400.15 STE

- 1 Pneumatic pump inlet
- 2 Pneumatic pump outlet
- 3 Connection water cooling
- 4 Union nut
- 5 Pneumatic connection
- 6 Motor
- 7 Fan cover
- 8 Terminal box (electrical connection)

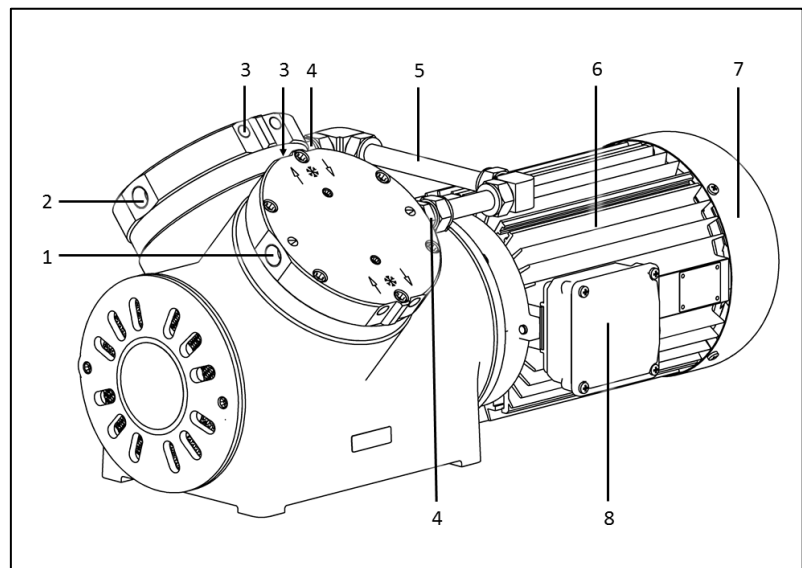


Fig. 2: Diaphragm N 2400.15 STE

Function Diaphragm Pump

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

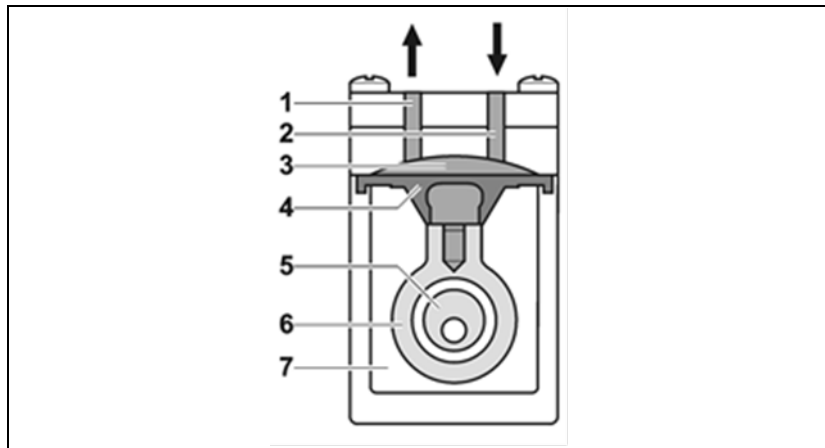


Fig. 3: Pump head

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

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

6. Transportation



CAUTION

Personal injury and/or damage to property because of false or improper transportation of the pump.

If the pump is raised and/or carried at the pneumatic connection during the transportation, this can lead to leaks and/or damages of the pump.

→ Don't carry the pump at the pneumatic connection/the interstage cooler.



CAUTION

Personal injury and/or damage to property because of false or improper transportation of the pump.

Due to false or improper transportation the pump can fall down, become damaged and injure people.

→ If necessary, use suitable aids (harness, lifting device, etc.).

→ If necessary, wear proper personal protective equipment (e.g. safety gloves, safety shoes).



CAUTION

Danger of injury due to sharp edges on the package.

When handling or opening the package there is the possibility of injury by cutting sharp edges.

→ If necessary, wear proper personal protective equipment (e.g. safety gloves).

- Carry the pump in the original packaging up to its place of installation.
- Retain the original packaging of the pump (e.g. for later storage).
- Check the pump for transport damages after receipt.
- Document occurred transport damages in writing and with pictures.
- If necessary, remove the transportation protection before putting the pump into service.

Parameter	Value
Storage temperature	+ 5°C to + 40°C
Transport temperature	- 10°C to + 60°C
Permiss. Humidity (non-condensing)	30% to 85%

Tab. 11

Transportation with harness

Fig. 4: Position of the harness (exemplary)

1. Pull the harness through among the pump (see Fig. 4).

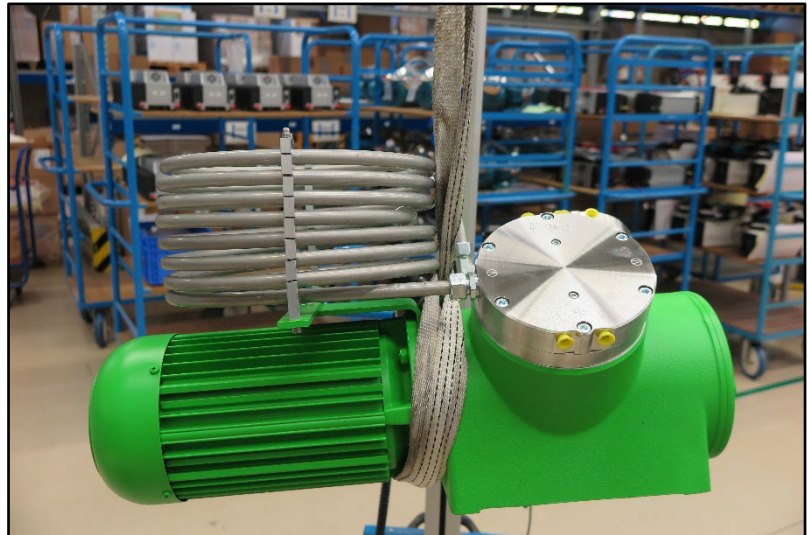


Fig. 5:

2. Fix the harness between compressor housing and motor (Fig. 5).
3. Make sure that the lifting load cannot be transferred from the belt to the pump connection.
4. Use a lifting device to lift the pump out of the packaging.
5. Place the pump carefully at the installation location.

7. Installation and connection

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

7.1. Installation of the pump

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

Mounting dimensions ➔ See Fig. 6 (pump series N 2400.15 SPE) and Fig. 7 (pump series N 2400.15 STE) for mounting dimensions.

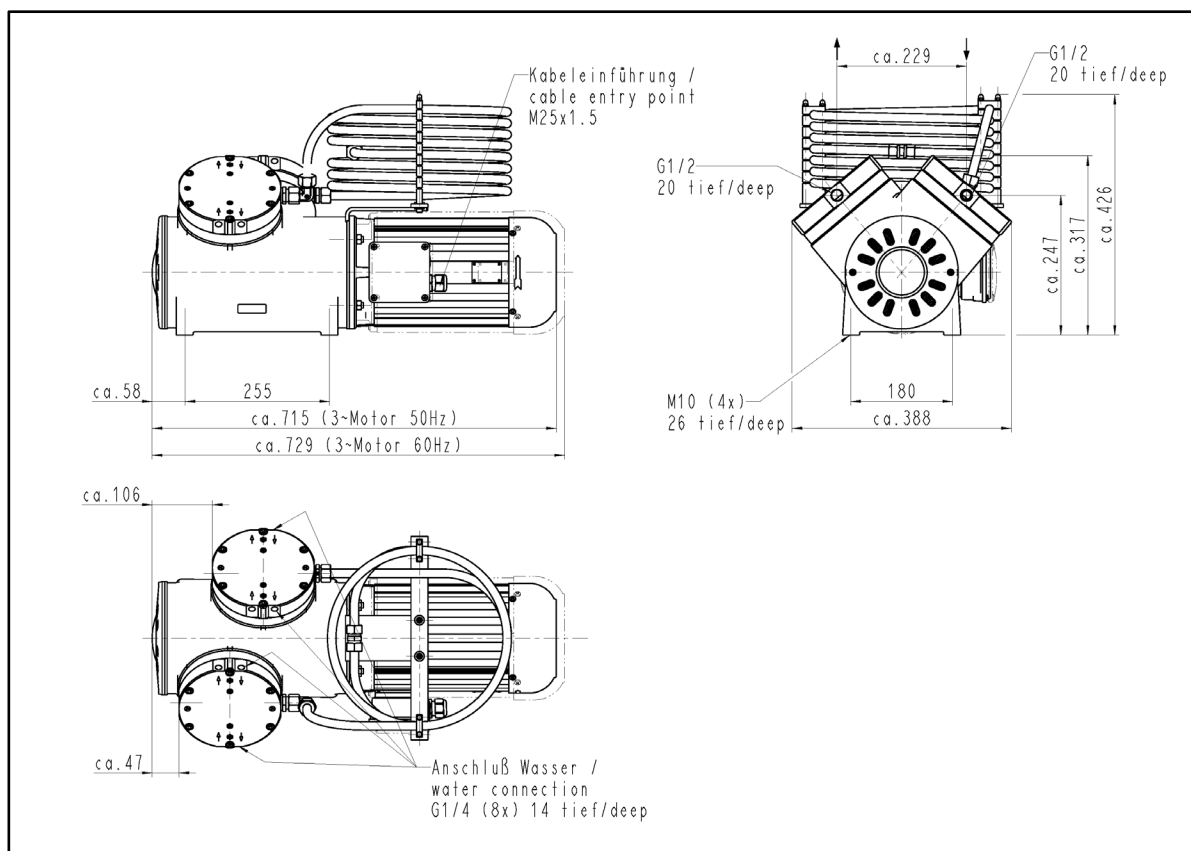


Fig. 6: Mounting dimensions pump series N 2400.15 SPE (All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V)

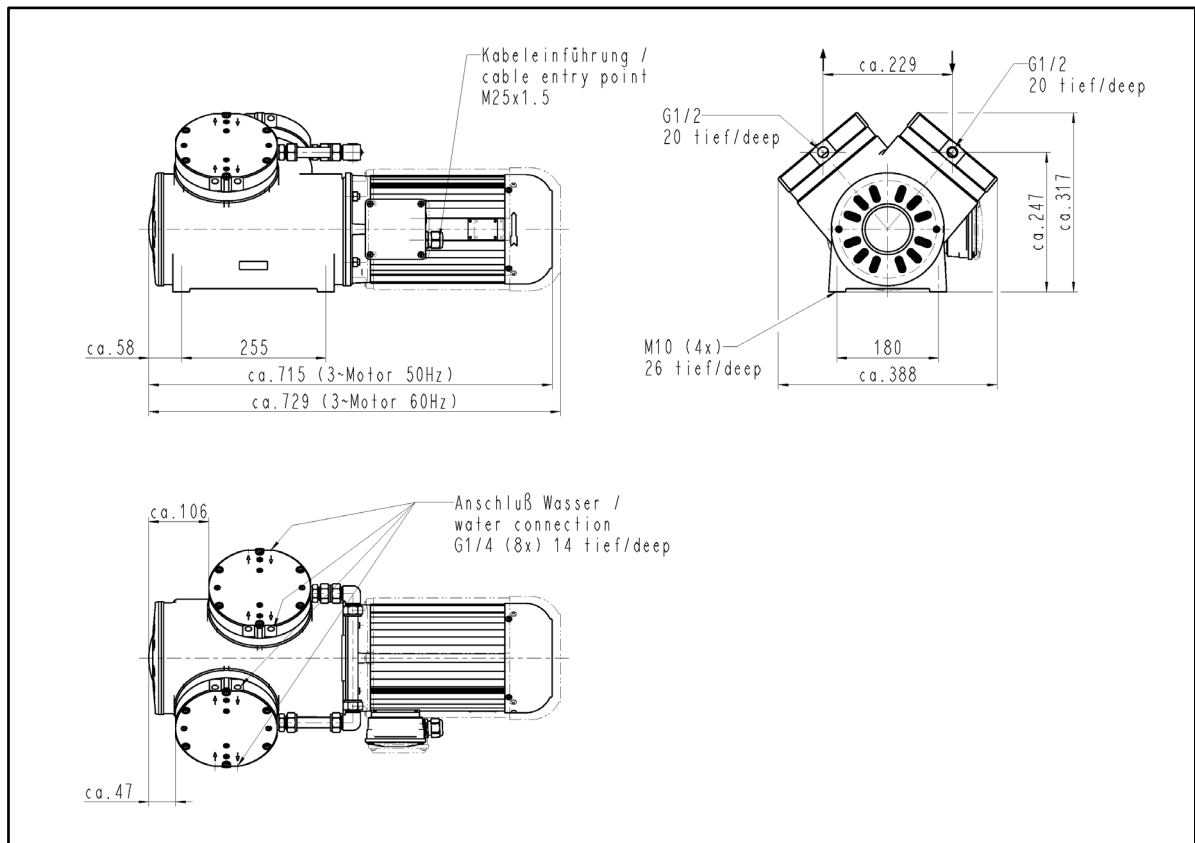


Fig. 7: Mounting dimensions pump series N 2400.15 STE (All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V)

Cooling air supply



Danger of burns from hot surfaces

Hot surfaces may be caused by overheating of the pump.

WARNING

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

Immediate ambient of the hot pump parts

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

Installation location

- Make sure that the installation location is dry and the pump is protected against rain, splash, hose and drip water as well as other pollutions.
- Make sure, that the installation location is accessible for maintenance and service.
- Ensure that the pump is securely attached to the mounting holes provided. If necessary, fasten the pump to the base plate with rubber-bonded metals (see accessories, chapter 11; information on pump weight, chapter 4 Technical Data).
- Ensure that there is no access to moving parts (such as from the bottom of the pump housing).

- i** The IP protection class of the pump motor is indicated on the type plate.
- Install the pump at the highest point in the system to prevent condensate from collecting in the pump head.
- Protect the pump from dust.
- Protect the pump from vibrations and jolts.



Personal injury and/or damage to property because of vibration

WARNING

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

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

Installation position

- The pump can be installed in any position. Secure the pump with metallic screws to the attachment points shown.

Foreign matter protection

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

7.2. Electrical connection



Extreme danger from electrical shock

DANGER

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

- When connecting the device to a power source, the relevant standards, directives, regulations, and technical standards must be observed.
- For electrical connection, carefully read and observe the motor operating instructions (also including information on insulation resistance measurement).
- In the electrical installation, arrangements (complying with EN 60335-1) must be made for disconnecting the pump motor from the electrical supply.
- The motors of the pump must be protected according to EN 60204-1 (protection against excess current, or overloading).

- i** For max. operating current of the pump see pump's type plate.
- It is recommended that an additional "Emergency Stop" switch is installed.
- The pump must be installed so that contact with live parts is impossible.

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

- PTC sensors **i** The pumps are fitted as standard with PTC sensors to protect against overloading (connection according to operating instructions of the motor).
- i** The 3~ motors are provided for the operation with frequency converter.

Connecting pump

1. Compare the supply data with the data on the motor plate. For maximum operating current of the pump see pump's type plate.
- i** See operating instructions of the motor for permissible deviation of the voltage.
2. Open terminal box cover.
 3. Connect the earth (ground) wire to the motor.
 4. Connect the mains cables according to the operating instruction of the motor.
- i** Set the direction of rotation in accordance with the arrow on the fan guard (see 7.1 Pump installation and motor operating instructions).
5. Close the terminal cover box.

7.3. Pneumatic connection



CAUTION

Personal injury or damages to property by ejected protective plugs

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

- Remove the protective plug during the installation.

- Connected components → Only connect components to the pump which are designed for the pneumatic data of the pump (see Chapter 4, Technical Data).
- Pressure relief device → Protect the pump with a pressure relief device between the pressure connection of the pump and the first shut-off valve.
- Pump exhaust → If the pump is used as a vacuum pump, safely discharge the pump exhaust at the pump's pneumatic outlet.

- Disengaging → KNF recommends mechanically disengaging the pump from the piping system. This can be achieved with flexible tubing or pipes, for example. This will avoid transferring to the system any pump oscillations that may arise.

Connecting pump

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



CAUTION

Risk of injury due to mixing up suction and pressure side

Mixing up the suction and pressure side can lead to the rupture of connected components on the suction and pressure side.

→ Observe the marking of the inlet/outlet.

-
1. Remove the protective plugs from the hose connection threads.
 2. Connect the suction line and pressure line (see Chapter 4, Tab. 10 for mounting dimensions).
 3. Lay the suction and pressure line at a downward angle to prevent condensate from running into the pump.

i Pneumatic noises can be reduced or dissipated by using a silencer (see Chapter 11.2 Accessory).

7.4. Connecting the water cooling system (optional)

i Water cooling (see 11.2 Accessory) can increase the service life of the diaphragm, especially at high pressures or high ambient temperatures.

Recommended parameters

Parameter	Value
Water temperature	+ 5°C to + 30°C
Water flow quantity [l/min]	1.0

Tab. 12

Mounting dimensions Mounting dimensions see Fig. 8 and Fig. 9.

i The base plate is shown as an additional accessory in the following dimension drawings.

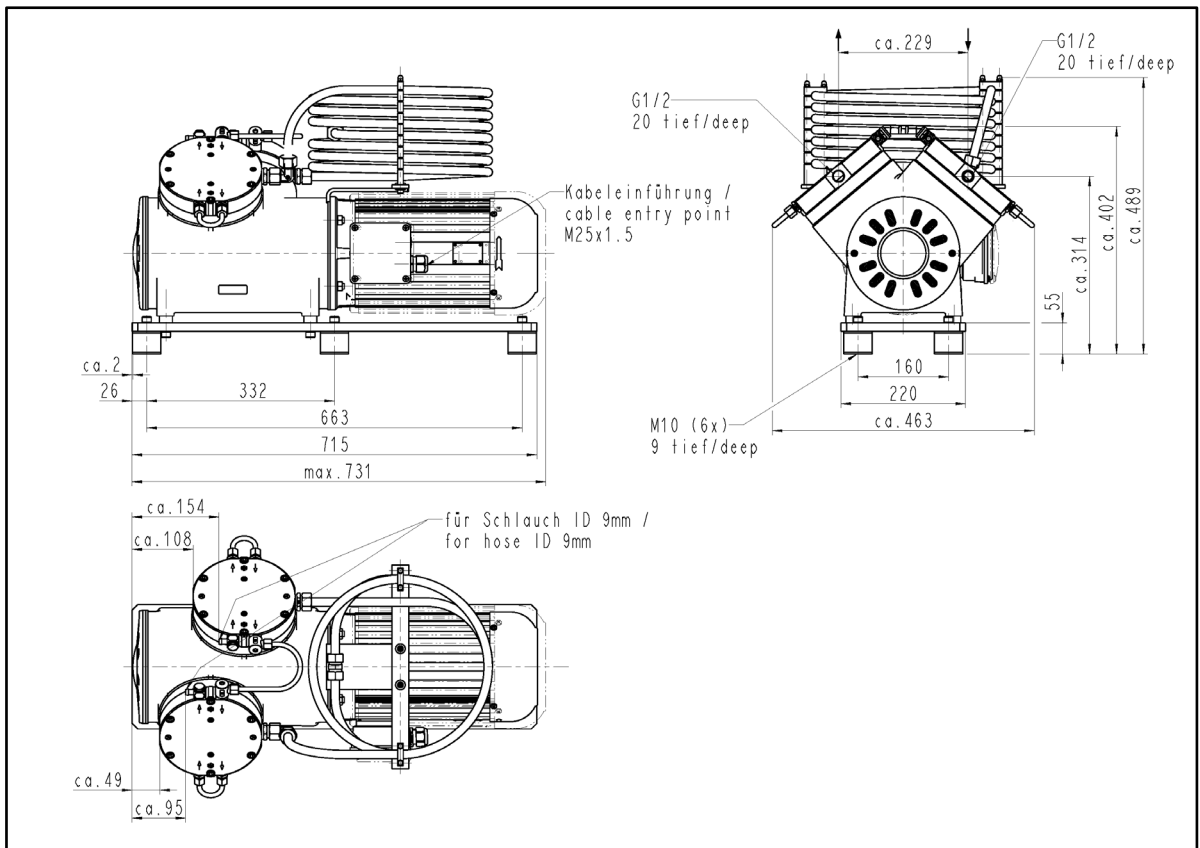


Fig. 8: Mounting dimensions pump series N 2400.15 SPE (All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V)

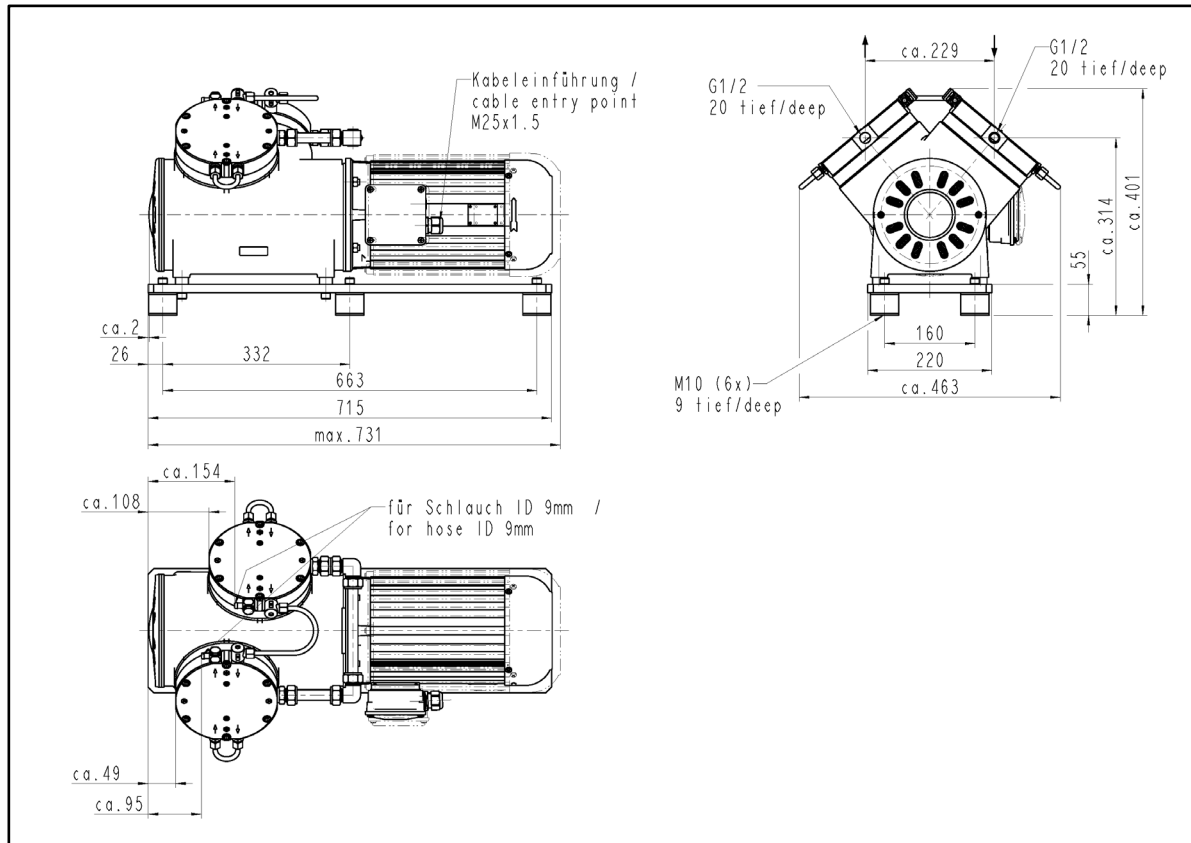


Fig. 9: Mounting dimensions pump series N 2400.15 STE (All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V)

- ➔ Operate the water connection up to max. 1.0 bar.
- ➔ Drain water runoff safely.
- ➔ The flow direction is permissible in both directions.

8. Operation



Danger of burns from hot pump parts or hot medium

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

WARNING

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



Injury of the eyes

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

WARNING

- Don't look into the pump's inlet or outlet during the operation.

- Only operate the pumps under the operating parameters and conditions described in Chapter 4. Technical Data.
- Make sure the pumps are used properly (see Chapter 2.1).
- Make sure the pumps are not used improperly (see Chapter 2.2).
- Observe the safety precautions (see Chapter 3).
- The pumps are intended for installation. Before putting them into service it must be established that machinery or equipment in which they are installed meets the relevant regulations.



Hazard of the pump head bursting due to excessive pressure increase

WARNING

- Do not exceed max. permissible operating pressure (see Chapter 4. Technical Data).
- Monitor pressure during operation.
- If the pressure exceeds the maximum permissible operating pressure, immediately switch off pump and eliminate fault (see Chapter 10. Troubleshooting).
- Only throttle or regulate the air or gas quantity in the suction line to prevent the maximum permissible operating pressure from being exceeded.
- If the air or gas quantity in the pressure line is throttled or regulated, make sure that the maximum permissible operating pressure is not exceeded.
- Ensure that the pump outlet is not closed or constricted.

i Excessive pressure (with all of the related hazards) can be prevented by placing a bypass line with a pressure-relief valve between the pressure and suction sides of the pump. For further information, contact our technical adviser (contact data: see www.knf.com).



WARNING

Automatic starting can cause personal injury and pump damage

When the operation of the pump is interrupted by the triggering device for PTC sensors, the pump will restart automatically after cooling down.

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

i Operation with an open suction-side gas connection can lead to the suction of contaminants and objects.

Pump standstill ➔ With the pump at a standstill, open pressure and suction lines to normal atmospheric pressure.

i The pump may not start up against pressure or vacuum during switch-on. This also applies in operating following a brief power failure. If a pump starts against pressure or vacuum, it may block. This activates the triggering device for PTC sensors, and the pump switches off.

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

Vapors as media The life of the diaphragm is prolonged the formation of condensate is avoided. Therefore the following precautions should be taken:

➔ Run the pump for a few minutes to warm it up before handling saturated or nearly saturated vapors.

➔ KNF recommends: When transferring aggressive media, flush the pump prior to switch off (see Chapter 9.2.1) to increase the service life of the diaphragm.

Switching off the pump / removing from operation ➔ Restore the system to normal atmospheric pressure (release pneumatic pressure in pump).

Recommissioning ➔ Before recommissioning, the relevant norms, directives, regulations and technical standards must be observed at the power source.

9. Servicing

9.1. Servicing schedule

Component	Servicing interval
Pump	<ul style="list-style-type: none"> - Regular inspection for external damage or leaks - Regular check for noticeable changes in noise and vibration
Tube connection	<ul style="list-style-type: none"> - Regular inspection for external damage or leaks
Diaphragm and reed valves	<ul style="list-style-type: none"> - Change if pressure or flow rate of the pump changes for no apparent reason - Replace if bent or worn - Replace at the latest, when pump output decreases

Tab. 13

9.2. Cleaning

9.2.1. Flushing pump

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

9.2.2. Cleaning pump



Danger of burns from hot pump parts

The pump head or motor may be hot even after the pump has been shut off.

CAUTION → Allow the pump to cool after operation.



Health hazard due to dangerous substances in the pump

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

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



Ensure that no liquids enter the inside of the housing during cleaning work.

- Only use solvents for cleaning if the head materials cannot be attacked (check the resistance of the materials).
- If compressed air is available, blow out the components.

9.3. Replacing diaphragm and reed valves

- Conditions
- Motor disconnected from mains and de-energized.
 - Pump and motor cooled.
 - Pump free of dangerous substances.
 - Tubes/pipes removed from pump's pneumatic inlet and outlet.

With multi-head pumps, parts of the individual pump heads can be confused.

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

Information on procedure



WARNING

Health hazard due to dangerous substances in the pump!

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

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



CAUTION

Danger of burns from hot pump parts

The pump head or motor may be hot even after the pump has been shut off.

- Allow the pump to cool after operation.

Spare parts

Spare part*	Position**	Quantity
Diaphragm	(10)	1 (per pump head)
Reed valve	(5)	2 (per pump head)
Valve stopper	(3)	2 (per pump head)
O-Ring	(7)	2 (per pump head)
O-Ring (only .13)	(11)	1 (per pump head)
O-Ring (only .13)	(12)	1 (per pump head)

Tab. 14

*According to spare parts list, Chapter 11

**According to Fig. 10

Tools and material

Quantity	Tools/material
1	Allen key 4 with torque indicator
1	Allen key 6 with torque indicator
1	Philips screwdriver No. 2
1	Adjustable pin-wrench for two-hole nuts, pin dia. 4mm, length of wrench ca. 160 mm (available as 'wrench for retainer plate', a KNF accessory, see Chapter 11.
1	Felt-tip pen
1	Hot air blower
1	Adhesive (Delo ML5249) or comparable product

Tab. 15

*According to accessories list, Chapter 11

- 1 Hexagon socket head cap screw
- 2 Slotted cheese head screw
- 3 Limiter
- 4 Head plate
- 5 Reed valve
- 6 Hexagon socket head cap screw
- 7 O-ring
- 8 Diaphragm
- 9 Diaphragm support
- 10 Retainer plate
- 11 O-ring (only .13)
- 12 O-ring (only .13)
- 13 Housing
- 14 Intermediate plate
- 15 Diaphragm spacer(s)

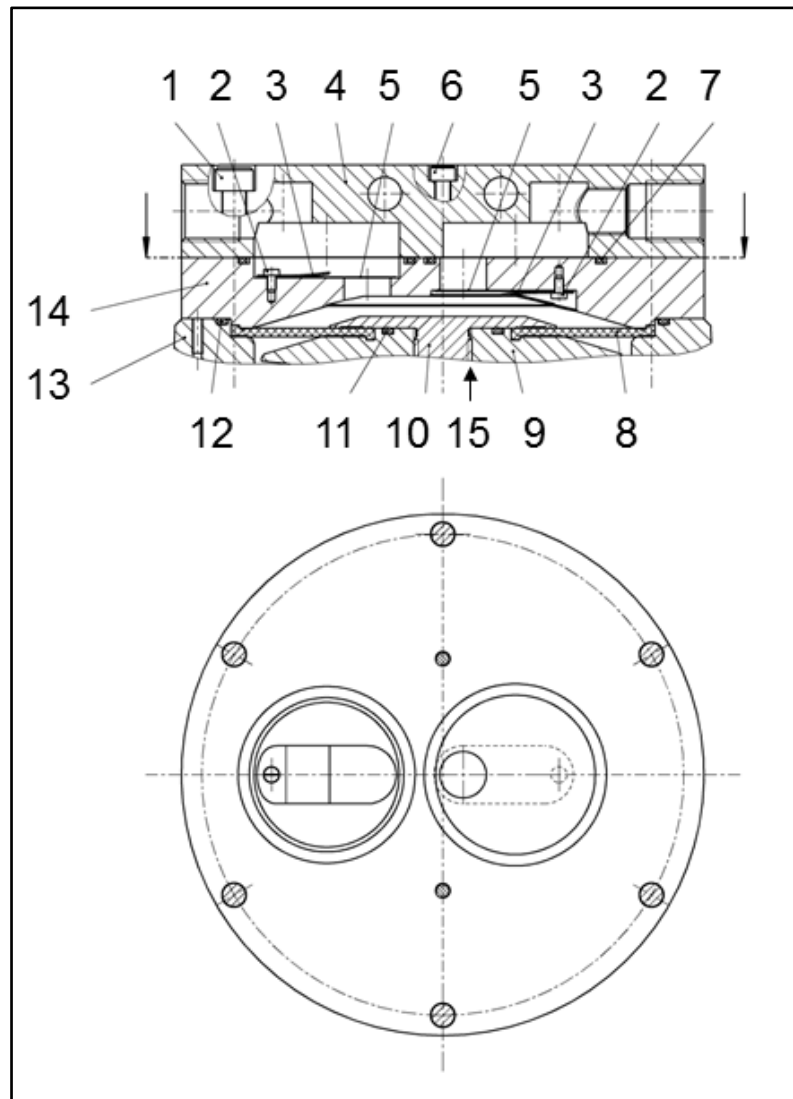


Fig. 10: Pump parts

i The following item numbers refer to Fig. 10, unless otherwise indicated.

Removing pump head

1. Take the steps necessary to gain access to the motor cooling fan:
Undo the screws that hold the fan cover (Fig. 2/7) and remove the fan cover.
 2. Remove the pneumatic connection or the interstage cooler between the pump heads: To do so, mark the union nuts (Fig. 2/7) according to Fig. 11 and loosen them.
 3. Mark the position of head plate (4), intermediate plate (14) and housing (13) relative to each other by a drawing line with a felt-tip pen.
- i** This helps avoid incorrect assembly later.
4. Undo the six hexagon socket head cap screws (1) and the two screws (6); lift off head plate (4) and intermediate plate (14).

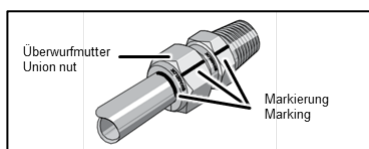


Fig. 11: Marking of the union nuts

5. Carry out steps 3 and 4 for the second pump head.

Changing diaphragm

1. Use a hot-air blower (T= approx. 400°C) to heat the retainer plate (10) for about five minutes until it heats up to approx. 100°C.
2. You must observe the following when removing the retainer plate:



Danger of burns from hot parts

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

WARNING

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

Use the wrench for retainer plate to turn it anti-clockwise and remove the retainer plate (10) from the diaphragm support (9).

3. Remove diaphragm (8).
4. Only .13:
Remove the O-ring (12) from the housing (13).
5. Only .13:
Remove the O-ring (11) from the diaphragm support (9).
6. Inspect all parts for dirt and clean them if necessary.
- i** There might be adhesive residue on the external thread of the retainer plate and on the internal thread of the diaphragm support (9). Remove any adhesive residue!
- i** Make sure the diaphragm spacer(s) (15) do not fall into the pump housing.
With removal of the diaphragm support (9) remove and retain the diaphragm spacer(s) (15).
With reassembly insert the exact number of diaphragm spacer(s) (15).
7. Turn the fan until the diaphragm support (9) is mid-stroke.
8. Place the new diaphragm (8) on the diaphragm support (9);
For N 2400.15 SPE:
Take care that the beads on the outer and inner edges of the diaphragm are properly seated in the grooves in housing and diaphragm support respectively.
9. Only .13:
Fit the new O-ring (12) in the housing (13).
10. Only .13:
Fit the new O-ring (11) in the diaphragm support (9).

11. Completely cover the thread start of the retainer plate (**10**) and the threaded hole of the diaphragm support (**9**) with adhesive. Then screw the retainer plate into the diaphragm support.

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

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

12. Tighten the retainer plate (**10**) firmly; use the wrench for retainer-plate to do so (tightening torque: 20 Nm).

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

13. Carry out steps 1 to 12 for the second pump head.

Changing reed valves

1. Remove the two O-rings (**7**) from the intermediate plate (**14**).
2. Undo the two screws (**2**) and remove valve limiters (**3**) and reed valves (**5**) from the intermediate plate (**14**).
3. Fit new reed valves and valves limiters on pressure and suction sides.

i Take care that the reed valves are symmetrically to the valve bore.

4. Carry out steps 1 to 3 for the second pump head.

Mounting pump head

1. Place intermediate plate (**14**) on housing (**13**) according to the mark made previously (at the same time, keep the diaphragm in its mid-position by holding the motor fan).
2. Fit the two new O-rings (**7**) in the intermediate plate (**14**).
3. Place head plate (**4**) on intermediate plate (**14**) according to the mark made previously.
4. Screw the hexagon socket head cap screws (**1**) and (**6**) in one or two turns.
5. Tighten the two hexagon socket head cap screws (**6**) (tightening torque: 6 Nm); then tighten the six hexagon socket head cap screws (**1**) diagonally (tightening torque: 9 Nm).

i In order to ensure the required gas tightness of the pump head after maintenance, a leak test must be carried out.

6. Turn the fan to check that the pump rotates freely.
7. Carry out steps 1 to 6 for the second pump head:
8. Remount fan cover (Fig. 2/7).
9. Remount the pneumatic connection or the interstage cooler.
To do so, tighten the union nut in the original position (as it was marked during disassembly, see Fig. 11).

10. Troubleshooting



DANGER

Extreme danger from electrical shock!

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

- Check the pump (see Tab. 16 and Tab. 17).

Pump does not transfer	
Cause	Fault remedy
Pump is not connected with the power source.	→ Connect pump with the power source.
No voltage in the power source.	→ Check room fuse and switch on if necessary.
Triggering device for PTC sensors of the motor has operated following to over-heating.	<ul style="list-style-type: none"> → Disconnect pump from mains. → Allow pump to cool. → Trace cause of over-heating and eliminate it.
Connections or lines blocked.	<ul style="list-style-type: none"> → Check connections and lines. → Remove blockage.
External valve is closed or filter is clogged.	→ Check external valves and filters.
Condensate has collected in pump head.	<ul style="list-style-type: none"> → Detach the condensate source from the pump. → Flush the pump under atmospheric conditions some minutes with air (if necessary for safety reasons: with an inert gas).
Diaphragm or reed valves are worn.	→ Replace diaphragm and reed valves (see Chapter 0).

Tab. 16

Flow rate, pressure or vacuum too low	
The pump does not achieve the output specified in the Technical data or the data sheet.	
Cause	Fault remedy
Condensate has collected in pump head.	<ul style="list-style-type: none"> → Flush the pump (see Chapter 9.2.1). → Install pump at highest point in system.
There is gauge pressure on pressure side and at the same time vacuum or a pressure above atmospheric pressure on suction side.	→ Change the pressure conditions.
Pneumatic lines or connection parts have an insufficient cross section.	<ul style="list-style-type: none"> → Disconnect pump from system to determine output values. → Eliminate throttling (e.g. valve) if necessary. → Use lines or connection parts with larger cross section if necessary.
Leaks occur on connections, lines or pump head.	→ Eliminate leaks.
Connections or lines completely or partially jammed.	<ul style="list-style-type: none"> → Check connections and lines. → Remove the jamming parts and particles.
Head parts are soiled.	→ Clean head components.
Diaphragm or reed valves are worn.	→ Replace diaphragm and reed valves (see Chapter 0).

Tab. 17

Fault cannot be rectified

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

1. Flush the pump under atmospheric conditions some minutes with air (if necessary for safety reasons: with an inert gas) to free the pump head of dangerous or aggressive gases (see Chapter 9.2.1).
2. Clean the pump (see Chapter 9.2.2).
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

A spare parts kit contains all parts needed for complete overhaul of the pump head:

N 2400.15 S_E

Spare part	Position*	Quantity
Diaphragm	(10)	2
Reed valve	(5)	4
Valve stopper	(3)	4
O-ring	(7)	4
O-ring (only .13)	(11)	2
O-ring (only .13)	(12)	2
Slotted cheese head screw	(2)	4

Tab. 18

*according to Fig. 10

Spare parts kit	Order No.
N2400SP.9E	315482
N2400SP.13E	313336
N2400ST.9E	315484
N2400ST.13E	315485

Tab. 19

11.2. Accessory

Accessory	Order No.
Wrench for retainer plate	128753
Adhesive (Delo ML5249)	020088
Connection water cooling device N 2400.15 SPE N 2400.15 STE	305444
Base plate with rubber-bonded metals: N 2400.15 SPE N 2400.15 STE	304476
Inlet filter G 1/2	316662

Tab. 20

12. Returns

Preparing for return

1. Flush the pump with air for a few minutes (if necessary for safety reasons: with inert gas) at atmospheric pressure to free the pump head of dangerous or aggressive gases (see Chapter 9.2.1 Flushing pump).
- i** Please contact your KNF sales partner if the pump cannot be flushed due to damage.
2. Remove the pump.
3. Clean the pump (see Chapter 9.2.2 Cleaning pump)
4. Send the pump together with the completed Health and Safety Clearance and Decontamination Form to KNF, stating the nature of the transferred medium.
5. Pack the device securely to prevent further damage to the product. If necessary, request original packaging for a fee.

Returns

KNF shall undertake to repair the pump only under the condition that the customer presents a certificate regarding the medium that is pumped and the cleaning of the pump. In the same way, a return of old devices is possible. Please follow the instructions at knf.com/repairs here.

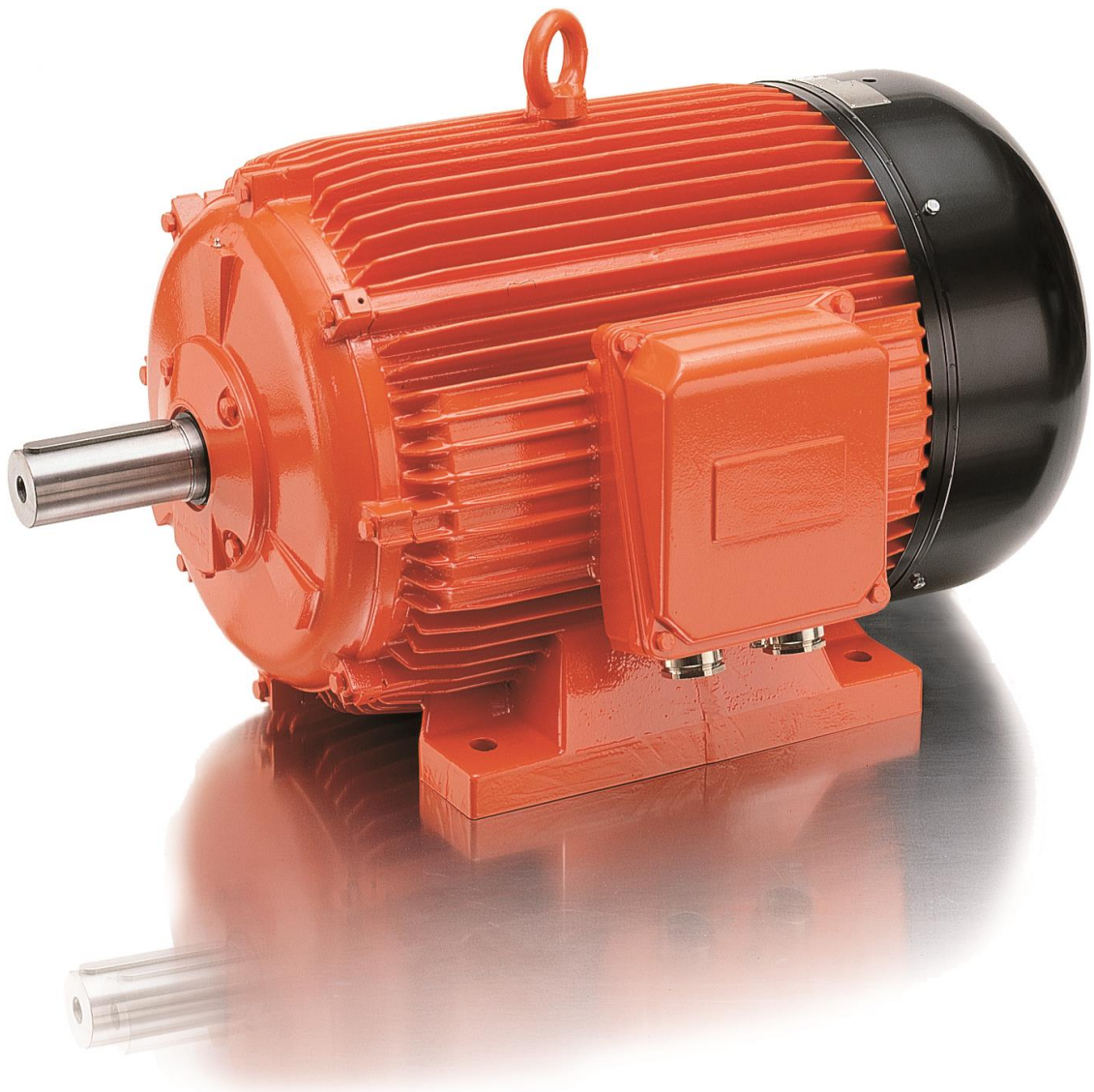
Contact your KNF sales partner directly if you require additional support for your return service.

KNF worldwide

Find your local KNF partner on www.knf.com

Operating manual for three-phase motors (IE2 + IE3 in accordance with IEC 60034-30-1) Frame size HEFIE2 / IE3 56L/.. - HEFIE2 / IE3 450L/..

Issue:2.0 - 07/21



EMOD Motoren GmbH

Electric motor factory

Zur Kuppe 1

36364 Bad Salzschlirf

Germany

Phone: +49 6648 51-0

Fax: +49 6648 51-143


info@emod-motoren.de

www.emod-motoren.de

Table of contents

1	General information	4
1.1	Area of application	4
1.2	Explanation of the labels used	4
1.3	List of safety and installation notes	5
1.4	Limitation of liability	5
1.5	Safety	6
2	Transportation and storage	6
2.1	Transportation	6
2.2	Storage	6
3	Installation and commissioning	7
3.1	Positioning	7
3.1.1	Location	7
3.2	Mountings for motors	7
3.3	Condensation drain holes	7
3.4	Balancing	7
3.5	Insulation resistance check	7
3.6	Electrical connection	8
3.7	Motor protection	8
3.7.1	Thermistor	8
3.8	Commissioning	8
4	Maintenance	9
4.1	Inspection	9
4.2	Bearings	9
4.2.1	Bearings with permanent lubrication	9
4.2.2	Bearings with re-lubrication	9
4.3	Repair	10
4.3.1	Joint sealing	10
5	Spare parts	10
6	Final decommissioning (disassembly, recycling, disposal)	10
7	Appendix	11
8	Declaration of conformity	14
9	Documents provided	15









1 General information

Note	
	<p>The safety instructions contained in this operating manual must be observed!</p> <p>Special designs and structural variants may differ from the basic type in terms of technical details. If there are any uncertainties, we strongly advise you to contact EMOD Motoren GmbH. Always state the motor type and motor number.</p>

1.1 Area of application

The motors can be used in accordance with the protection class stamped on the rating plate, the type of construction intended by the manufacturer according to the catalogue or the customer's information. When using custom motors, the information in the quote and order confirmation also applies.

1.2 Explanation of the labels used

Symbol	Meaning
 Danger	Indicates an immediate danger to life and health. Results in death or serious injury if not prevented.
 Warning	Indicates a possible danger to life and health. May result in death or serious injury if not prevented
 Caution	Indicates a possible danger to life and health. May result in slight or minor injuries if not prevented.
Note	Indicates a potentially harmful situation. The system or things in the surrounding area may be damaged if not prevented.
	Warning of a danger (general). The type of danger is specified by the accompanying warning text.
	Warning of dangerous electrical voltage and its effect.
	Warning of hot surface.
	Warning of suspended load.
	Warning of explosive atmosphere.

1.3 List of safety and installation notes



Caution

Electric motors have dangerous, live and rotating parts. All work during connection, commissioning, maintenance and disposal may only be carried out by qualified professionals. (Observe EN 50110-1 and IEC 60364) Before beginning any work, any in particular before opening covers, the drive must be isolated according to regulations. In addition to the main circuit, any auxiliary circuits which may be present must be taken into account here.

Compliance with the 5 safety rules:

- Isolate
- Secure against being switched on again
- Establish the absence of voltage
- Earth and short-circuit
- Cover or block off adjacent live parts

The measures specified above may only be withdrawn after the work has been completed and the drive is fully installed. Improper conduct may result in injuries and property damage. The applicable national, local and system-specific provisions and requirements must be observed and complied with.



Warning

The proper and safe operation of the products assumes proper transportation, proper storage, positioning and installation, and careful operation and maintenance.



Caution

The surfaces of the motors may be ≥ 55 °C during operation! The hot surfaces should not be touched.



Note

Products with a weight of ≥ 20 kg should only be moved and lifted with appropriate lifting devices.

1.4 Limitation of liability

All information and instructions in this manual have been put together taking the applicable standards and regulations, the state of the art and our many years of knowledge and experience into account.

The manufacturer assumes no liability for damage resulting from:

- Failure to observe the manual
- Improper use
- Use of untrained personnel
- Unauthorised modifications
- Technical modifications
- Use of unapproved spare parts

The obligations agreed in the supply contract, the general terms and conditions, as well as the manufacturer's delivery conditions, and the applicable statutory provisions at the time of signing of the contract apply.

We reserve the right to make technical changes within the context of the performance characteristics and further development.


1.5 Safety

⚠ Warning	
	Installation, commissioning and maintenance may only be carried out by personnel with suitable training and qualifications.

In this respect, special attention should be paid to:

- the technical data and information concerning the proper use (commissioning, environmental and operational conditions), which are stated in the catalogue, the operation manual, the rating plates and the additional product documentation,
- the relevant construction and accident prevention regulations,
- the correct use of tools, lifting and transport devices,
- the implementation of protection measures against unintentional contact when installed to prevent endangerment of persons due to moving parts,
- the use of personal protective equipment.

2 Transportation and storage

⚠ Warning	
	<p>Danger due to heavy loads severe injuries and property damage possible</p> <ul style="list-style-type: none"> ▶ Products with a weight of ≥ 20 kg should only be moved and lifted with appropriate lifting devices ▶ Only use the intended lifting eyes for transportation of the fully assembled drive unit ▶ Do not lift the complete drive unit at the motor transport eyes

2.1 Transportation

The motors must be inspected for transport damage upon receipt. Any possible damage should be documented in detail in writing.

Motors with cylindrical roller bearings are protected against bearing damage by transport protection. The transport protection must be removed before raising of the transfer elements and commissioning.


2.2 Storage

The storage location should be as dry, clean, stable in temperature and free from vibrations as possible.

So that the lubrication film in the motor bearings and the sealing systems is not stripped off, the motor shaft should be turned a few times by hand, e.g. at monthly intervals, during long storage periods.

The motor rolling bearings should be re-greased or replaced if the period between delivery and commissioning is more than 4 years. In unfavourable storage conditions, this period is significantly reduced.

3 Installation and commissioning

⚠ Danger	
	<p>Installations and work may only be carried out with the device deenergised (separated from the mains) and the motor shut down.</p> <p>Death, cardiac arrhythmia</p> <p>► Observe the 5 safety rules, see chapter List of safety and installation notes on page 5</p>

3.1 Positioning

3.1.1 Location

The motors should be installed/fitted while easily accessible and at an ambient or coolant temperature +60°C. Altitude of site max. 1000 m (above sea level).

The cooling air should be able to flow in and out unhindered and should not be directly sucked in again. The air inlets and outlets, as well as the channels between the cooling ribs, should be protected against dust and dirt and regularly cleaned.

If the product is installed with the shaft end upwards or downwards, it should be guaranteed that no water can penetrate the upper bearing.

3.2 Mountings for motors

Foot-mounting motors must be positioned and mounted on an even, vibration-free surface. All mounting feet must lie flat; place thin sheets underneath for levelling if necessary.


For flange motors, care must be taken to ensure the axial run-out of the counterflange. Axial run-out errors may result in bearing damage and/or the failure of sealing systems.

3.3 Condensation drain holes

Care must be taken to ensure that the available condensation drain holes are located at the lowest point of the motor after installation and are kept free from dirt.

Closed condensation drain holes (if present) should be opened from time to time and closed again before each start-up.

3.4 Balancing

⚠ Danger	
	<p>Rotating parts</p> <p>Severe injuries</p> <p>► Secure feather keys against being ejected</p>

The balancing type is indicated on the shaft end face of the motor shafts in accordance with DIN ISO 8821:

- Balancing with a half key "H"
- Balancing with a full key "F"

Observe the appropriate balancing type when installing the drive element!

3.5 Insulation resistance check

Before commissioning of the motor, or after a longer storage period or downtime (more than 6 months), the insulation resistance of the winding should be checked. Check the winding against mass by means of an insulation resistance measuring device (max. DC voltage 500 V). If the minimum

insulation resistance at a winding temperature of 25 °C is smaller than 30 MΩ, or smaller than 1 MΩ at a winding temperature of 75 °C, the motor winding should be dried until the required minimum insulation resistance is reached. The winding temperature should not exceed 80 °C in this regard! Loosen the bearing plate, so that an air exchange can be carried out with closed motors. After the winding has been dried out, the bearing needs to be serviced (see corresponding chapter!).

3.6 Electrical connection

The mains voltage and frequency must match the data on the rating plate. Voltage differences of ±5% and/or frequency differences of ±2% are permissible as described in sector A in accordance with EN 60034-1. We ask that you note this when connecting the motors.

A connection diagram is enclosed with each motor upon delivery. Connection of the motor and the control system, as well as overload protection and earthing, must be done in accordance with the VDE and installation instructions and the EVU provisions.

The direction of rotation of the shaft end on the output side must be checked before commissioning. Reversal of the direction of rotation is possible by swapping any two voltage phases.

The insertion parts intended for tension relief or as anti-rotation protection for the supply lines must be used properly. Seal any openings which are not required.


Tightening torques for terminal board connection screw connections (see page 11)

3.7 Motor protection

3.7.1 Thermistor

Connect the built-in thermistor to the tripping device in accordance with the connection diagram in the terminal box cover or provided with the motor. Only carry out any continuity tests which may be required with a measuring bridge (max. 2.5 V).

3.8 Commissioning

⚠ Caution	
	<p>The surface of the drive may reach high temperatures during operation.</p> <p>Danger of burns</p> <ul style="list-style-type: none"> ▶ Secure hot surfaces against operation or unintentional contact. To this end, attach covers or warning according to the regulations. ▶ Allow the motor to cool sufficiently before commencing any work.

Installation of the transmission elements

Only use appropriate tools and devices for fitting and removing the transmission elements. No pressure or impacts may be transmitted to the motor bearings.

Alignment during coupling operation

During coupling operation, the shafts must be axially and radially aligned against each other. Adjustment of the air between the coupling halves must be done in accordance with the coupling manufacturer's specifications.


Use only couplings which are flexible in terms of centre offset, angle, length and torsion. Rigid couplings are not permitted and may only be used in exceptional cases after consultation with the manufacturer.

Before commissioning, the following at a minimum must be checked:

- The runners can be turned without scraping,
- The motor is properly aligned and installed,
- The drive elements have the correct settings,
- All electrical connections, connection elements and mounting screws are properly tightened and implemented,

- Additional devices which are present (e.g. brakes) are functional,
- The coolant supply is not restricted,
- Measures have been taken to protect against contact with moving and live parts.

4 Maintenance

⚠ Danger	
	<p>Installations and work may only be carried out with the device deenergised (separated from the mains) and the motor shut down.</p> <p>Death, cardiac arrhythmia</p> <p>▶ Observe the 5 safety rules, see chapter List of safety and installation notes on page 5</p>

4.1 Inspection

Depending on the level of the contamination, the entire surfaces of the motors should be cleaned. In most cases, the first inspection should be carried out after approx. 500 operating hours, after 1 year at the latest. Follow-up inspections should be carried out within appropriate intervals based on application conditions, for instance re-lubrication or re-greasing, however at least once a year. Accumulating dust should also be removed every now and then.

During inspection, it should be checked whether

- the technical data is observed in accordance with the rating plate,
- there are no leaks (oil, grease, water),
- the operating noises of the bearings as well as the smooth running of the motor have not deteriorated,
- all mounting screws for electrical and mechanical connections are tight,
- the connection of cable screws on the terminal box is fixed properly. If the cable screws are loose, the strain relief (if present) should be loosened and then, the cable screw should be tightened until the cable can no longer move. Tightening the cable screw too firmly will cause constrictions in the cable and should absolutely be prevented. After successful tightening, the strain relief (if present) should be refastened.
- the alignment of the motor is within the approved tolerances during coupling operation.
- any accumulated dust is removed.

4.2 Bearings

4.2.1 Bearings with permanent lubrication

The motor bearings with permanent lubrication are maintenance-free under normal operating conditions for 10000 to 20000 operating hours, but not longer than 3 years.

4.2.2 Bearings with re-lubrication

For motors with a re-lubrication device, the re-lubrication interval, grease quantity and grease quality are specified on an additional label on the motor.

The prescribed lubrication intervals are shorter under extreme loads and/or at increased temperatures. If the number of operating hours specified on the lubrication plate is not reached within 3 years, then re-lubrication should be carried out early. Re-lubrication should be done with the shaft turning.

Lubricants see page 11

After approx. 15000 operating hours, or 3 years at the longest, the grease should be replaced owing to ageing and excessive lubrication of the bearings. Here, inspect the bearings and replace if necessary.

Mixing of different grease types must be avoided!




Caution

When re-lubricating the bearings, the grease drain screws on the DE side and NDE side bearing plate, where present, must always be opened!



Cleaning intervals

The regular removal of old grease is necessary in order not to negatively affect the expected service life of the bearings.

Note	
	<p>It must be ensured that the running tracks of the bearing and the rolling elements are not damaged during the cleaning process. Do not use metal tools as aids. Make sure there is no dust or dirt near the rolling element or in the rolling element!</p> <p>This causes a drastic shortening in service life!</p>

For further instructions, see chapter Repair

4.3 Repair

Spare parts lists and regular drawings do not contain the types and dimensions of the parts. Therefore, the type and dimensions of the concerned parts should be determined during disassembly and they should be marked for assembly.

4.3.1 Joint sealing

For motors with protection class IP56 or higher (see rating plate), the part joints between the motor housing and the bearing plates should be sealed with a suitable, non-hardening sealing mass.

5 Spare parts

For spare parts orders, the motor type and motor number (details can be found on the rating plate) must always be specified in addition to the exact part designation.

With the exception of standardised commercially available and equivalent parts, e.g. ball bearings, only original parts may be used.

This applies in particular for seals and terminals.

6 Final decommissioning (disassembly, recycling, disposal)

Always disassemble motors in such a way that environmentally-friendly recycling and disposal of the motor components is possible.

When recycling and disposing of the disassembled motor components, always observe the legal regulations and provisions applicable at the time of the final decommissioning!

7 Appendix

Operating conditions	Insulation class	Roller bearing grease / area of application
Normal	F	High-temperature and long-term lubricant -40 °C to +180 °C
High temperatures, extreme operating conditions	H	High-temperature and long-term lubricant -20 °C to +180 °C
Low temperatures	F	Low-temperature lubricant -50 °C to +150 °C

Table 1: Lubricants

Thread \varnothing		M4	M5	M6	M8	M10	M12	M16
Tightening torque	min.	0.8	1.8	2.7	5.5	9.0	14.0	27.0
	max.	1.2	2.5	4.0	8.0	13.0	20.0	40.0

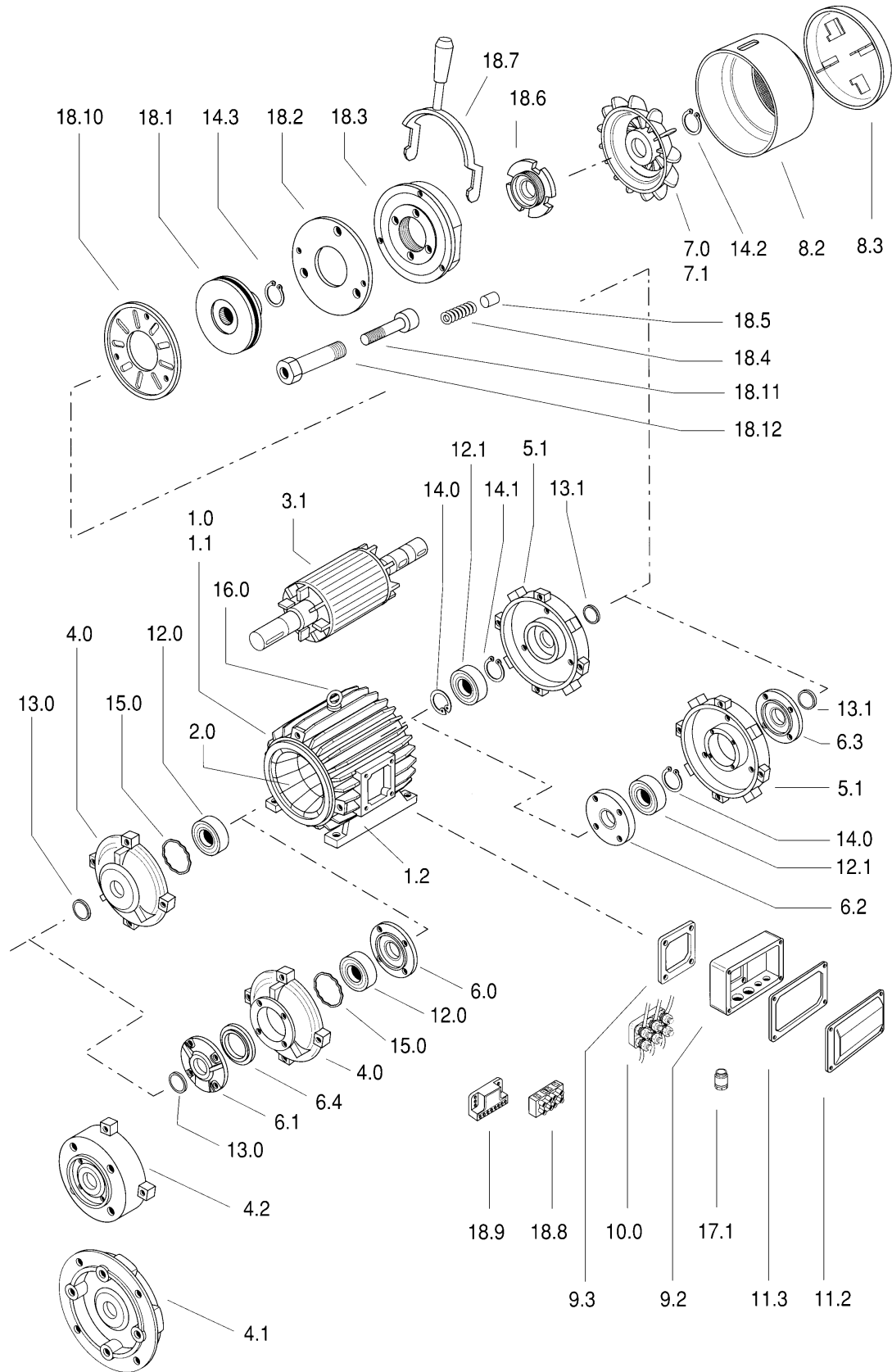
Table 2: Tightening torques for terminal board connection screw connections

The tightening torques apply provided no other values are specified!

Part no.	Description
1.0	Housing (IMB3)
1.1	Housing without feet (IMB5 / IMB14)
1.2	Motor feet
2.0	Stator package with winding
3.1	Rotor with shaft
4.0	Bearing plate AS (IMB3)
4.1	Flange bearing plate (IMB5)
4.2	Flange bearing plate (IMB14)
5.1	Bearing plate BS
6.0	Bearing cover ASi
6.1	Bearing cover ASa
6.2	Bearing cover BSi
6.3	Bearing cover BSa
6.4	Centrifugal disc
7.0	Fan (thermoplastic)
7.1	Fan (aluminium alloy)
8.2	Fan cover
8.3	Protective roof (IMV1)
9.2	Terminal box frame
9.3	Terminal box frame sealing
10.0	Terminal board, complete
11.2	Terminal box cover
11.3	Terminal box cover sealing
12.0	Rolling bearing AS
12.1	Rolling bearing BS
13.0	Shaft seal ring
13.1	Shaft seal ring
14.0	Securing ring (rolling bearing)
14.1	Securing ring (rolling bearing)
14.2	Securing ring (fan)
14.3	Securing ring (brake)
15.0	Spring plate
16.0	Ring bolt
17.1	Cable screw
18.0	Brake, complete
18.1	Brake disc
18.2	Armature plate
18.3	Magnet part
18.4	Compression spring
18.5	Pressure piece
18.6	Adjustment ring
18.7	Manual ventilation, complete
18.8	Terminal strip
18.9	Rectifier
18.10	Friction plate
18.11	Cylinder screw
18.12	Re-adjustment sleeve

Table 3: Spare parts

Order example: Frame size: 160L
 Motor no.: 3574507
 Part: 3.1 rotor with shaft



8 Declaration of conformity

EC Declaration of conformity

Document no./month/year : 1.51.821.010/06.22
Manufacturer : EMOD Motoren GmbH
Address : Zur Kuppe 1
D-36364 Bad Salzschlirf
Product description : Three-phase motors
Type (frame size) : HEF IE2 56L/.. - HEF IE2 450L/..
HEF IE3 56L/.. - HEF IE3 450L/..

Three-phase motors in accordance with Directive 2009/125/EG, Regulation (EU) No. 2019/1781 and Regulation (EU) No. 4/2014

The designated product is in compliance with the stipulations set forth in the following European directives:

2014/35/EU

Directive 2014/35/EU of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast)


2014/30/EU

Directive 2014/30/EU of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

The designated product has been developed and produced in compliance with the following standards:

EN 60034-1: 2010 + Cor.: 2010	EN IEC 60034-5: 2020	EN 60034-6: 1993
EN 60034-9: 2005 + A1: 2007	EN IEC 61000-6-1: 2019	EN IEC 61000-6-2: 2019
EN IEC 61000-6-3: 2021	EN IEC 61000-6-4: 2019	EN 60204-1: 2018
EN IEC 60034-30-1: 2014		

First establishment of the CE certification: 2010

Issuer: : EMOD Motoren GmbH
Place, date : Bad Salzschlirf, 28.06.2022
Management : 

Roland Odenwald

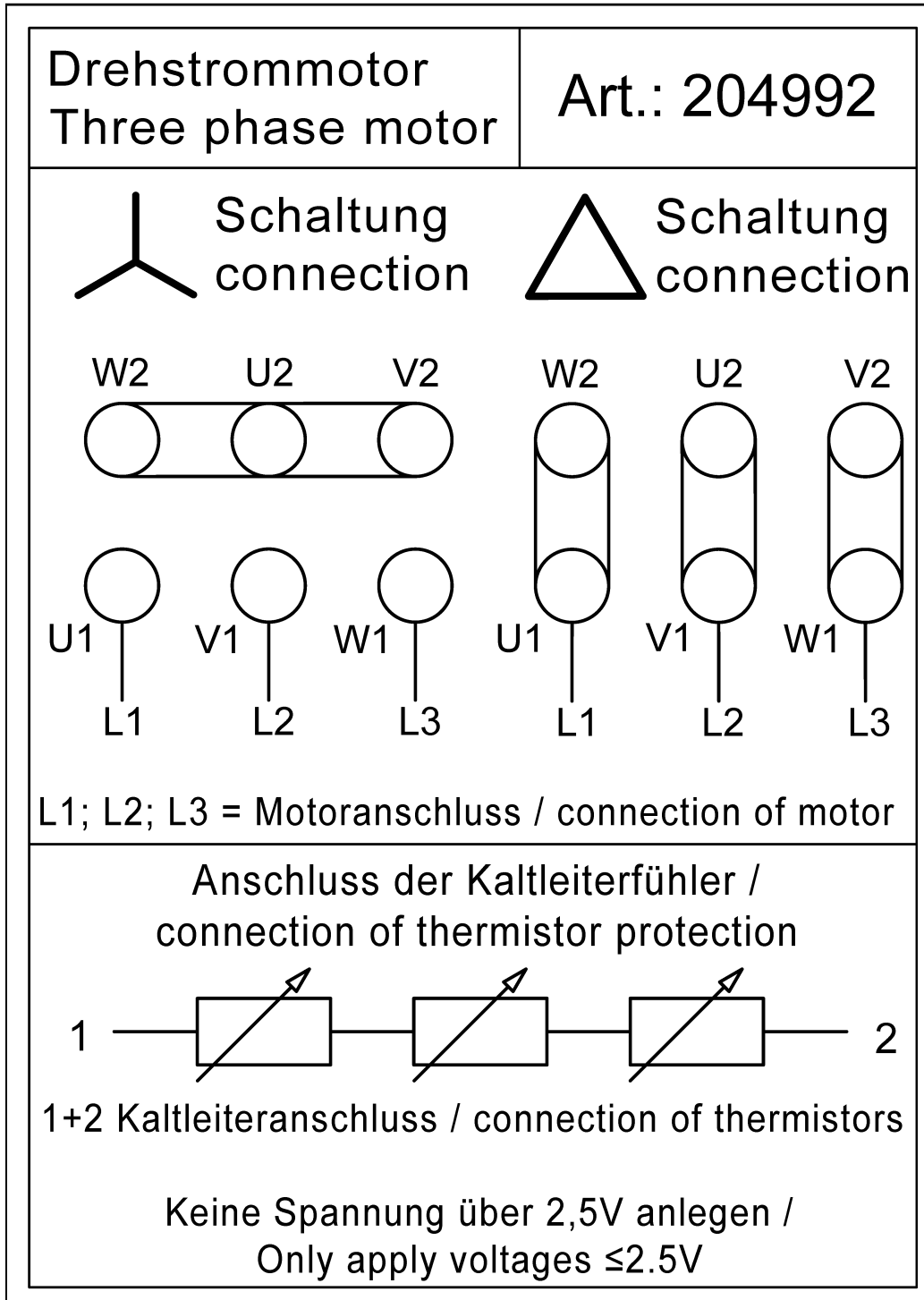
This declaration certifies compliance with the above-mentioned directives and standards, but is no assurance of characteristics in the sense of the product liability.

The safety instructions in the operating manual supplied must be observed.

9 Documents provided

- [Circuit diagram](#)

Anschlussschaltbild(er)
Connection diagram(s)



Hausanschrift/ address:
Zur Kuppe 1
D- 36364 Bad Salzschlirf

Tel. 06648 51-0
Fax. 06648 51-143
info@emod-motoren.de
www.emod-motoren.de

EC Declaration of conformity

Document no./month/year : 1.51.821.010/06.22
Manufacturer : EMOD Motoren GmbH
Address : Zur Kuppe 1
D-36364 Bad Salzschlirf
Product description : Three-phase motors
Type (frame size) : HEF IE2 56L.. - HEF IE2 450L..
HEF IE3 56L.. - HEF IE3 450L..

Three-phase motors in accordance with Directive 2009/125/EG, Regulation (EU) No. 2019/1781 and Regulation (EU) No. 4/2014

The designated product is in compliance with the stipulations set forth in the following European directives:

2014/35/EU

Directive 2014/35/EU of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast)


2014/30/EU

Directive 2014/30/EU of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

The designated product has been developed and produced in compliance with the following standards:

EN 60034-1: 2010 + Cor.: 2010	EN IEC 60034-5: 2020	EN 60034-6: 1993
EN 60034-9: 2005 + A1: 2007	EN IEC 61000-6-1: 2019	EN IEC 61000-6-2: 2019
EN IEC 61000-6-3: 2021	EN IEC 61000-6-4: 2019	EN 60204-1: 2018
EN IEC 60034-30-1: 2014		

First establishment of the CE certification: 2010

Issuer: : EMOD Motoren GmbH
Place, date : Bad Salzschlirf, 28.06.2022
Management : 

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