HERBORNER PUMPEN

Operating manual

# herborner.F-N

**100% COATING = 0% CORROSION!**

NSF
Certified to NSF/ANSI Standard 50

**Version F-N**
**F-N-C**
**F-N-PM**

**Before starting any work, please read the manual!**

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Translation of the original operating manual

## Information about the operating manual

This manual enables the pump to be used safely and efficiently. The manual is a part of the pump and must be kept in the immediate vicinity of the pump to be accessible to the personnel at all times.

Before starting any work, personnel must have carefully read and understood this manual. It is a basic requirement for safe work that all safety instructions and all other instructions in this manual are obeyed.

In addition, local regulations on health & safety at work as well as general safety rules apply for the area where the pump is used.

*Depending on the type of pump, even if the size and capacity of the pumps differ, unless otherwise specified, all specifications in this operating manual apply for all types of pump.*

## Other applicable documents

In addition to this manual, the following documents must also be considered:

- The block motor's operating manual:
  - "Integral Horsepower AC Induction Motors (MN408), Baldor Electric Company" for herborner.F-N
  - "Operating Instructions for three-phase-motors with permanent magnets (12.13), EMOD MOTOREN" for herborner.F-N-PM
  - "Operating Instructions for water-cooled three-phase-motors (01.14), EMOD MOTOREN" for herborner.F-N-C
- Additional safety and maintenance instructions for the block motor "AC & DC Motor Installation - Maintenance Instructions" for herborner.F-N

## Customer service

| | |
|---|---|
| Phone number | +49 2772 933 - 0 (reception) |
| E-mail | info@herborner-pumps.com |

Our reception will quickly connect you with the right person.

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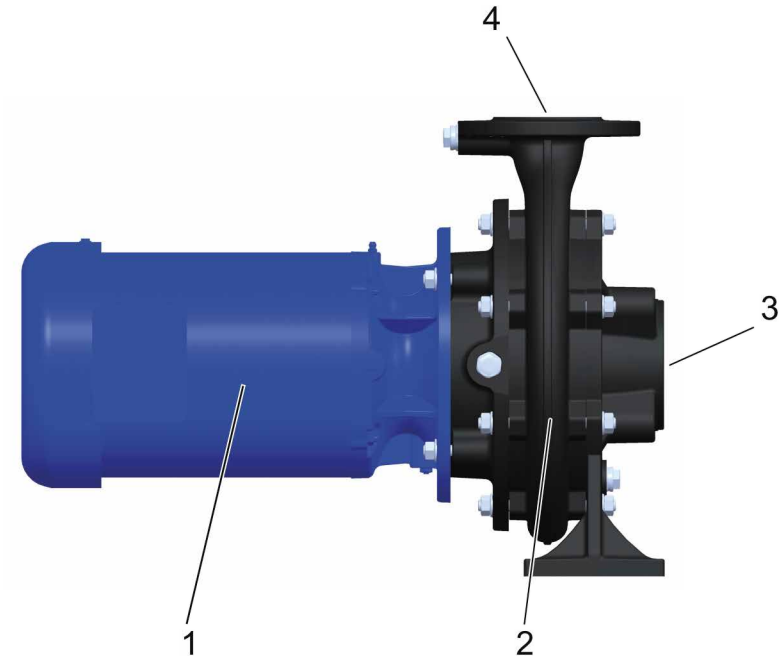



*Fig. 1 Modules overview (example: herborner.F-N)*

1 Block motor
2 Pump casing with impeller
3 Inlet/suction side flange
4 Outlet/pressure side flange

**Brief description**

The herborner.F-N is a coated pump for swimming pools which can be used to recirculate the water in the pool in feed mode. It is available in a variety of sizes with motors configured in a variety of ways (↳*chapter "13.2 Configuration of motor" on page 198*). Depending on the requirements, a frequency converter may be used to control the pump.

This operating manual is valid for all herborner.F-N series pumps.

## Scope of delivery

| Quantity | Name |
|---|---|
| 1 | Ready assembled and configured pump with a block motor |
| 1 | Frequency converter direct or separate connection (optional) |
| 1 | Seal Guard system (optional) |
| 1 | Separate Long-Life set (optional) |
| 1 | Separate analog pressure gage (optional) |
| 1 | Separate digital pressure sensor unit (optional) |
| 1 | Separate installation tool for mechanical seals (optional) |

# 2 Safety

## 2.1 Symbols used in this manual

**Safety instructions**

Safety instructions in this manual are marked with symbols. The safety instructions are introduced with key words which are intended to express the extent of the risk.

**⚠ DANGER** — **This key word signals a situation which can be immediately hazardous, which will lead to death or serious injury if not avoided.**

**⚠ WARNING** — **This key word signals a situation which might possibly be hazardous, which could lead to death or serious injury if not avoided.**

**⚠ CAUTION** — **This key word signals a situation which might possibly be hazardous, which could lead to minor or light injuries if not avoided.**

***NOTICE*** — **This key word signals a situation which might possibly be hazardous, which could lead to damage to property or to the environment if not avoided.**

### Safety instructions in the manual

Safety instructions can refer to certain, individual instructions to do something. Safety instructions like this are embedded in the general instructions so that they do not interrupt the smooth flow of reading the instructions, while carrying them out. The key words described above are used.

For example:

1. Undo the screw.
2. ⚠ **CAUTION, risk of entrapment by cover!**

   Close the cover carefully.
3. Tighten the screws.

### Hints and recommendations

*This symbol shows that there are useful hints and recommendations for efficient, fault-free operation of the pump.*

## Other conventions

The following symbols are used in this manual to emphasize instructions, results, lists, references and other items:

| Marking | Explanation |
|---|---|
| 1., 2., 3. ... | Used for step by step instructions |
| ⇨ | The results of a step |
| ↳ | References to other sections of this manual or to other applicable documents |
| ■ | Lists in no particular order |
| [Pushbutton] | Controls (e.g. pushbuttons, switches), indicators (e.g. indicator lights) |

## 2.2 Intended use

The herborner.F-N pump is only to be used to recirculate and filter the water from swimming pools in feed mode. It may be operated horizontally (with the motor upwards) and vertically and within its designed capacity (↳ *chapter "13 Technical data" on page 181*) with the safety devices specified in this manual. The pump can be used in public or private swimming pools to maintain the water quality via circulation.

*The herborner.F-N is not able to filter out viruses, bacteria, chemical pollutants, microorganisms or other materials injurious to health. Other preventive measures must be taken to ensure hygiene.*

Intended use also includes complying with everything specified in this manual.

Any use which exceeds or deviates from the intended use is misuse.

**⚠ WARNING**

**Danger from misuse!**

**Never**

- **operate the pump in a potentially explosive environment.**
- **immerse or operate the pump in water.**
- **operate in any other position than the horizontal and vertical position (with motor upwards).**
- **operate the pump with pipelines which exert forces on the connecting flanges.**
- **start the pump when empty.**
- **operate the pump without any liquid to pump.**
- **use the pump to pump chemicals or water containing chemicals.**
- **use the pump to pump liquids containing hydrogen sulfide (e.g. waste products, drainage water, clarified waste water, pond water) or other heavily polluted liquids.**
- **operate the pump with brine baths, the chloride content of which exceeds 0.13 oz/gal.**
- **fill the pump with additives (such as perfumes, cleaning tablets, soap, dyes etc.).**
- **operate the pump for a longer period with the wrong direction of rotation.**
- **operate the pump outside of its specified operating limits.**

**Improper of the herborner.F-N can result in hazardous situations.**

## 2.3 Danger zone

*When operating, the danger zone is a zone with a radius of 59 inches around the pump and the immediate environment of any connected frequency converter. Persons may only enter the danger zone when the pump is switched off.*

## 2.4 Safety devices

### 2.4.1 Existing safety devices

**Temperature monitor**

All block motors have an integrated temperature monitor, which will turn the motor off, if it overheats, to prevent damage to components. As soon as the block motor has cooled down sufficiently, the temperature monitor will then automatically switch the block motor back on again.

**NOTICE**

**Disabling the temperature monitor will result in a danger of overheating!**

- **When starting up the pump, wire the temperature monitor so that it functions correctly (*chapter "6.3 Connecting the electrical power supply" on page 78*).**

**If the temperature monitor is not correctly connected, overheating can damage the block motor.**

**Ball valve**

The ball valve is used to release trapped air in the pump *of the herborner.F-N-C*

*The ball valve cannot be used to vent an entire system!*

### 2.4.2 Safety devices required in addition

**Gate valve**

A gate valve allows the water to be safely shut off for maintenance work. It must be fitted in the pressure pipe after the non-return valve.

When operating in feed mode, a gate valve must also be fitted in the supply pipe, immediately in front of the pump.

*To avoid losses due to friction and turbulent flows, the gate valves must not be used to control the flow rate and should always be fully open.*

**Electrical overcurrent protection**

The circuit supplying the block motor must be separately fused or otherwise protected in accordance with the regulations applicable at the pump's location, so that, if there is an overload or a short circuit, the power supply will be interrupted. The power supply may only be restored by resetting the circuit breaker or replacing the fuse in the fuse box.

**Air bleeding device**

The air bleeding device serves to release air trapped in the system of pump and pipes. It must be used in the pressure pipe to avoid long term damage to the pump caused by air pockets.

**Frequency converter (optional)**

Frequency converters serve to adjust the speed of the pump when operating at its duty point and ensure that the block motor is always optimally driven. They provide protection from dangerous pressure surges, which can lead to damage to the system of pump and pipework.

*For systems which are not in constant operation, frequency converters help to avoid long-term damage to the system of pump and pipes.*

**Main switch with emergency stop function**

It must be possible to switch the pump on and off via an easily accessible, separate switch with an emergency stop function, which immediately brings the pump to a standstill. The main switch must conform with the regulations applicable at its site of use.

**Compensators (optional)**

Compensators reduce the vibrations transmitted from the pump to the piping system and compensate for mechanical tension in the pipes.

*Compensators should be used in the pressure pipe to avoid long term damage to the pipe system from material fatigue.*

**Non-return valve**

The non-return valve prevents the water from flowing backwards. It thus prevents dangerous pressure surges, which can lead to damage to the system of pump and pipework.

*A non-return valve should be used before the gate valve in the pressure pipe to avoid long term damage to the system of pump and pipes.*

**Vibration dampers**

Vibration dampers between the pump and its foundations reduce the vibrations and thus the noise generated by the pump when it is operating.

*Vibration dampers should be used to avoid long term damage through material fatigue and to minimize noise levels.*

**Seal Guard system (optional)**

A fully-functioning Seal Guard system uses a media reservoir to prevent the mechanical seal from dry running for approx. two minutes.

*A Seal Guard system may be used to prevent damage to the mechanical seal by dry running.*

## 2.5 Safety labels

The following symbols and signs are in the working area. They relate to the immediate vicinity where they are attached.

**⚠ WARNING**

**Illegible signs are a danger!**

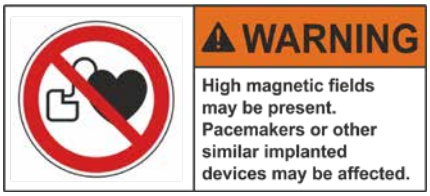
- **Always keep all safety, warning and operating instructions in a good, legible condition.**
- **Immediately renew damaged signs or adhesive labels.**

**Over time, adhesive labels and signs can get dirty or become illegible in some other way, so that dangers cannot be recognized or necessary operating instructions cannot be followed. There is thus a risk of injury.**

### Electrical voltage

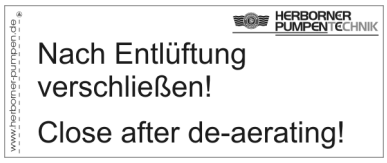
At the points labeled like this, there is a danger of a fatal electrical shock on contact. Only qualified electricians or electrical installers/electric motor technicians may work on electrical components and connection boxes.

### Strong magnetic fields




Strong magnetic fields can cause injuries, even fatal ones. Persons with pacemakers or implants made from metal must not stand within the vicinity of the block motor.

## Danger of water leaking

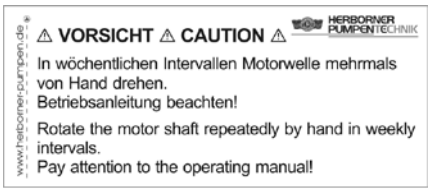



If the pump is operated with the ball valve open, there is a risk of injury and a danger of material damage caused by water leaking out. The pump may only be operated with the ball valve closed.

## Direction of rotation

The rotation indicator arrow on the pump's name plate shows the direction that the pump should be turning. The pump may not be operated in the opposite direction.

## Unhindered operation of impeller




If the pump is not used for a longer period, its impeller must be checked once per week to see that it moves easily, to prevent it from jamming.

## 2.6 Securing the unit to prevent it from being switched on again

Personnel:
- Electrical installer/electric motor technician

**⚠ WARNING!**

- **Before switching on again, ensure that all of the safety devices have been fitted and are in working order and that there is no danger to personnel.**
- **Always comply with the following procedure to secure the system to prevent it from being switched on again.**

**Someone switching the system on who is not authorized to do so or in an uncontrolled manner represents a danger to life! Someone switching the system on who is not authorized to do so or in an uncontrolled manner can lead to serious, even fatal injuries.**

1. Switch the pump off at the main switch if this has not already been done.
2. Interrupt the electrical power supply by removing or switching off the fuse/circuit breaker in the fuse box.
3. Attach a label to the fuse box containing the following details:
   - Date switched off:
   - Time switched off:
   - Switched off by:
   - Notice: Do not switch on!
   - Notice: Only switch on if you are sure that there is no danger to anyone in doing so.
4. If necessary, notify the responsible person about work in a danger zone.
5. After all of the work has been done, ensure that there is no danger for persons.
6. Ensure that all of the safety and protective devices have been installed and are working correctly.
7. Remove the label from the fuse box.

## 2.7 Residual risks

The pump was designed to the latest state of the art and to comply with current safety requirements. There are however residual risks, which require care to be exercised. The following lists the residual risks and the resulting procedures and measures to be taken to avoid them.

### 2.7.1 Dangers from electrical voltage

**Electrical voltage**

**⚠ DANGER**

**Electrical voltage represents a possibly fatal danger!**

- **Never operate the pump if it is not connected to the protective earth.**
- **Only allow qualified electricians to work on the building's electrical installation.**
- **Only allow qualified electricians or electrical installers/electric motor technicians to work on the pump's block motor or on the frequency converter.**
- **During all installation work, comply with the valid state and local building regulations, the national electric code as well as any additional local regulations.**
- **If insulation becomes damaged, immediately disconnect the electrical power supply by removing/switching off the fuse/circuit breaker and have the damage repaired.**
- **Before doing any work on the pump remove all live voltages from it and secure this state for the duration of the work. During this, conform with the following safety rules:**
  - **De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).**
  - **Check that there are no live voltages present.**
- **Never bridge or otherwise disable fuses/circuit breakers. When replacing fuses ensure that you use the same amperage.**
- **Keep moisture away from live parts. This can lead to a short circuit.**

**On contact with any live parts on the pump's block motor or on the frequency converter there is an immediate danger of death from an electric shock. Damage to the insulation or to individual components can represent a danger to life.**

### 2.7.2 Dangers from rotating parts

**Fan and impeller**

**⚠ WARNING**

**There is a danger of injury from the rotating fan and the impeller!**

- **Before doing any work on the pump remove all live voltages from it and secure this state for the duration of the work. During this, conform with the following safety rules:**
  - **De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26).***
  - **Check that there are no live voltages present.**
- **Take account of the run-on time. Before starting work make sure that nothing is moving.**
- **Never reach into the pump while it is in operation or stand near the block motor.**
- **During maintenance or commissioning work do not wear loose items of clothing, hanging jewelry (e.g. necklaces or bracelets) and if you have long hair do not wear it loose.**
- **Protective covers removed for maintenance work must always be replaced once the maintenance work is complete.**

**The impeller in the pump casing and the fan in the block motor (only herborner.F-N and herborner.F-N-PM) turn very quickly when in operation. Contact with the rotating parts or them tangling/catching clothing, jewelry or long hair can lead to serious injuries.**

### 2.7.3 Risk from magnetic fields

**Strong magnetic fields**

**⚠ WARNING**

**Risk of death from strong magnetic fields!**

- **Persons with pacemakers or implants made from metal must not stand within the vicinity of the block motor.**
- **Keep magnetic materials or those containing iron away from the block motor. Such materials may be attracted and cause injuries to persons.**
- **Remove any metallic items (jewelry, watches, pens, etc.) before performing maintenance.**
- **Keep electronic devices, data storage devices or credit cards, etc. away from the block motor. These may be damaged.**

**During operation, the block motor may build up a strong electromagnetic field. Strong magnetic fields may cause serious or even fatal injuries as well as considerable damage to equipment.**

### 2.7.4 Dangers from high temperatures

**Hot water being pumped**

**⚠ WARNING**

**There is a danger of scalding if hot water is being pumped!**

- **Before doing any work, interrupt the flow of the water using the gate valve.**
- **Before doing any work, ensure that any liquid remaining in the pump casing has cooled down to ambient temperature. Drain the pump if required (↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*).**

**Depending on the application, the pumped medium can be hot. Skin contact with the pumped medium can cause burns to the skin.**

**Hot surfaces**

**⚠ WARNING**

**There is a danger of burns from hot surfaces on the block motor!**

- **Before doing any work, ensure that all surfaces have cooled down to ambient temperature.**

**The block motor can heat up in operation. If the hot surfaces touch skin, burns may result.**

### 2.7.5 Dangers at the installation site

**Noise**

**⚠ CAUTION**

**There is a danger of injury from noise!**

- **Depending on the power of the pump, use vibration dampers and compensators for assembly (↳ *chapter "5 Installing and connecting the pump" on page 63*).**
- **Do not stand near the pump for longer periods while it is in operation. Wear hearing protection when working near the pump.**

**The level of noise which occurs in the working area can cause damage to your hearing after extended exposure.**

### Water leaking

**⚠ CAUTION**

**There is a danger of injury and of damage from leaking water!**

- **Regularly check the pump for leaks.**
- **Never open the ball valve or the screwed plugs when the pump is in operation, and close them properly when the maintenance work is complete.**
- **If water comes out, immediately switch the pump off, close the gate valve, find what is causing it and fix it (↳*chapter "9 Fault-fixing" on page 113*).**
- **Wear non-slip safety shoes.**
- **Attach warning signs close to where puddles formed on the floor.**
- **Clean up puddles using suitable means.**

**If the pump or the piping system is not sealed properly then water may leak out. Slipping in puddles on the floor can lead to a fall. A fall may cause injuries.**

## 2.8 What to do in case of danger

- **In case of danger immediately switch off the pump via the main switch with an emergency stop function or interrupt the electrical power supply by removing or switching off the fuse/circuit breaker in the fuse box.**
- **Get the dangerous situation under control and, before switching back on, ensure that there is no longer any danger.**

**⚠ WARNING**

**Someone switching the system on who is not authorized to do so or in an uncontrolled manner represents a danger to life!**

- **Before switching on again, ensure that the dangerous situation has been remedied, that all of the safety devices have been fitted and are in working order, and that there is no longer any danger to personnel.**

**Someone switching the pump on who is not authorized to do so or in an uncontrolled manner can lead to serious, even fatal injuries.**

## 2.9 The owner's responsibility

**The owner**

The owner is the person or company who operates the pump or who allows it to be used by a third party and who bears the legal responsibility for the product for the protection of the user, the personnel and for third parties.

**The owner's duties**

If the pump is used in the commercial area, then its owner is subject to the legal duties regarding health & safety at work.

Apart from the safety instructions in this manual, the regulations on safety, on health & safety at work and on the protection of the environment must be complied with.

In particular, the owner must

- find out about the health & safety at work regulations which apply at the place where the pump is used and must then ensure compliance with these regulations.
- fit the necessary safety devices which are required for safe operation of the pump (↳*chapter "2.4.2 Safety devices required in addition" on page 22*).
- clearly determine and specify who is responsible for the installation, operation, fault-fixing, maintenance and cleaning of the system.
- make sure that everyone who has to deal with the pump has read and understood this manual. In addition, the owner must also train the personnel how to deal with the pump and inform them of the dangers which it represents.
- provide all those who use the pump with the manual.
- provide the personnel with the necessary protective equipment and issue instructions that it is mandatory to wear it.
- take additional measures at the pump's location to maintain the water quality in the swimming pool in accordance with the legal requirements and specifications of the relevant institutions (for example WHO, CDC).

The owner is also responsible for ensuring that the pump is always in a technically faultless condition. This means that:

The owner must

- ensure compliance with the maintenance intervals described in this manual.
- have all safety devices regularly checked to see that they are both complete and in proper working order.
- ensure that the pump is only used within its permissible operating limits over its entire period of operation.

## 2.10 Qualifications of the personnel

**⚠ WARNING**

**There is a danger of injury if the personnel are inadequately qualified!**

- **Only have all jobs carried out by correspondingly qualified personnel.**

**If unqualified personnel work on the pump, dangers will arise which can cause serious injuries and significant damage.**

### Unauthorized persons

**⚠ WARNING**

**There is a risk of death to unauthorized persons from the hazards in the danger zone!**

- **Unauthorized persons must be kept out of the danger zone. In case of doubt, speak to the persons concerned and instruct them to leave the danger zone.**
- **Interrupt your work while unauthorized persons are within the danger zone.**

**Unauthorized persons who do not meet the requirements described here, do not know what the dangers are in the danger zone. For unauthorized persons there is thus a danger of serious injury and even death.**

## Qualifications of the personnel

The following qualifications for the various areas of work are mentioned in this manual:

### Crane and tower operator

Crane and tower operators have been trained to transport and handle heavy objects with the help of a crane and suitable lifting gear. They are able to safely operate a crane and to select suitable lifting gear for the object to be transported and to securely fasten it, taking account of the nature of the object.

They can prove their technical qualifications with a corresponding certificate.

### Electrical installer/electric motor technician

Electrical installers/electric motor technicians have been trained to do installation, test, maintenance and repair work on complex electrical and electronic equipment. They are able to read instructions, circuit diagrams and technical specifications, to evaluate and make use of them to carry our work competently.

They can prove their technical qualifications with a corresponding certificate.

### Electrician

Electricians have been trained to do installation, test, maintenance and repair work on electrical installations in buildings. They are able to read instructions, circuit diagrams and technical specifications, to evaluate and make use of them to carry our work competently. They do their work in compliance with state and local building regulations and the national electric code as well as other local regulations.

They can prove their technical qualifications with a corresponding certificate.

### General maintenance and repair worker

The general maintenance and repair workers are qualified to carry out simple maintenance and repair work across different technical fields on technical equipment and building installations. They are able to do simple installation and dismantling jobs for the purpose of repairing and to read, evaluate and make use of instructions, circuit diagrams and technical specifications in order to carry out work competently.

They can prove their technical qualifications with a corresponding certificate.

### Industrial truck and tractor operators

Industrial truck and tractor operators have been trained to transport and handle heavy objects with the help of a fork lift truck. They are able to safely operate a fork lift truck and to lift the object to be moved and transport it, taking account of its nature.

They can prove their technical qualifications with a corresponding certificate.

### Manufacturer (Baldor Electric Company)

Some work on the pump's block motor requires a high level of specialist knowledge. For safety reasons, this work can and must only be carried out by personnel from the Baldor Electric Company.

### Manufacturer (EMOD MOTOREN)

Some work on the pump's block motor requires a high level of specialized knowledge. For safety reasons, this work can and must only be carried out by personnel from EMOD MOTOREN.

### Manufacturer (Herborner Pumps)

Some work on the pump requires a high level of specialist knowledge. For safety reasons, this work can and must only be carried out by personnel from Herborner Pumps.

### Millwright

Millwrights have been trained to assemble, repair, move and disassemble complex machines and components. They are able to read instructions, circuit diagrams and technical specifications, to evaluate and make use of them to carry our work competently.

They can prove their technical qualifications with a corresponding certificate.

### Plumber/Pipefitter

Plumbers/pipefitters have been trained to safely install & connect pipelines to carry water, and to do necessary maintenance and repair work. They are able to read instructions, flow diagrams and technical specifications, to evaluate and make use of them to carry our work competently and to choose pipes which correspond to the technical requirements and loads, to ensure safe & reliable operation of the system.

They can prove their technical qualifications with a corresponding certificate.

**General requirements on personnel**

Only persons who can be expected to do their work reliably are allowed. Persons whose ability to react is affected, for example through drugs, alcohol or medicines are not allowed to work on the pump.

*Please note the regulations applicable on site specifically related to age and profession.*

## 2.11 Personal protective equipment

Personal protective equipment serves to protect persons from impairments to their health & safety at work.

Persons who work on the pump must wear personal protective equipment, which will be explicitly pointed out in the individual sections of this manual.

**Description of the personal protective equipment**

The personal protective equipment is explained in the following:

**Safety clothing**

Safety clothing is close-fitting work clothing with low resistance to tearing, with close-fitting sleeves and without protruding parts.

**Safety helmet**

Safety helmets protect your head against falling objects, swinging loads and collisions with immobile objects.

**Safety gloves**

Safety gloves serve to protect your hands from abrasion, grazes, puncture wounds or deeper injuries as well as from contact with hot surfaces.

**Safety shoes**

Safety shoes protect your feet from being crushed, from falling parts and slipping on slippery surfaces.

## 2.12 Dangers of damage to material

### Flooding danger

**NOTICE**

**There is a danger of flooding due to mistakes!**

- **Never open the ball valve or the screwed plugs when the pump is in operation, and close them properly when the maintenance work is complete.**
- **Switch off the pump, secure it against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*) and close the gate valve before performing any work on the pump.**

**By making a mistake water can escape in an uncontrolled manner and cause cause considerable damage.**

### Dry running

**NOTICE**

**The pump can be damaged if it runs dry!**

- **Never operate the pump without any liquid to pump. Fill up the pump before starting it up (↳ *chapter "6.5 Filling the pump" on page 86*).**
- **Make sure that all of the gate valves are open during operation.**

**If the pump is operated without any liquid to pump, it will run dry and be damaged.**

### Insufficient cooling

**NOTICE**

**The block motor can be damaged by insufficient cooling!**

- **Only operate the pump at a site with sufficient air exchange and with enough distance to the walls and other devices which radiate heat.**
- **Do not cover the block motor, do not put it in a housing or in any other way cut it off from the surrounding air.**
- **Do not paint the block motor again.**

**Insufficient cooling can overheat the block motor and damage it.**

### Frequent switching

**NOTICE**

**The block motor can be damaged by frequent switching!**

- **Avoid frequent switching processes which are close together.**
- **Before switching the pump on again, allow the motor to cool down.**
- **When operating the pump via a control system, ensure that the control system cannot trigger frequent switching operations.**

**By frequently switching the pump on & off, the block motor can be overloaded.**

### High chlorine levels

**NOTICE**

**The pump can be damaged by high levels of chlorine!**

- **Never chlorinate the water in the supply line directly in front of the pump.**
- **By taking suitable measures (regular checks, for example) ensure that the level of chlorine in the swimming pool is always within the standardized range, in accordance with the relevant specifications (issued for example by the WHO (World Health Organization) and the CDC (Centers for Disease Control and Prevention).**
- **For brine baths, check regularly to ensure that the fraction of chloride ions does not exceed 0.13 oz/gal.**

**A permanently high level of chlorine may damage the pump.**

### Additives

**NOTICE**

**The pump can be damaged by additives!**

- **Do not use cleaning agents, perfumes, dyes or similar substances with the pump.**

**Additives may damage the pump.**

## 2.13 Spare parts

**The wrong spare parts**

**⚠ WARNING**

**There is a danger of injury if the wrong spare parts are used!**

- **Only use genuine spare parts made by Herborner Pumps (*chapter "10 Spare parts" on page 168*).**
- **Always contact our service if there are any questions.**

**If the wrong or faulty spare parts are used, dangers to persons can arise and damage may be caused, malfunctions or even total failure.**

## 2.14 Protecting the environment

***NOTICE***

**A danger to the environment can arise when environmentally hazardous substances are incorrectly used!**

- **Always follow the instructions given below on the use and disposal of environmentally hazardous substances.**
- **If environmentally hazardous substances are unintentionally released into the environment, immediately take suitable measures.**

**If environmentally hazardous substances are used improperly, especially if their disposal is inappropriate, significant damage to the environment can arise.**

The following environmentally hazardous substances are used:

**Grease**

Greases contain poisonous substances. They must not get into the environment. A specialist waste disposal company must dispose of grease.

**Electrical components**

Electrical components contain poisonous substances. They require special waste disposal.

# 3 The function of the pump

## 3.1 Overview

### Overview

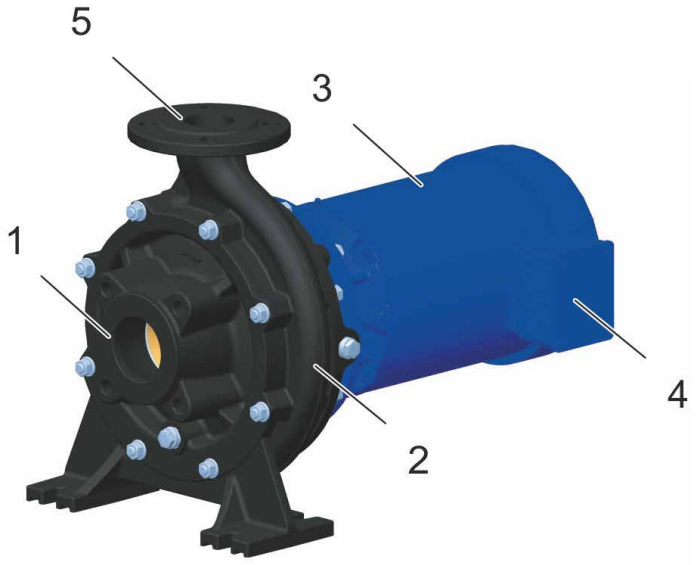



*Fig. 2 Pump setup (example: herborner.F-N)*

1 Connection flange inlet/suction side (↳ *chapter "3.3 Pump casing" on page 51*)
2 Pump casing (↳ *chapter "3.3 Pump casing" on page 51*)
3 Block motor (↳ *chapter "3.2 Block motor" on page 47*)
4 Block motor terminal box (↳ *chapter "3.2 Block motor" on page 47*)
5 Connection flange outlet/pressure side (↳ *chapter "3.3 Pump casing" on page 51*)

*Depending on the application, the block motor can be driven by a frequency converter, which can be installed directly on the motor (up to 30 HP, herborner.F-N und herborner.F-N-PM only), or can be wall-mounted, or can be fitted in a switching cabinet (↳ chapter "3.5.1 Frequency converter" on page 53). The frequency converter is not shown here.(Fig. 2)*

## Functional description of the pump and its type

The herborner.F-N is a coated centrifugal pump. It is used for recirculating swimming pool water.

The pump is available in a number of different sizes, with different drive outputs (↳ *chapter "13 Technical data" on page 181*). Standard motors, permanent magnet motors and heat exchanger motors are used as drives. The pump's exact version can be found on name plate (↳ *chapter "13.8 Name plate" on page 220*). The pump is delivered fully assembled and configured for the particular application specified in the purchase order. Depending on the requirements, a frequency converter will be supplied separately.

The water from the swimming pool enters the pump through the connection flange inlet/suction side (Fig. 2/1). The water is pumped back to the swimming pool through the outlet/pressure side (Fig. 2/5). The flow rate is created in the pump casing (Fig. 2/2) by an impeller which is driven by an electric block motor (Fig. 2/3) The motor is connected to the electrical supply in a terminal box (Fig. 2/4) and optionally through a frequency converter (not shown).

## Operating modes

The pump should be operated in feed mode. The pipelines need to be laid out accordingly (↳ *chapter "5 Installing and connecting the pump" on page 63*).

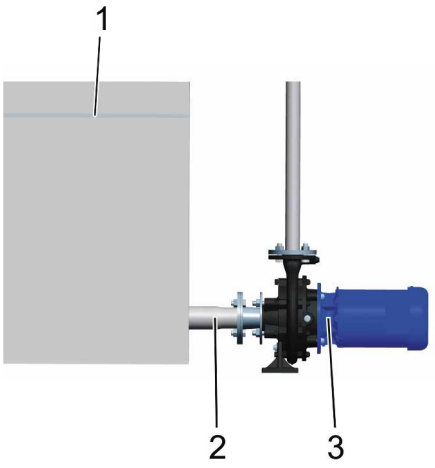



*Fig. 3 Feed mode (example: herborner.F-N)*

1 Water level
2 Feed pipe
3 Pump

In feed mode, the water head pressure pushes the water into the pump. The hydraulic part of the pump (pump casing and impeller) is located below the level of the water in the pool.

## 3.2 Block motor

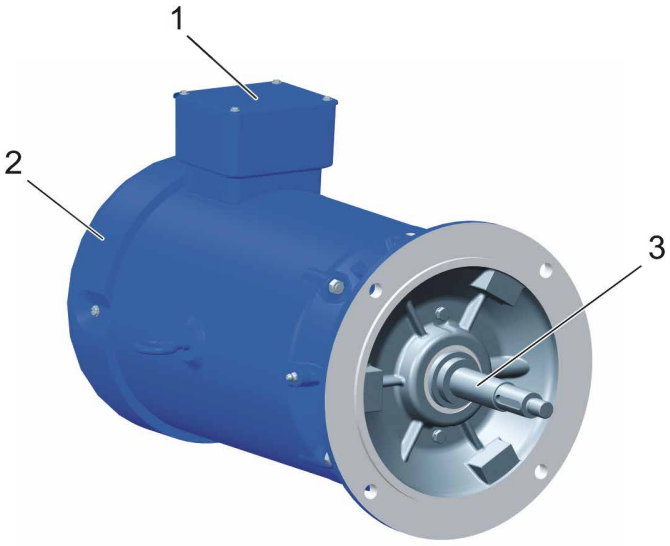



*Fig. 4 Block motor (example: herborner.F-N)*

1 Terminal box
2 Fan with fan hood (herborner.F-N and herborner.F-N-PM only)
3 Motor shaft

A standard motor (herborner.F-N), a permanent magnet motor (herborner.F-N-PM) or a heat exchanger motor (herborner.F-N-C) are used for the block motor. This drives the pump's impeller via a motor shaft (Fig. 4/3).The motor is cooled via a fan (Fig. 4/2) on the rear of the block motor. On herborner.F-N-C pumps, the motor is cooledvia the medium (not shown).

*On the herborner.F-N-PM, the motor can only be started up using a suitable frequency converter. The motor cannot be operated directly via the mains.*

The block motor can be adapted to the electrical supply available the pump's installation site (low or high voltage) via the terminal box (Fig. 4/1). The block motors have parallel windings for the various supply voltages. Depending on what is required, the connection can also be made via an upstream frequency converter (↳ *chapter "3.5.1 Frequency converter" on page 53*).

*The motor's power depends upon the type of pump (↳ chapter "13.2 Configuration of motor" on page 198).*

## Winding taps at the terminal box (herborner.F-N)

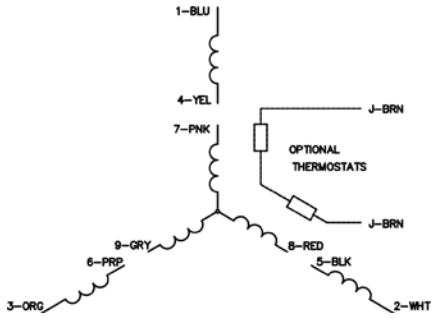



*Fig. 5 Numbering and wiring of the motor connection cables in wye connection (herborner.F-N)*

The connecting wires in the terminal box are numbered as shown in the illustration and are taps from the motors parallel windings. Via corresponding wiring, the windings for the voltage concerned are used in a star connection.

The temperature monitor is connected via the additional lines (J).

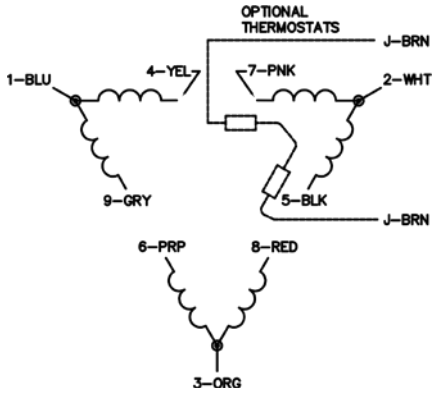



*Fig. 6 Numbering and wiring of the motor connection cables in a delta connection (herborner.F-N)*

The connecting wires in the terminal box are numbered as shown in the illustration and are taps from the motors parallel windings. Using corresponding wiring, the windings for the voltage concerned are used in a delta connection.

The temperature monitor is connected via the additional lines (J).

## Winding taps in the terminal box (herborner.F-N-PM)

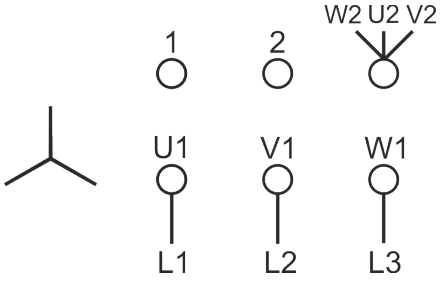



*Fig. 7 Wiring diagram version 1 (herborner.F-N-PM)*

The motors on the herborner.F-N-PM are connected in a wye connection at the factory in versions 1 (Fig. 7) or 2 (Fig. 8). The frequency converter is connected via the terminals U1, V1 and W1.

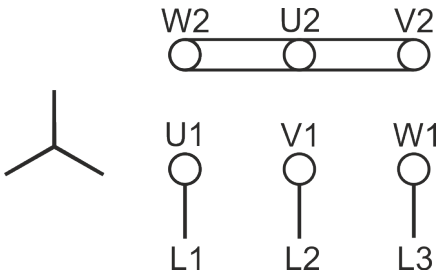



*Fig. 8 Wiring diagram version 2 (herborner.F-N-PM)*

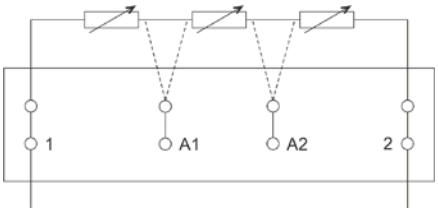



*Fig. 9 Temperature monitor wiring diagram*

The temperature monitor is connected via the additional lines (1 and 2) either to the motor terminal board (Fig. 7) or via a terminal strip (Fig. 8).

## Winding taps in the terminal box (herborner.F-N-C)

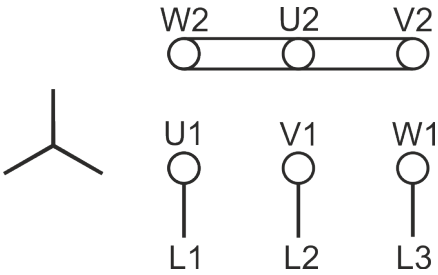



*Fig. 10 Wiring diagram (herborner.F-N-C, wye connection)*

The 3 hp and 5 hp motors of the herborner.F-N-C are connected in a wye connection (Fig. 10) at the factory. The power supply is connected at terminals U1, V1 and W1.

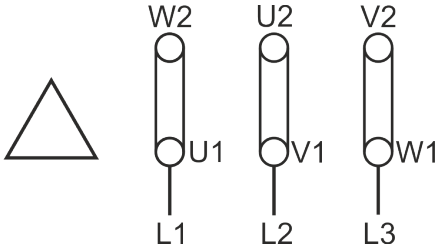



*Fig. 11 Terminal diagram (herborner.F-N-C, delta connection)*

The motors of the herborner.F-N-C (except for 3 hp and 5 hp) are connected in a delta connection (Fig. 11) at the factory. The power supply is connected at terminals U1, V1 and W1.

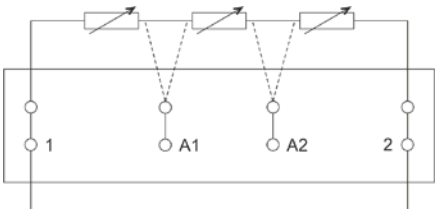



*Fig. 12 Temperature monitor wiring diagram*

The temperature monitor is connected via a terminal strip (Fig. 10) and (Fig. 11) using the additional lines (1 and 2).

## 3.3 Pump casing

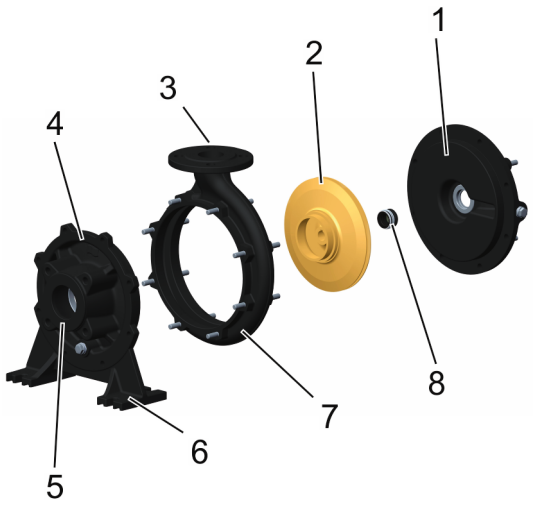



*Fig. 13 Pump casing with attachments (example: herborner.F-N/herborner.F-N-PM)*

1 Intermediate casing
2 Impeller
3 Outlet/pressure side flange
4 Casing cover
5 Inlet/suction side flange
6 Assembly feet
7 Pump casing
8 Mechanical seal

The casing cover (Fig. 13/4) is screwed in the base using the assembly feet (Fig. 13/6) and holds the whole pump structure. The water from the swimming pool enters the pump via the connection flange inlet/suction side (Fig. 13/5) on the casing cover. The closed impeller (Fig. 13/2) rotates in the pump casing (Fig. 13/7), which is powered by the motor shaft. The joint to the block motor is sealed with a mechanical seal (Fig. 13/8) in the intermediate casing (Fig. 13/1). The water is pumped through the connection flange outlet/pressure side (Fig. 13/3).

*On the herborner.F-N-C, the ball valve for de-aerating of the pump is located on the motor's return pipe.*

## 3.4 Connections

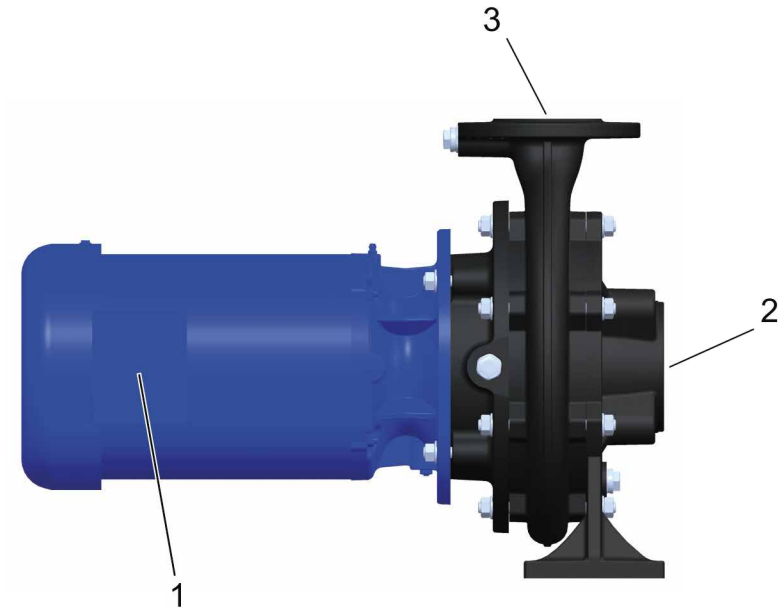



*Fig. 14 Overview of connections (example: herborner.F-N)*

1 Block motor terminal box
2 Inlet/suction side flange
3 Outlet/pressure side flange

The pump is connected electrically via the motor's terminal box (Fig. 14/1) according to the type of mains power. The wiring for the different voltage levels (low/high voltage) is printed in the terminal box or on the block motor.

The suction-side pipes are routed to the connection flange inlet/suction side (Fig. 14/2). The flange diameter depends on the type of pump (*chapter "13.1 Pump dimensions and weight" on page 181*).

The pressure-side pipes are routed to the connection flange outlet/pressure side (Fig. 14/3). The flange diameter depends on the type of pump (*chapter "13.1 Pump dimensions and weight" on page 181*).

## 3.5 Accessories

### 3.5.1 Frequency converter

The frequency converter serves to adjust the speed of the pump when operating at its duty point and ensures that the block motor is always optimally driven. It provides protection from dangerous pressure surges, which can lead to damage to the system of pump and pipework. The frequency converter is connected between the block motor and the electrical power supply, on the block motor's terminals. It can be installed externally, either on a wall or in an electrical cabinet.

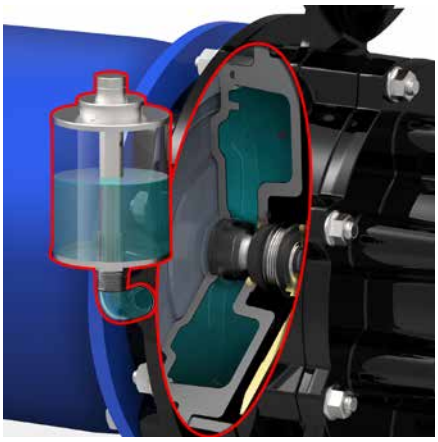
***NOTICE***

**The use of unsuitable frequency converters can damage the pump!**

- **Only use the frequency converters supplied and configured by Herborner Pumpentechnik with the pump.**

**The use of unsuitable frequency converters can damage the pump.**

### 3.5.2 Seal Guard system



A fully-functioning Seal Guard system uses a media reservoir to prevent the mechanical seal from dry running for approx. two minutes. The media reservoir is automatically replenished by a supply container. This container can also be used to detect primary mechanical seal leakage.

*Fig. 15 Seal Guard system (example: herborner.F-N)*

### 3.5.3 Long Life set

The Long Life set consists of a grease gun with high-performance grease. Keeping the motor bearings lubricated increases their lifetime considerably and therefore improves the life cycle costs of the pump.

*Fig. 16 Long Life set*

### 3.5.4 Analog pressure sensor unit

The analog pressure sensor unit is used to display the pressure on the pressure side of the pump. This makes it easy to check how the pump is functioning.

*Fig. 17 Analog pressure sensor unit*

### 3.5.5 Digital pressure sensor unit


The digital pressure sensor unit records the pressure on the pump's pressure side. The value is shown directly via the optional digital display.

*Fig. 18 Digital pressure sensor unit*

### 3.5.6 Installation tool for mechanical seals

Using the installation tool, a new mechanical seal can be precisely pushed onto the motor shaft.

# 4 Transport and storage

## 4.1 Safety instructions for transport and storage

### Offset center of gravity

**⚠ WARNING**

**There is a danger of injury from falling or toppling packages!**

- **When transporting with a crane, note the correct lifting points and attach the crane's hook so that it is above the pump's center of gravity.**
- **Carefully lift the pump and check to see if it tilts. If necessary, correct the positioning of the lifting gear.**
- **Only set the pump down on a level surface capable of bearing its weight.**

**The pump may have a center of gravity that is not in the middle of the pump, depending on the pump model. If the lifting gear is incorrectly attached, the pump can tilt, fall down and cause serious injuries.**

## Loads held aloft

**⚠ WARNING**

**Loads held aloft represent a possibly fatal danger!**

- **Only use approved lifting gear with sufficient load-bearing capacity.**
- **Do not use torn or frayed lifting gear such as ropes or belts.**
- **Do not use lifting gear such as ropes or belts around sharp edges or corners, do not knot them and do not twist.**
- **Only move loads under supervision.**
- **During transport, ensure that there are no persons, objects or obstructions within the range that the pump can swing.**
- **Never go beneath or with the range that a load held aloft can swing.**
- **Before leaving the workplace, set the load down.**

**During lifting procedures, loads can swing out and drop. This can cause serious injuries which may even be fatal.**

## Improper transport

***NOTICE***

**Improper transport can cause damage!**

- **Proceed with great care when setting the pump down on delivery as well as when transporting it to its installation site.**
- **Only use the intended lifting points.**
- **Only remove the packaging shortly before installation.**

**If transported improperly, the pump can fall or topple over. This can result in a considerable amount of damage.**

## 4.2 Delivery

### 4.2.1 Type of delivery

The pump with the installed block motor is packed in a crate and is delivered on a pallet that is suitable for transport with a forklift truck.

The frequency converter (optional) is delivered together with the pump in the crate.

### 4.2.2 Symbols on the packaging

**Center of gravity**

This marks the center of gravity of packed items.

Please note the center of gravity when lifting and transporting.

### 4.2.3 Transporting the packed items

Under the following circumstances, the pallet with the pump can be transported with a fork lift truck:

- The forklift truck must be rated to lift the weight of the items being transported (↳ *chapter "13.1 Pump dimensions and weight" on page 181*). The total weight including packaging can be found in the freight order and in part on the packaging.
- Suitable equipment must be used (e.g., lashes) to secure the pump on the pallet to prevent it from tipping or falling over.
- The driver of the fork lift truck must be authorized to do so.

### Transporting the equipment

Personnel:
- Industrial truck and tractor operators

Personal protective equipment:
- Safety helmet
- Safety clothing
- Safety shoes

Special tool:
- Fork lift truck

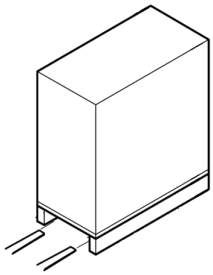


*Fig. 19 Transport using a fork-lift truck*

1. Drive the forks of the fork lift truck between or underneath the pallet's spars.
2. Introduce the forks so far that they protrude from the opposite side.
3. Ensure that the pallet cannot tip over.
4. Lift the pallet with its load and start the transport.

## 4.2.4 Storing the packed items

Store packed items under the following conditions:
- Do not store in the open air.
- Store in a dry and dust-free place.
- Do not expose to any aggressive media.
- Storage temperature: 41 to 104 °F.
- Relative humidity should be less than 60 % if possible.
- If storing for longer than 3 months, regularly check the general condition of all parts and packaging.

## 4.3 Transport inspection

On receipt, immediately check that the delivery is complete and undamaged.

If transport damage is found, proceed as follows:

- If the damage is discovered in the presence of the transport company, do not accept delivery or accept it conditionally and note the transport damage on the transport documents or on the transport company's delivery note.
- If the damage is only discovered when unpacking, report the damage to the transport company. Keep the pump's packaging to allow it to be inspected or for complaints.
- If the items are to be returned, use the original packaging or, if no longer available, have a packaging company securely package the pump for its return transport. If in doubt, please contact Herborner Pumpentechnik.

*Report every problem as as soon as it is detected. Claims for damages can only be made within the applicable period.*

## 4.4 Transporting the pump to its installation site

Under the following circumstances, the pallet with the pump can be transported with a crane:

- The crane and the lifting gear must be rated for the weight of the pump (*chapter "13.1 Pump dimensions and weight" on page 181*).
- The packaging must be removed.
- The pump must be attached at the provided lifting points.
- The crane's hook must be attached over the pump's center of gravity.
- The crane driver must be authorized to operate the crane.
- Protect accessories like hoses, threaded fittings (herborner.F-N-C) and accessories during transport.

## Attaching the lifting gear

| | |
|---|---|
| Personnel: | ■ Crane and tower operator |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Special tool: | ■ Crane and lifting gear |

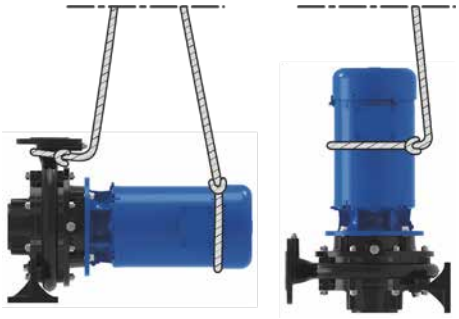


*Fig. 20 Lifting points on the pump (example: herborner.F-N)*

1. Attach the ropes, lashes or multi-point slings according to (Fig. 20.

*The pump may have a center of gravity that is not in the middle of the pump, depending on the pump model. Attach the lifting gear accordingly (if necessary using a traverse), so that the crane hook can be attached over the center of gravity.*

2. Ensure that the pump is hanging straight, if necessary, reattach the crane hook further towards the center of gravity.
3. Start the transport.

# 5 Installing and connecting the pump

## 5.1 Safety instructions for assembly/installation

### Loads held aloft

**⚠ WARNING**

**Loads held aloft represent a possibly fatal danger!**

- **During transport, ensure that there are no persons, objects or obstructions within the range that the pump can swing.**
- **Never go beneath or with the range that a load held aloft can swing.**
- **Make sure that there is sufficient space to install the pump at its installation location.**
- **Remove obstructions and neighboring components from the working area.**
- **Handle the pump carefully.**

**During lifting procedures, the load can swing out and drop. This can cause serious injuries which may even be fatal, as well as significant damage at the installation site.**

### Pump casing

**⚠ WARNING**

**There is a danger of injury from the pump casing!**

- **Wear personal protective equipment during all installation work.**
- **Make sure the installation site meets the necessary requirements (↳ *chapter "5.2 Requirements for installation" on page 64*) before setting the pump down.**
- **Handle the pump carefully and only set it down on a horizontal surface capable of bearing its weight.**

**When installing the pump, there is a danger of limbs being crushed between the pump casing, the foundations, the walls and adjacent components.**

## 5.2 Requirements for installation

Before starting with the installation, ensure that the requirements listed below are met at the installation site.

- The installation site
  - must have the permissible ambient conditions (↳ *chapter "13.4 Operating conditions" on page 204*).
  - must be suitable for the pump's dimensions (↳ *chapter "13.1 Pump dimensions and weight" on page 181*). There must be sufficient free space for the installation and the terminal box and the connection flange must be easily accessible during operation.

    There must be a gap of at least X between the block motor (↳ *chapter "13.4 Operating conditions" on page 204*) and the wall so that the motor can draw in enough cooling air.
  - must ensure that the pipes and cables can easily be routed to the installation site. Clarify the necessary requirements in advance if possible, with a plumber and an electrician.
- The foundations must
  - have a minimum compressive strength of 1200 lbs/sq in (characteristic cylinder strength) and allow a firm screwed connection for the pump.
  - have a waterproof, horizontal and flat surface.
  - have correspondingly prepared holes with thread inserts to bolt the pump in place.

*The installation requirements must be met by building work if necessary, or find some other suitable installation site which meets the necessary requirements.*

## 5.3 Installing and aligning

### 5.3.1 Removing the protective caps

Personnel:
- Millwright

Personal protective equipment:
- Safety helmet
- Safety clothing
- Safety gloves
- Safety shoes


*Fig. 21 Removing protective caps (example: herborner.F-N)*

Remove the protective caps before assembly.

1. Remove the protective caps (Fig. 21/1) on the connection flange inlet/suction side.

### 5.3.2 Checking that the pump's impeller turns easily

Personnel:
- Millwright

Personal protective equipment:
- Safety helmet
- Safety clothing
- Safety gloves
- Safety shoes

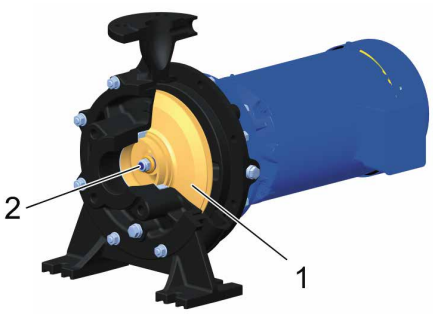



*Fig. 22 Pump impeller (example: herborner.F-N)*

Check that the pump rotates freely before assembly.

2. **⚠ CAUTION! Risk of injury from impeller!**

   While wearing safety gloves, reach into the connection flange inlet/suction side in the direction of the block motor and touch the impeller (Fig. 22/1)

3. Manually turn the impeller a few times until it can be smoothly turned.

## 5.3.3 Installing the pump

### Horizontal installation

| | |
|---|---|
| Personnel: | ■ Crane and tower operator<br>■ Millwright |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Special tool: | ■ Crane and lifting gear |
| Materials: | ■ Vibration dampers<br>■ ½", ⅝" or ¾" foundation bolts<br>■ Washers |

When the installation site meets the requirements, position and install the pump as follows:


*Fig. 23 Horizontal installation of the pump (example herborner.F-N)*

4. **⚠ WARNING! Risk of crushing from pump housing!**

   With the crane, carefully set the pump down horizontally and align it at its installation site on the assembly foot of the casing cover (Fig. 23/1) or the rail (from 50 HP). If necessary, use vibration dampers for vibration and noise reduction between the base and the assembly foot of the casing cover or the rail. The rail is not shown here (Fig. 23).


*Fig. 24 Screwing pump onto base (example: herborner.F-N)*

5. **⚠ WARNING! Risk of injury from the pump falling over if the lifting tackle is removed prematurely!**

   Use the assembly feet of the casing cover (Fig. 24/1) or the rail (50 hp and higher) to firmly screw the pump into the base with four foundation screws with washers. Only remove the crane's separate lifting accessories afterward. The rail is not shown here (Fig. 24).

   ⇨ The pump is now standing safe & secure.

6. Remove the lifting gear.

## Vertical installation

| | |
|---|---|
| Personnel: | ■ Crane and tower operator<br>■ Millwright |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Special tool: | ■ Crane and lifting gear |
| Materials: | ■ Support (25 hp and higher) |

When the installation site meets the requirements, position and install the pump as follows:


*Fig. 25 Vertical installation of the pump (example: herborner.F-N)*

**7. ⚠ WARNING! Risk of crushing from pump housing!**

With the crane, carefully set the pump down horizontally and align it at its installation site on the pipeline and align with the connection flange inlet/suction side (Fig. 30 /1).

**8. ⚠ WARNING! Risk of injury from the pump falling over if the lifting tackle is removed prematurely!**

Screw the pump via the connection flange inlet/suction side with the pipeline. Only then remove the crane's lifting gear.

⇨ The pump is now standing safe & secure.

**9.** Remove the lifting gear.


*Fig. 26 Additional pump fastening (example herborner.F-N)*

10. ***NOTICE*** **The pump can be damaged if not fastened sufficiently!**

    The pump must also be fastened to the wall or a support structure at the foot (Fig. 31/1) on the casing cover.

### 5.3.4 Tightening the screw connections

Personnel:
- Plumber/Pipefitter

Personal protective equipment:
- Safety clothing
- Safety shoes

Special tool:
- Torque wrench

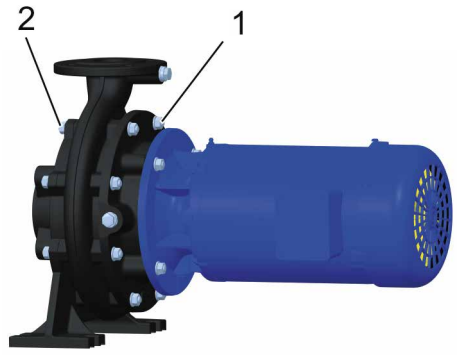



*Fig. 27 Tightening the screw connections (example: herborner.F-N)*

1 Screw connection between intermediate casing and pump casing
2 Screw connection between pump casing and casing cover

**11.** Tighten all screw connections between intermediate casing and pump casing (Fig. 32/1) and between pump casing and casing cover (Fig. 32/2) (⅜" - 16 UNC = 45 Nm, 7/16" - 14 UNC = 70 Nm).

### 5.3.5 Connecting to the pump's flanges

**Suction side**

| | |
|---|---|
| Personnel: | ■ Plumber/Pipefitter |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Materials: | ■ Pipes and reducing adapters<br>■ Pre-filter<br>■ Gate valve<br>■ Pressure gage (optional) |

If installed as the main circulation pump, this pump shall be installed with a strainer conforming to the requirements of NSF/ANSI Standard 50.

When the pump is properly bolted to the foundations, the installation of the pipes can begin.

For feed mode, connect up the pump's suction-side flange as follows.

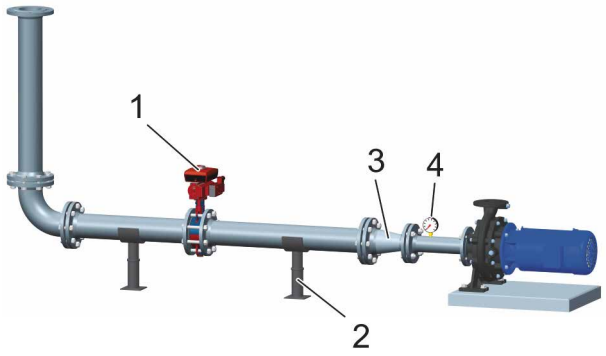



*Fig. 28 Layout of the suction side (example: herborner.F-N)*

1 Gate valve
2 Pipe support
3 Reducing adapter
4 Pressure gage

1. Route the pipes from the swimming pool to the inlet/suction side flange and support all pipes evenly (Fig. 33/2).

**- To avoid cavitation, the pipe should be one size larger than diameter of the pump's flange.**

**- The feed line to the pump must always fall so as to avoid air pockets.**

**- If possible the piece of pipe connecting to the pump's flange should be straight.**

2. Attach a pre-filter at the start of the feed pipe.
3. Install a gate valve at an easily accessible location upstream of the pump (Fig. 33/1).
4. If the pump's flange is smaller than the pipeline, place an eccentric reducing adapter upstream of the flange (Fig. 33/3).

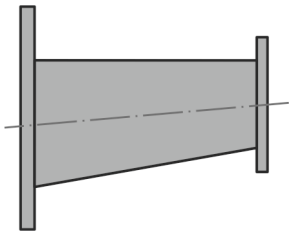


*Fig. 29 Reducing adapter*

*To avoid air pockets from reducing the pump's power, install the reducing adapter with its horizontal side at the top (Fig. 34).*

5. If necessary, fit a pressure gauge immediately upstream of the pump in a straight piece of pipe, which is at least three times as long as the pipe's diameter, in order to read pressure (Fig. 33/4).
6. Bolt the pipe to the pump's flange, ensuring that it is aligned properly and not under stress and that it is air-tight.

*Use washers for optimal handling when screwing the pump onto the pipeline.*

## Pressure side

| | |
|---|---|
| Personnel: | ■ Plumber/Pipefitter |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Materials: | ■ Pipes and reducing adapters<br>■ Air bleeding device<br>■ Non-return valve (optional)<br>■ Compensators (optional) |

When the pump is properly bolted to the foundations, the installation of the pipes can begin.

Whatever the operating mode, the pump's pressure side flange is connected up as follows.

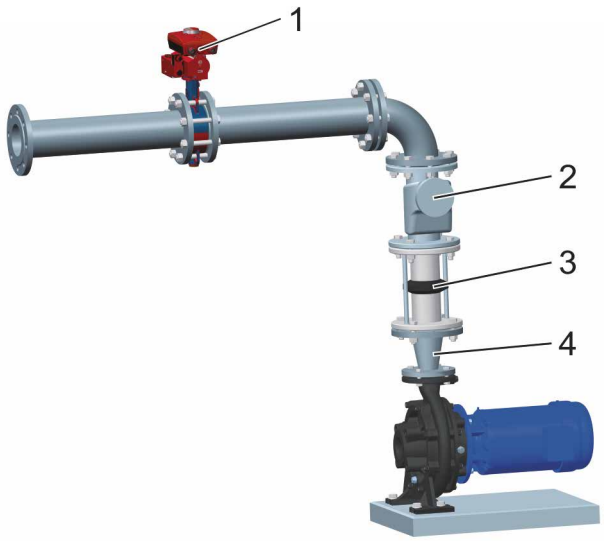



*Fig. 30 Layout of the pressure side (example: herborner.F-N)*

1 Gate valve
2 Non-return valve
3 Compensator
4 Reducing adapter

**1.** Route the pipes from the swimming pool to the outlet/ pressure side flange and evenly support all pipes.

- **To avoid flow losses, the pipe should be one size larger than the diameter of the pump's flange.**
- **To reduce noise transmitted through the structure of the building, use suitable damping on pipe fixings and when pipes are fed through walls.**

2. Fit an air bleeding device to the pressure pipe.
3. If the pump's flange is smaller than the pipe, place a reducing adapter in the connection between the pipe and the flange. (Fig. 35(4.

*To avoid air pockets from reducing the pump's power, install a concentric reducing adapter if possible.*

4. Install a gate valve at an easily accessible location upstream of the pump (Fig. 35(1.
5. If necessary, also fit a non-return valve to avoid surges (Fig. 35(2.
6. If necessary, fit a compensator at a distance of 1 to 1.5 times the pipe's diameter downstream of the pump's connection flange to reduce vibrations (Fig. 35(3.
7. Bolt the pipe to the pump's flange, ensuring that it is aligned properly and not under stress and that it is airtight.

## 5.4 After installation

| | |
|---|---|
| Personnel: | ■ Plumber/Pipefitter |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |

After the installation, repeat the final check.

1. Again check that all bolted connections along the pipeline are firmly seated.

# 6 Installation and putting into operation for the first time

## 6.1 Safety instructions for the installation and putting into operation for the first time

### Electrical voltage

**⚠ DANGER**

**Electrical voltage represents a possibly fatal danger!**

- **Only allow qualified electricians to work on the building's electrical installation.**
- **Only allow qualified electricians or electrical installers/electric motor technicians to work on the pump's block motor or on the frequency converter.**
- **During all installation work, comply with the valid state and local building regulations, the national electric code as well as any additional local regulations.**
- **Before doing any work on the pump remove all live voltages from it and secure this state for the duration of the work. During this, conform with the following safety rules:**
  - **De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).**
  - **Check that there are no live voltages present.**

**There is a danger of a fatal injury on touching live components. If an unauthorized person switches the electrical power supply on during the installation, there is a danger of serious injuries which can be fatal.**

### Water leaking

**⚠ CAUTION**

**There is a danger of injury and of damage from slipping in leaking water!**

- **Wear non-slip safety shoes.**
- **If water comes out, immediately switch the pump off, close the gate valve, find what is causing it and fix it (*chapter "9 Fault-fixing" on page 113*).**
- **Clean up puddles using suitable means.**

**If the connection flange does not seal properly, it may cause water leaks. Slipping in puddles on the floor can lead to a fall. A fall may cause injuries.**

### Improper installation

**NOTICE**

**The pump can be damaged by improper installation!**

- **Make sure that the block motor and frequency converter are suitable for the supply voltage available on site (*chapter "13 Technical data" on page 181*).**
- **Carefully wire up the block motor and any frequency converter to the terminals in accordance with the supply voltage on site as shown on the wiring diagrams printed on the block motor.**
- **Fill up the pump before starting it up (*chapter "6.5 Filling the pump" on page 86*).**
- **Check the pump for correct direction of rotation before regular operation (*chapter "6.6 Checking the direction of rotation" on page 87*).**

**Improper installation can damage the pump.**

## 6.2 Preparing the electrical installation in the building

Personnel: ■ Electrician

Personal protective equipment: ■ Safety shoes

Before starting with the installation, the requirements listed below must be met at the installation site.

1. Install the power supply company's electrical connection cables to the block motor at the pump's installation site in accordance with the applicable regulations.
2. Separately fuse the electrical connections to the pump in accordance with the regulations which apply at the pump's installation site.
3. Install a main switch with an emergency stop function, to switch the pump on and off at an easily accessible location near to the pump in accordance with the regulations which apply at the pump's installation site.

## 6.3 Connecting the electrical power supply

### 6.3.1 Connecting the herborner.F-N without frequency converter

Personnel:
- ■ Electrician
- ■ Electrical installer/electric motor technician

Personal protective equipment: ■ Safety shoes

Materials: ■ Screw terminals

Connect block motors without a frequency converter as follows, directly to the motor's terminal box:

**⚠ DANGER! Electrical voltage represents a possibly fatal danger!**

1. De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

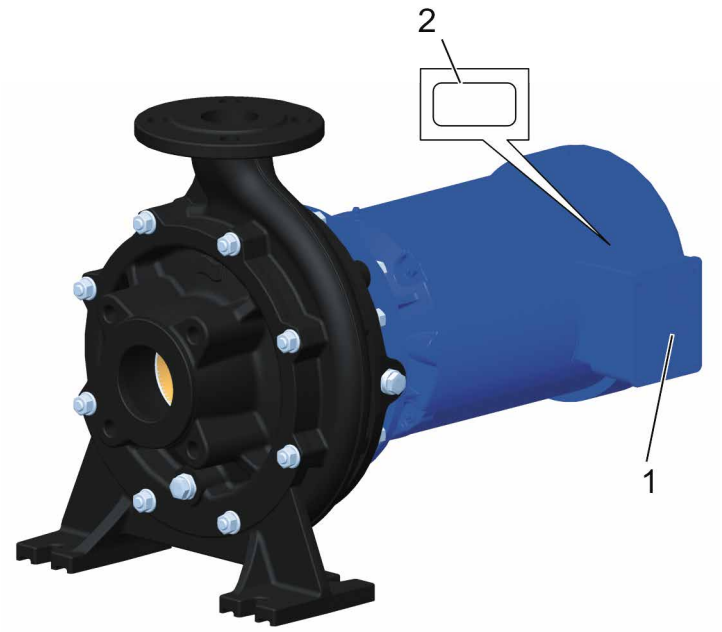



*Fig. 31 Wiring the terminal box*

1 Terminal box
2 Connection diagram

**2.** Unscrew the lid of the motor's terminal box (fig. 36/1) and remove it.

**3.** ***NOTICE*** **The block motor can be damaged by the wrong voltage!**

Wire the motor's electrical connection cables according to the supply voltage (low voltage or high voltage) with a screw terminal in accordance with the wiring diagram (Fig. 34/2) printed in the terminal box or on the block motor.

**4.** Connect the phase wires (L1 – L3) from the building's power supply to the connection cables 1, 2 and 3 on the block motor with the screw terminal.

*If the motor turns in the wrong direction, it can be reversed by exchanging two phase wires from the mains power supply.*

**5.** Connect the temperature monitor with the additional lines (J).

6. Ground the block motor in accordance with the regulations which apply at the pump's installation site.
7. Put the screw terminals into the terminal box and refit the lid on the terminal box.

### 6.3.2 Connecting the herborner.F-N-C without frequency converter

| | |
|---|---|
| Personnel: | ■ Electrician<br>■ Electrical installer/electric motor technician |
| Personal protective equipment: | ■ Safety shoes |
| Materials: | ■ Screw terminals |

Connect block motors without a frequency converter as follows, directly to the motor's terminal box:

**⚠ DANGER! Electrical voltage represents a possibly fatal danger!**

1. De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

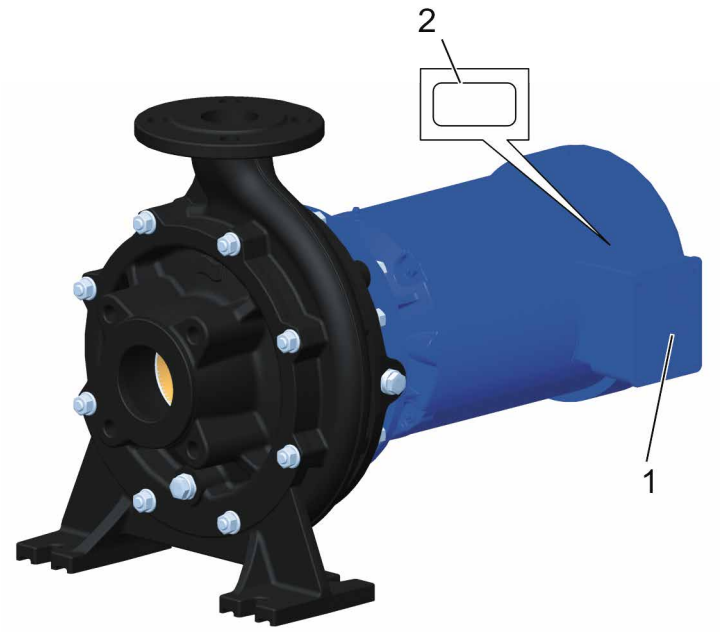



*Fig. 32 Wiring the terminal box (example: herborner.F-N)*

1 Terminal box
2 Connection diagram

**2.** Unscrew the motor's terminal box (Fig. 37/1) and remove the lid.

**3.** Connect the phase lines (L1 – L3) of the building power supply according to the wiring diagram in the terminal box or printed on the block motor (Fig. 35/2) to terminals U1, V1 and W1 of the block motor.

*If the motor turns in the wrong direction, it can be reversed by exchanging two phase wires from the mains power supply.*

**4.** Connect the temperature monitor with the additional connection cables (1 and 2) according to the wiring diagram printed in the terminal box or on the block motor (Fig. 35/2) using a terminal strip.

5. ***NOTICE*** **Incorrect voltage may damage the temperature monitor!**
   - Do not connect any voltage above 2.5 V.
   - To check the resistances, only use measuring bridges or ohmmeters.

**- Only operate temperature monitors in conjunction with a tripping device.**

**- Terminals A1 and A2 (if available) can be connected in case of a PTC thermistor failure.**

6. Ground the block motor in accordance with the regulations which apply at the pump's installation site.
7. Reinstall the cover on the terminal box.

### 6.3.3 Connecting the herborner.F-N with frequency converter

| | |
|---|---|
| Personnel: | ■ Electrician<br>■ Electrical installer/electric motor technician |
| Personal protective equipment: | ■ Safety shoes |
| Materials: | ■ Screw terminals |

Connect a frequency converter as follows to the motor's terminal box:

**⚠ DANGER! Electrical voltage represents a possibly fatal danger!**

1. De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

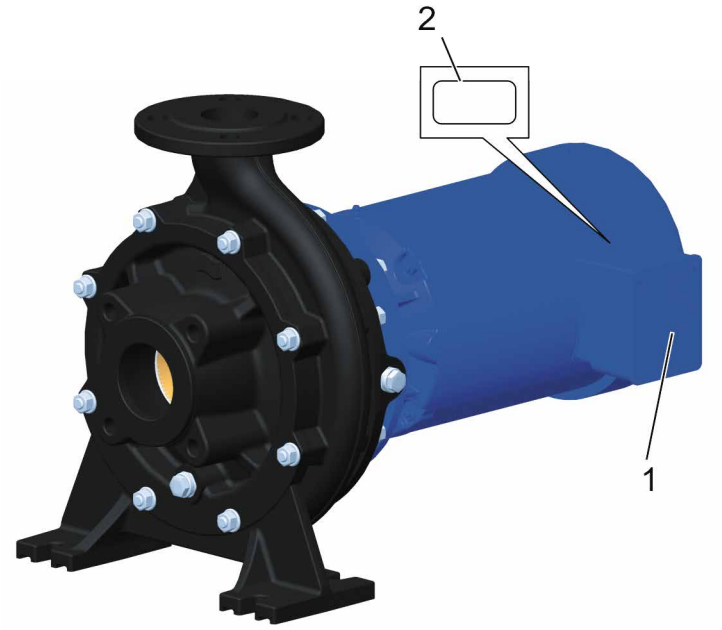



*Fig. 33 Wiring the terminal box*

1 Terminal box
2 Connection diagram

**2.** Unscrew the motor's terminal box (Fig. 38/1) and remove the lid.

**3.** ***NOTICE*** **The block motor can be damaged by the wrong voltage!**

Wire the motor's electrical connection cables according to the supply voltage (low voltage or high voltage) with a screw terminal in accordance with the wiring diagram(Fig. 36/2) printed in the terminal box or on the block motor.

**4.** Ground the block motor in accordance with the regulations which apply at the pump's installation site.

**5.** Install and connect the frequency converter as specified in its operating manual to the block motor's terminal box with the help of the adapter plate (*up to 30 hp*, herborner.F-N only), or install it externally, either to a wall or in an electrical cabinet. Connect the temperature sensor to the corresponding terminals.

*If the motor turns in the wrong direction, it can be reversed by exchanging two phase wires at the output of the frequency converter.*

6. In case of wall-mounting/attachment to a control cabinet, reinstall the cover on the terminal box.

### 6.3.4 Connecting the herborner.F-N-PM and herborner.F-N-C with frequency converter

| | |
|---|---|
| Personnel: | ■ Electrician<br>■ Electrical installer/electric motor technician |
| Personal protective equipment: | ■ Safety shoes |
| Materials: | ■ Screw terminals |

Connect a frequency converter as follows to the motor's terminal box:

**⚠ DANGER! Electrical voltage represents a possibly fatal danger!**

1. De-energize and secure against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

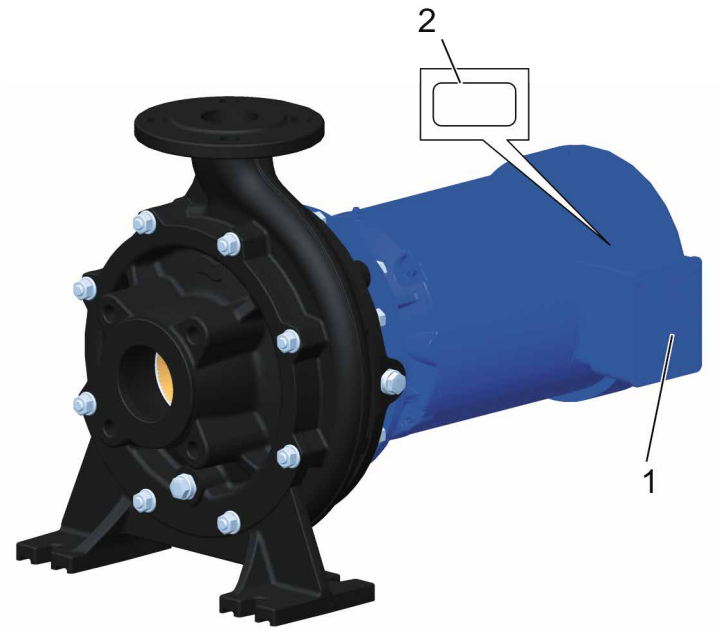



*Fig. 34 Wiring the terminal box (example: herborner.F-N)*

1 Terminal box
2 Connection diagram

**2.** Unscrew the lid of the motor's terminal box (Fig. 37/1) and remove it.

**3.** Ground the block motor in accordance with the regulations which apply at the pump's installation site.

**4.** Install and connect the frequency converter as specified in its operating manual to the block motor's terminal box with the help of the adapter plate (*up to 30 hp*, herborner.F-N-PM only), or install it externally, either on a wall or in an electrical cabinet.

*If the motor turns in the wrong direction, it can be reversed by exchanging two phase wires at the output of the frequency converter.*

**5.** Connect the temperature sensor to the corresponding terminals.

6. ***NOTICE*** **Incorrect voltage may damage the temperature monitor!**
   - Do not connect any voltage above 2.5 V.
   - To check the resistances, only use measuring bridges or ohmmeters.

**- Only operate temperature monitors in conjunction with a tripping device.**

**- Terminals A1 and A2 (if available) can be connected in case of a PTC thermistor failure.**

7. In case of wall-mounting/attachment to a control cabinet, reinstall the cover on the terminal box.

## 6.4 Connecting the control system

Pumps operated with a frequency converter can be connected to a controller.

*To connect a pump to a control system, see the frequency converter's manual and get in touch with Herborner Pumps.*

## 6.5 Filling the pump

| | |
|---|---|
| Personnel: | ■ Electrical installer/electric motor technician<br>■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |

Before putting the pump into operation, it must be completely filled with water to prevent the pump from running dry.

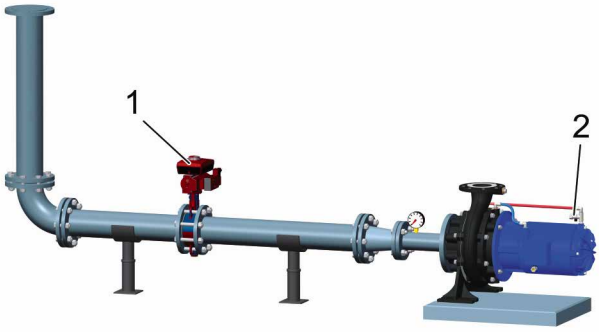



*Fig. 35 Filling the pump (example: herborner.F-X-C)*

1 Gate valve
2 Ball valve

**1.** Open the gate valve (Fig. 40/1) slowly and steadily.

**2.** On the herborner.F-N-C, de-aerate the pump via the ball valve (Fig. 40/2) on the motor's return pipe.

## 6.6 Checking the direction of rotation

### Fan and impeller

**⚠ WARNING**

**There is a danger of injury from the rotating fan and the impeller!**

- **Never reach into the pump while it is in operation or stand near the block motor.**
- **During maintenance or commissioning work do not wear loose items of clothing, hanging jewelry (e.g. necklaces or bracelets) and if you have long hair do not wear it loose.**

**The impeller in the pump casing and the fan in the block motor (only herborner.F-N and herborner.F-N-PM) turn very quickly when in operation. Contact with the rotating parts or them tangling/catching clothing, jewelry or long hair can lead to serious injuries.**

## Strong magnetic fields

**⚠ WARNING**

**Risk of death from strong magnetic fields!**

- **Persons with pacemakers or implants made from metal must not stand within the vicinity of the block motor.**
- **Keep magnetic materials or those containing iron away from the block motor. Such materials may be attracted and cause injuries to persons.**
- **Keep electronic devices, data storage devices or credit cards, etc. away from the block motor. These may be damaged.**

**During operation, the block motor may build up a strong electromagnetic field. Strong magnetic fields may cause serious or even fatal injuries as well as considerable damage to equipment.**

| | |
|---|---|
| Personnel: | ■ Electrical installer/electric motor technician |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |

Before starting routine operation, the pump's direction of rotation must be checked and corrected if necessary to avoid damage to the pump.

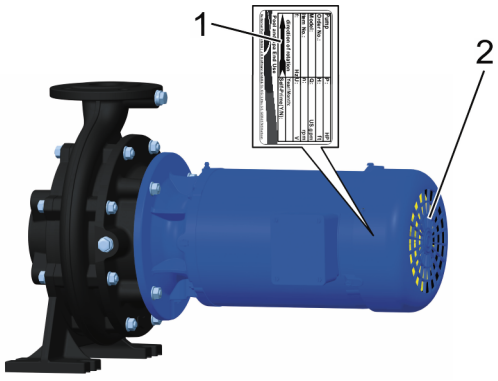



*Fig. 36 Checking motor rotation direction (example: herborner.F-N)*

1 The rotation indicator arrow on the pump's name plate
2 Fan

1. ***NOTICE*** **The pump can be damaged if its direction of rotation is wrong!**

   Briefly switch the pump (herborner.F-N and herborner.F-N-PM only) on using the main switch, and immediately switch it off again, then compare the fan's direction of rotation (Fig. 41/2) on the block motor as it slows down to the arrow marking the direction of rotation on the name plate (Fig. 41/1).

*If the block motor's fan cannot be seen from the main switch, then two people will be needed for this task. One person to switch the pump on and the other to check the direction of rotation.*

   ⇨ The fan's direction of rotation must correspond to the marking arrow.

2. If the direction of rotation does not match the arrow, then reverse the motor's rotation by exchanging two phase wires (↳ *chapter "6.3 Connecting the electrical power supply" on page 78*).

*On the herborner.F-N-C the direction of rotation needs to be checked using the duty point.*

## 6.7 After the installation and putting into operation for the first time

Personnel:
- Electrical installer/electric motor technician
- Plumber/Pipefitter

Personal protective equipment:
- Safety clothing
- Safety shoes

Do the following tests before starting routine operation of the pump:

1. Make sure that all of the gate valves are open.
2. Switch the pump on at the main switch.
3. Bleed the system using the air bleeding device.
4. Check the pipes, especially the flange connections, for leaks. If leaks are found, tighten the screw connections. If necessary repeat the installation steps to seal or replace components (↳ *chapter "5.3 Installing and aligning" on page 65*).
5. Make sure the Seal Guard system (optional) is filled to the correct level (↳ *chapter "8.3.8 Checking the (optional) Seal Guard system for the correct fill level and for any substances" on page 111*)
6. Check the pump for loud noises and heavy vibrations. If it is making an unusual amount of noise, find out what is causing it and fix it (↳*chapter "9 Fault-fixing" on page 113*).
7. On the herborner.F-N-C, check the fluid flow in the return and cooling line.
8. On the analog pressure gauge (optional), adjust the pointer to the value shown.

# 7 Operation

## 7.1 Safety instructions for operation

### Strong magnetic fields

**⚠ WARNING**

**Risk of death from strong magnetic fields!**

- **Persons with pacemakers or implants made from metal must not stand within the vicinity of the block motor.**
- **Keep magnetic materials or those containing iron away from the block motor. Such materials may be attracted and cause injuries to persons.**
- **Keep electronic devices, data storage devices or credit cards, etc. away from the block motor. These may be damaged.**

**During operation, the block motor may build up a strong electromagnetic field. Strong magnetic fields may cause serious or even fatal injuries as well as considerable damage to equipment.**

### Noise

**⚠ CAUTION**

**There is a danger of injury from noise!**

- **When the pump is operating, do not stay in its vicinity for longer periods. When working in the immediate vicinity, wear hearing protection.**

**The level of noise which occurs in the working area can cause damage to your hearing after extended exposure.**

### Water leaking

**⚠ CAUTION**

**There is a danger of injury and of damage from leaking water!**

- **If water comes out, immediately switch the pump off, close the gate valve, find what is causing it and fix it (↳*chapter "9 Fault-fixing" on page 113*).**
- **Clean up puddles using suitable means.**

**If the pump or the piping system is not sealed properly then water may leak out. Slipping in puddles on the floor can lead to a fall. A fall may cause injuries**

### Dry running

***NOTICE***

**The pump can be damaged if it runs dry!**

- **Make sure that all of the gate valves are open during operation.**

**If the pump is operated without any liquid to pump, it will run dry and be damaged.**

### High chlorine levels

**NOTICE**

**The pump can be damaged by high levels of chlorine!**

- **For brine baths, check regularly to ensure that the fraction of chloride ions does not exceed 0.13 oz/gal.**

**A permanently high level of chlorine may damage the pump.**

### Frequent switching

**NOTICE**

**The block motor can be damaged by frequent switching!**

- **Avoid frequent switching processes which are close together.**
- **Before switching the pump on again, allow the motor to cool down.**
- **When operating the pump via a control system, ensure that the control system cannot trigger frequent switching operations.**

**By frequently switching the pump on & off, the block motor can be overloaded.**

## 7.2 Stopping the pump in an emergency

In an emergency, proceed as follows:

1. Immediately trigger an emergency stop at the main switch.
2. Switch off the pump and secure it against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

## 7.3 Switching on/off

**Switching on**

1. ***NOTICE*** **There is a danger of the pump running dry!**
   Fill the pump (↳ *chapter "6.5 Filling the pump" on page 86*).
2. Switch the pump on at the main switch.
   ⇨ The pump will start.

**Switching off**

1. Switch the pump off at the main switch.
   ⇨ The pump will stop.
2. ***NOTICE*** **There is a danger of flooding from leaking water!**
   Close all all gate valves.

## 7.4 Operating the pump

*During routine operation there is no need to take any action to control the pump. The pump will work at the optimum duty point for the application specified when the pump was ordered.*

## 7.5 Adjusting the pump parameters

The operating parameters can only be adjusted for pumps with a frequency converter. Pumps without a frequency converter always run at their specifically designed duty point.

## 7.6 When the pump has not been used for a longer period

### 7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM

Personnel: ■ General maintenance and repair worker

Materials: ■ Container for draining

When the pump has not been used for a longer period, it must be drained and flushed out to prevent contamination.

1. Use the pipeline to flush the pump with clean water.
2. ***NOTICE*** **There is a danger of flooding from leaking water!**

   Make sure that all of the gate valves are closed.
3. Put the container under the screwed plug (Fig. 42/1) and unscrew the screwed plug.

   ⇨ The water remaining in the pump and the pipelines will run out.


*Fig. 37 Draining the pump (example: herborner.F-N)*

*Depending on the size of the container, this will need to be emptied from time to time.*

4. Wait until all of the water has run out. Now drain the container.

### 7.6.2 Flushing and draining the herborner.F-N-C

Personnel: ■ General maintenance and repair worker

Materials: ■ Container for draining

When the pump has not been used for a longer period, it must be drained and flushed out to prevent contamination.

1. Use the pipeline to flush the pump with clean water.
1. ***NOTICE*** **There is a danger of flooding from leaking water!**

   Make sure that all of the gate valves are closed.
2. Open the ball valve (Fig. 43/1).

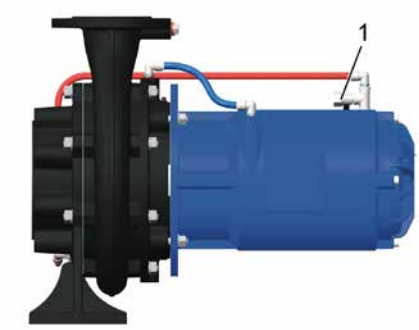



*Fig. 38 Opening the ball valve*

*The ball valve is at the rear wall of the pump for the herborner.F-N.*

3. Put the container under the screwed plug (Fig. 44/1) and unscrew the screwed plug.

   ⇨ The water remaining in the pump and the pipelines will run out.


*Fig. 39 Draining the pump (example: herborner.F-N-C)*

*Depending on the size of the container, this will need to be emptied from time to time.*

4. Wait until all of the water has run out. Now drain the container.

### 7.6.3 Storing the pump

Store the pump under the following conditions:

- Do not store in the open air.
- Store in a dry place away from dust and vibrations.
- Do not expose to any aggressive media.
- Storage temperature: 41 to 104 °F.
- Relative humidity should be less than 60 % if possible.
- Grease the block motor (↳ *chapter "8.2 Maintenance schedule" on page 100* ).
- Check insulating resistance if stored longer than 6 months.
  - herborner.F-N (see the block motor's manual "Integral Horsepower AC Induction Motors (MN408), Baldor Electric Company", Chapter 1)
  - herborner.F-N-PM (see the block motor's manual "Operating Instructions for three-phase-motors with permanent magnets (12.13), EMOD MOTOREN," Chapter 2.3).
  - herborner.F-N-C (see block motor operating manual "Operating Instructions for water-cooled three-phase-motors (01.14), EMOD MOTOREN," Chapter 2.3)
- If anti-friction bearings are stored for longer than 4 years, they need to be regreased or replaced (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126* ).
  - herborner.F-N-PM (see additional block motor operating instructions "Operating Instructions for three-phase-motors with permanent magnets (12.13), EMOD MOTOREN," Chapter 4.3).

# 8 Maintenance

## 8.1 Safety instructions for maintenance

### Electrical voltage

**⚠ DANGER**

**Electrical voltage represents a possibly fatal danger!**

- **Only allow qualified electricians to work on the building's electrical installation.**
- **Only allow qualified electricians or electrical installers/electric motor technicians to work on the pump's block motor or on the frequency converter.**
- **Before doing any work on the pump remove all live voltages from it and secure this state for the duration of the work. During this, conform with the following safety rules:**
  - **De-energize and secure against being switched on again (*chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).**
  - **Check that there are no live voltages present.**
- **Never bridge or otherwise disable fuses/circuit breakers. When replacing fuses ensure that you use the same amperage.**
- **Keep moisture away from live parts. This can lead to a short circuit.**

**On contact with any live parts on the pump's block motor or on the frequency converter there is an immediate danger of death from an electric shock. Damage to the insulation or to individual components can represent a danger to life.**

### Strong magnetic fields

**⚠ WARNING**

**Risk of death from strong magnetic fields!**

- **Persons with pacemakers or implants made from metal must not stand within the vicinity of the block motor.**
- **Keep magnetic materials or those containing iron away from the block motor. Such materials may be attracted and cause injuries to persons.**
- **Remove any metallic items (jewelry, watches, pens, etc.) before performing maintenance.**
- **Keep electronic devices, data storage devices or credit cards, etc. away from the block motor. These may be damaged.**

**During operation, the block motor may build up a strong electromagnetic field. Strong magnetic fields may cause serious or even fatal injuries as well as considerable damage to equipment.**

### Improperly done maintenance work

**⚠ WARNING**

**There is a danger of injury from improperly done maintenance work!**

- **Only use original spare parts.**
- **Completely carry out all maintenance work according to the specifications and instructions in this manual.**
- **If components have been removed, make sure that they are properly installed, re-tighten all fasteners and observe the specified torques (↳ *chapter "13.9 Torque values" on page 223*).**
- **Before starting up again, make sure that all covers and safety devices have been installed and are in proper working order.**

**Improper maintenance can lead to serious injuries and significant damage.**

**Protecting the environment**

Observe the following instructions on environmental protection during the maintenance work:

- At all lubrication points, remove used and excess grease and any grease which comes out, and dispose of it in accordance with the valid local regulations.

## 8.2 Maintenance schedule

The following sections describe maintenance work which is required for optimal and fault-free operation.

| Interval | Maintenance work | Personnel |
|---|---|---|
| every 500 operating hours, no later than after 3 months | Clean the block motor's casing (↳ *chapter "8.3.2 Cleaning the block motor's casing" on page 106*) | General maintenance and repair worker |
| | Clean any condensation drain holes on the block motor (↳ *chapter "8.3.3 Cleaning up any condensation water" on page 107*) | General maintenance and repair worker |
| | Check the block motor for damaged windings (↳ *chapter "8.3.4 Checking the block motor" on page 108*) | Electrical installer/ electric motor technician |
| | Check the electrical connections in the terminal box (↳ *chapter "8.3.5 Checking the electrical connections in the terminal box" on page 108*) | Electrical installer/ electric motor technician |
| every 3000 to 10000 operating hours, or no later than every 3years | herborner.F-N-PM and herborner.F-N-C (2 hp to 100 hp): Grease the block motor while impeller is rotating (↳ *chapter "13.5.3 Re-greasing and quantity of Klüberquiet BQH 72-102 with the herborner.F-N-PM and the herborner.F-N-C" on page 211*) | General maintenance and repair worker |

| Interval | Maintenance work | Personnel |
|---|---|---|
| | NOTICE Anti-friction bearing can be damaged if lubrication is inadequate or excessive. | |
| | Klüberquit BQH 72-102 (Klüber Lubrication) | |
| every 3500 operating hours, or no later than every | herborner.F-N (60 hp to 100 hp): Grease the block motor (↳ *chapter "13.5.2 Re-greasing and quantity of grease with the herborner.F-N" on page 210*) | General maintenance and repair worker |
| | NOTICE Anti-friction bearing can be damaged if lubrication is inadequate or excessive. | |
| | Grease: Polyrex EM (Exxon Mobil) | |
| every 4000 operating hours, no later than every 12 months | Oil change for version with Seal Guard system (optional) (↳ *Chapter "9.4.1 Disassembling and reassembling a pump" on page 112*) | General maintenance and repair worker |
| Every 7400 operating hours, or no later than every | herborner.F-N (25 hp to 50 hp): Grease the block motor (↳ *chapter "13.5.2 Re-greasing and quantity of grease with the herborner.F-N" on page 210* | General maintenance and repair worker |
| | NOTICE Anti-friction bearing can be damaged if lubrication is inadequate or excessive. | |
| | Grease: Polyrex EM (Exxon Mobil) | |
| every 9500 operating hours, no later than every 6 months | herborner.F-N (7½ hp to 20 hp): Grease the block motor (↳ *chapter "13.5.2 Re-greasing and quantity of grease with the herborner.F-N" on page 210*) | General maintenance and repair worker |
| | NOTICE Anti-friction bearing can be damaged if lubrication is inadequate or excessive. | |
| | Grease: Polyrex EM (Exxon Mobil) | |

| Interval | Maintenance work | Personnel |
|---|---|---|
| every 12000 operating hours, no later than every 12 months | herborner.F-N (¾ hp to 5 hp): Grease the block motor (↳ *chapter "13.5.2 Re-greasing and quantity of grease with the herborner.F-N" on page 210*) | General maintenance and repair worker |
| | NOTICE Anti-friction bearing can be damaged if lubrication is inadequate or excessive. | |
| | Grease: Polyrex EM (Exxon Mobil) | |
| Every 20000 operating hours, or no later than every 3 years | herborner.F-N-PM (¾ hp, 1 hp and 1½ hp): Regrease the anti-friction bearing or replace if necessary (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126* and refer to the block motor operating manual "Operating Instructions for three-phase-motors with permanent magnets (12.13), EMOD MOTOREN," Chapter 4.3) | General maintenance and repair worker |
| | NOTICE Anti-friction bearing can be damaged if lubrication is inadequate or excessive. | |
| | Klüberquit BQH 72-102 (Klüber Lubrication) | |
| every 6 months | Check the screwed connections and tighten if necessary (↳ *chapter "8.3.7 Checking the screwed connections and tightening if necessary" on page 110*) | General maintenance and repair worker |
| | Check the seal in the filter strainer and replace if necessary (↳ *Chapter "8.3.9 Checking the seal of the filter strainer and replacing if necessary" on page 113*) | General maintenance and repair worker |
| monthly | Check if the pump casing is dirty and clean it if necessary (↳ *chapter "8.3.6 Cleaning the pump casing" on page 110*) | General maintenance and repair worker |
| | Check the Seal Guard system (optional) for the correct fill level and check if it contains any substances (↳ *chapter "8.3.8 Checking the (optional) Seal Guard system for the correct fill level and for any substances" on page 111*) | General maintenance and repair worker |

| Interval | Maintenance work | Personnel |
|---|---|---|
| weekly | Check the pump for leaks (↳ *chapter "8.3.1 Checking the pump for leaks" on page 103*) | Plumber/Pipefitter<br>General maintenance and repair worker |
| | Check the filter strainer and clean if necessary (↳ *Chapter "8.3.2 Checking the filter strainer and cleaning if necessary" on page 114*) | General maintenance and repair worker |

## 8.3 Maintenance jobs

### 8.3.1 Checking the pump for leaks

Personnel:
- Plumber/Pipefitter
- General maintenance and repair worker

Personal protective equipment:
- Safety clothing
- Safety shoes

Check the pump for leaks as follows and fix any leaks found:

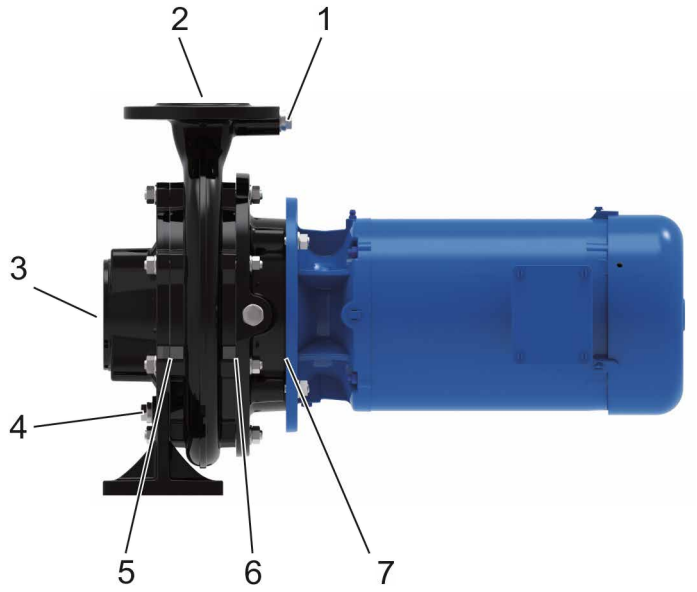



*Fig. 40 Places to check if water is leaking from the pump (example: herborner.F-N)*

1 Screwed plug
2 Flange
3 Flange
4 Screwed plug
5 The joint between the casing cover and the pump casing
6 The joint between the pump casing and the intermediate casing
7 The joint between the intermediate casing and the block motor

1. **⚠ CAUTION! There is a danger of slipping on leaking water!**

   Check the area of the pump for obvious leaks. If necessary clean away the leaked water and find the source of the leak.

   Check the following locations with particular care:

   - Screwed plug (Fig. 45/1)
   - Flange (Fig. 45/2)
   - Flange (Fig. 45/3)
   - Screwed plug (Fig. 45/4)
   - The joint between the casing cover and the pump casing (Fig. 45/5)

- The joint between the pump casing and the intermediate casing (Fig. 45/6)
- The joint between the block motor (Fig. 45/7) only on the version with Seal Guard system)

2. In places where there is a water leakage, first tighten the corresponding screws/screw connections, if available.
3. If the leak persists, switch the pump off, secure it against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*) and replace the faulty pipe connections/components/seals.

*To identify faulty seals, depending on the location of the leak, see* ↳ *chapter "10.2 List of spare parts" on page 169.*

### 8.3.2 Cleaning the block motor's casing

| | |
|---|---|
| Personnel: | ■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |
| Special tool: | ■ Hand brush |
| Materials: | ■ Cloths |

Clean the block motor as follows:

1. **⚠ WARNING! Risk of injury due to pump starting unexpectedly!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! There is a danger of injury from hot surfaces!**

   Allow the motor to cool down.

3. Brush out the ventilation opening in the block motor's cover (Fig. 46/1) with a hand brush.

   ⇨ The ventilation openings must be clear.

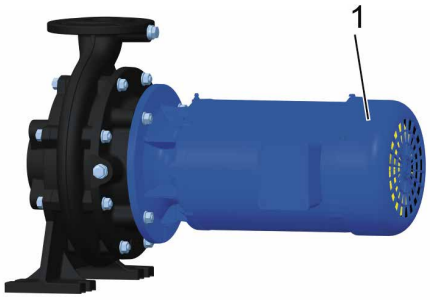



*Fig. 41 Block motor cover (example: herborner.F-N)*

*On the herborner.F-N-C, there are no ventilation openings. This step can therefore be ignored.*

4. Wipe down the complete motor casing with a cloth.

### 8.3.3 Cleaning up any condensation water

| | |
|---|---|
| Personnel: | ■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |
| Materials: | ■ Cloths |

Clean up any condensation water as follows:

1. **⚠ WARNING! Risk of injury due to pump starting unexpectedly!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! There is a danger of injury from hot surfaces!**

   Allow the motor to cool down.

3. **Open condensation water drain holes**

   Wipe any condensation water drain holes on the block motor using a cloth.

   ⇨ The condensation water drain holes must be unobstructed.

   **Closed condensation water drain holes**

   Open the block motor's condensation water drain holes, wipe using a cloth and close again.

   ⇨ The condensation water drain holes must be unobstructed.

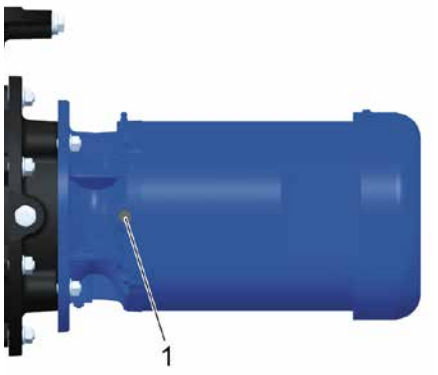



*Fig. 42 Condensation water drain holes (example: herborner.F-N)*

### 8.3.4 Checking the block motor

| | |
|---|---|
| Personnel: | ■ Electrical installer/electric motor technician |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |
| Special tool: | ■ Motor test unit |

1. **⚠ DANGER! Electrical voltage represents a possibly fatal danger!**

   Depending on the work being performed, make sure that the pump is switched off and is secured against being switched back on again. (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! There is a danger of injury from hot surfaces!**

   Allow the block motor to cool down.

3. Use the motor test unit to test the block motor for faulty windings.

*Take note of the motor test unit's operating manual!*

⇨ Remove the block motor in case of any defects and replace it (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*).

### 8.3.5 Checking the electrical connections in the terminal box

| | |
|---|---|
| Personnel: | ■ Electrical installer/electric motor technician |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |


*Fig. 43 Block motor terminal box (example: herborner.F-N)*

Check the terminals in the block motor's terminal box as follows:

1. **⚠ DANGER! Electrical voltage represents a possibly fatal danger!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! There is a danger of injury from hot surfaces!**

   Allow the motor to cool down.

3. If the block motor is used without a frequency converter or with a frequency converter which is wall-mounted or installed in an electrical cabinet, unscrew the cover of the motor's terminal box (Fig. 48/1) and remove it.

4. Make sure that all of the connecting wires are firmly seated in the screw terminals and that the insulation of the wires is undamaged. Replace any damaged insulation.

5. Put the screw terminals into the terminal box.

   - If the block motor is used without a frequency converter or with a frequency converter which is wall-mounted or installed in an electrical cabinet, refit the the lid of the motor's terminal box.

### 8.3.6 Cleaning the pump casing

| | |
|---|---|
| Personnel: | ■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |
| Special tool: | ■ Hand brush |
| Materials: | ■ Cloths |

Clean the pump casing as follows:

1. **⚠ WARNING! Risk of injury due to pump starting unexpectedly!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! There is a danger of injury from hot surfaces!**

   Allow the motor to cool down.

3. Brush down the complete pump casing with a hand brush and wipe it down with a cloth.

### 8.3.7 Checking the screwed connections and tightening if necessary

| | |
|---|---|
| Personnel: | ■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |
| Special tool: | ■ Torque wrench |

1. **⚠ WARNING! Risk of injury due to pump starting unexpectedly!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! There is a danger of injury from hot surfaces!**

   Allow the motor to cool down.

3. Check all visible screwed connections (base, casings, screwed plugs, flanges) to see if they are firmly seated and tighten as necessary (↳ *chapter "13.9 Torque values" on page 223*).

### 8.3.8 Checking the (optional) Seal Guard system for the correct fill level and for any substances

| | |
|---|---|
| Personnel: | ■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety shoes |

Check the Seal Guard system for the correct fill level and for any substances and repair any leaks:

1. Check the fill level of the Seal Guard system compensation tank (Fig. 49/2).

   This must be filled with Mobil SHC Cibus 46 with NSF H1 - license to the half-way mark (ISO VG 46).

2. Check if the grease contains any substances.

   ⇨ If the fill level visibly changes or substances are present in the Mobil Cibus 46 with NSF H1 - license, the mechanical seal (Fig. 49/1) needs to be inspected and replaced if necessary (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*).

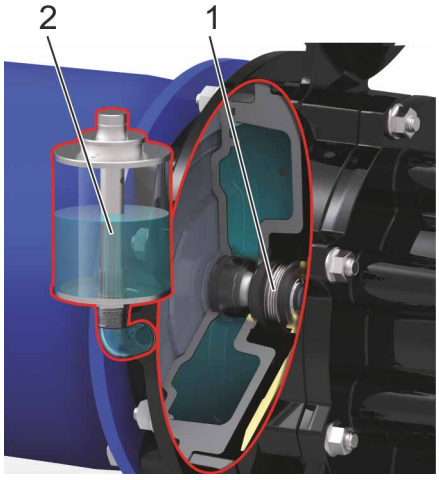



*Fig. 44 Checking the Seal Guard system (example: herborner.F-N)*

1 Mechanical seal
2 Seal Guard system compensation tank

## 8.4 After the maintenance

Personnel:
- Electrical installer/electric motor technician
- General maintenance and repair worker

1. Clean up any water which leaked out.
2. Make sure that all of the jobs have been completed and all of the screwed connections have been properly tightened.
3. Make sure that all of the safety devices have been refitted and are in working order and that there is no danger to personnel.

   ⇨ The pump can be switched on again. (↳ *chapter "7.3 Switching on/off" on page 94*).

# 9 Fault-fixing

## 9.1 Safety instructions for fault-fixing

**Work carried out improperly to fix a fault**

**⚠ WARNING**

**There is a danger of injury if faults are improperly fixed!**

- **Only fix faults which require work on the pump when you have ensured that the pump is at a standstill and has been secured against being switched on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).**
- **Only use original spare parts.**
- **Completely carry out all work according to the specifications and instructions in this manual.**
- **If components have been removed, make sure that they are properly installed, re-tighten all fasteners and observe the specified torques (↳ *chapter "13.9 Torque values" on page 223*).**
- **Before start back up, ensure that all covers and safety devices have been installed and are working properly.**

**Fault-fixing work which is done improperly can lead to serious injuries and significant damage.**

### Securing the unit to prevent it from being switched on again

**⚠ WARNING**

**Someone switching the system on who is not authorized to do represents a possibly fatal danger!**

- **Before starting work, switch off all sources of electricity and secure them against being switched on again (*chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).**

**If an unauthorized person switches the electrical power supply on during fault-fixing, for persons in the danger zone there is a danger of serious injuries, which can be fatal.**

### Hot water

**⚠ WARNING**

**There is a danger of scalding from hot water if the pump has heated up during operation!**

- **After a fault, always allow the pump to cool down before draining it.**

**When the pump is running hot, the temperature of the water in the pump can significantly increase. Hot water touching the skin can result in scalding.**

### What to do if there is a dangerous fault

In general, the following applies:

1. Switch off the pump immediately if a fault occurs that poses an immediate danger to persons or objects (*chapter "2.8 What to do in case of danger" on page 33*).
2. Determine the cause of the fault.
3. If work in the danger zone is required to fix the fault, switch off the power supply and secure it against being switched on again (*chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).
4. Depending on the type of fault, have it fixed by appropriately qualified personnel.

*The fault table helps to show who is authorized to fix a fault (chapter "9.2 Table of faults" on page 115).*

## 9.2 Table of faults

*If the pump is operated in combination with a frequency converter via a control system, other faults can arise from the connection to the control system (see the frequency converter's manual).*

### 9.2.1 Unusual states

**Faults on the pump**

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| The pump is not pumping any water CAUTION! There is a danger of the pump running dry. Immediately switch the pump off. | The block motor is not running | ↳ *"Faults in the block motor" on page 123* | |
| | A gate valve is closed | Make sure that the gate valves in both the supply and the pressure pipes are fully open | General maintenance and repair worker |
| | Pump not filled | Make sure that the filter casing is completely full with water (↳ *chapter "6.5 Filling the pump" on page 86*) | General maintenance and repair worker |
| | The feed pipe is obstructed | Make sure that no foreign bodies have collected in the supply/feed pipe (leaves, clothes, etc.) and are obstructing it | General maintenance and repair worker |
| The pump's power is inadequate | A gate valve is not completely open | Make sure that the gate valves in both the supply and the pressure pipes are fully open | General maintenance and repair worker |
| | The pump's direction of rotation is wrong | Check the pump's direction of rotation and reverse it if necessary (↳ *chapter "6.6 Checking the direction of rotation" on page 87*) | Electrical installer/ electric motor technician |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | Pipeline incorrectly installed | Check that the pipelines have been properly installed (↳ *chapter "5.3.6 Connecting to the pump's flanges" on page 72*)<br>The diameter of the feed and pressure pipelines should be larger than the diameter of the pump's flanges<br>Straight pipes must be used to connect to the pump's flanges<br>A non-return valve must be fitted in the pressure pipe | Plumber/Pipefitter |
| | The system has not been bled | Bleed the system using the air bleeding device | Plumber/Pipefitter |
| | The speed is not set correctly/pump is running at reduced speed | Increase the pump's speed/power:<br>using the frequency converter's controls if a frequency converter is in use<br>(↳ *chapter "7.5 Adjusting the pump parameters" on page 94*) | General maintenance and repair worker<br>Electrical installer/<br>electric motor technician |
| | A pipeline is blocked | Make sure that no foreign bodies have collected in the supply/feed pipe (leaves, clothes, etc.) and are obstructing it | General maintenance and repair worker |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | The pump is blocked | Check for foreign bodies and flush the pump if necessary (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95 or ↳ chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*) | General maintenance and repair worker |
| | A phase is missing from the power supply | Make sure that all of the fuses in the fuse box are intact and correctly fitted<br>Check the electrical connections in the terminal box (↳ *chapter "8.3.5 Checking the electrical connections in the terminal box" on page 108*)<br>Check the on site electrical installation | Electrical installer/ electric motor technician<br>Electrician |
| | The water to be pumped is very dirty (muddy) | Check the supply pool for contamination and clean it if necessary. Then flush the pump (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95 or ↳ chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*) | General maintenance and repair worker |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | The impeller is worn or loose | Check the condition of the impeller (↳ *chapter "9.3.2 Checking the impeller and tightening" on page 166*) and, if necessary, replace the impeller/nut (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*) | General maintenance and repair worker Electrical installer/ electric motor technician |
| | Wrong size of pump | Compare the chosen pump with the actual requirements and if necessary, use a more powerful pump | Plumber/Pipefitter General maintenance and repair worker |
| The pump vibrates heavily | The pipes are under stress as installed | Check to see if the pipes are stressed and correct if necessary | Plumber/Pipefitter |
| | The system has not been bled | Bleed the system using the air bleeding device | Plumber/Pipefitter |
| | The feed pipe is obstructed | Make sure that no foreign bodies have collected in the supply/feed pipe (leaves, clothes, etc.) and are obstructing it | General maintenance and repair worker |
| | The pump is blocked | Check for foreign bodies and flush the pump if necessary (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95 or* ↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*) | General maintenance and repair worker |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | Pipeline incorrectly installed | Check that the pipelines have been properly installed (↳ *chapter "5.3.6 Connecting to the pump's flanges" on page 72*)<br>The diameter of the feed and pressure pipelines should be larger than the diameter of the pump's flanges | Plumber/Pipefitter |
| | | The pipes on the suction side should not rise too much | |
| | | Straight pipes must be used to connect to the pump's flanges | |
| | | A non-return valve must be fitted in the pressure pipe | |
| | The pump's direction of rotation is wrong | Check the pump's direction of rotation and reverse it if necessary (↳ *chapter "6.6 Checking the direction of rotation" on page 87*) | Electrical installer/ electric motor technician |
| | The impeller is worn or loose | Check the condition of the impeller (↳ *chapter "9.3.2 Checking the impeller and tightening" on page 166*) and, if necessary, replace the impeller/nut (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*) | General maintenance and repair worker<br>Electrical installer/ electric motor technician |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | The pump is not working at its optimum speed/ power | Change the pump's speed/ power: using the frequency converter's controls if a frequency converter is in use (↳ *chapter "7.5 Adjusting the pump parameters" on page 94*) | General maintenance and repair worker Electrical installer/ electric motor technician |
| | The block motor is inadequate or has been excessively greased | Using the maintenance records, check whether there has been an insufficient or, if applicable, excessive amount of greasing. Depending on the result: Grease the herborner.F-N (see the block motor operating manual "Integral Horsepower AC Induction Motors (MN408), Baldor Electric Company", Chapter 3) | General maintenance and repair worker Electrical installer/ electric motor technician Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) |
| | | Grease the herborner.F-N-PM while the impeller is rotating (↳ *chapter "13.5.3 Regreasing and quantity of Klüberquiet BQH 72-102 with the herborner.F-N-PM and the herborner.F-N-C" on page 211*) | |
| | | Grease the herborner.F-N-C while the impeller is rotating (↳ *chapter "13.5.3 Regreasing and quantity of Klüberquiet BQH 72-102 with the herborner.F-N-PM and the herborner.F-N-C" on page 211*) | |
| | | Remove the anti-friction bearing, clean it and replace if necessary (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*) | |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | | CAUTION! Anti-friction bearing may be damaged if lubrication is inadequate or excessive. | |
| | The block motor's anti-friction bearing is faulty | Replace the anti-friction bearing (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*) | Electrical installer/ electric motor technician Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) |
| | The measures to reduce vibration are insufficient | Make sure that vibration dampers and compensators were inserted correctly when the pump was installed. If necessary, retrofit vibration-damping parts (↳ *chapter "5 Installing and connecting the pump" on page 63*) | Plumber/Pipefitter |
| The pump is making a lot of noise | The system has not been bled | Bleed the system using the air bleeding device | Plumber/Pipefitter |
| | There is no non-return valve installed or it is faulty | Install a non-return valve in the pressure pipe or check that the existing non-return valve is working properly and replace if necessary (↳ *chapter "5.3.6 Connecting to the pump's flanges" on page 72*) | Plumber/Pipefitter |
| | The pump is blocked | Check for foreign bodies and flush the pump if necessary (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95 or* ↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*) | General maintenance and repair worker |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | The block motor is running unevenly | block motor is running unevenly or is vibrating heavily | |
| The pump switches itself off | The block motor is overheated | ↳ *"Faults in the block motor" on page 123*, block motor is overheated | |
| | The pump's direction of rotation is wrong | Check the pump's direction of rotation and reverse it if necessary (↳ *chapter "6.6 Checking the direction of rotation" on page 87*) | Electrical installer/ electric motor technician |
| | The feed pipe is obstructed | Make sure that no foreign bodies have collected in the supply/feed pipe (leaves, clothes, etc.) and are obstructing it | General maintenance and repair worker |
| | The pump is blocked | Check for foreign bodies and flush the pump if necessary (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95 or* ↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*) | General maintenance and repair worker |
| | Too frequent switching | Allow the block motor to cool down and avoid frequently switching on & off<br>If operating the pump via a control system, ensure that the control system does not trigger frequent switching operations | General maintenance and repair worker<br>Electrical installer/ electric motor technician |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | The block motor is incorrectly connected | Check the electrical connections in the terminal box and make sure that it has been wired according to the site power supply (↳ *chapter "6.3 Connecting the electrical power supply" on page 78*) | Electrical installer/ electric motor technician |
| | The water to be pumped is very dirty (muddy) | Check the supply pool for contamination and clean it if necessary. Then flush the pump (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95* or ↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*) | General maintenance and repair worker |

**Faults in the block motor**

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| The block motor is not running | Power failure / the mains voltage has been interrupted | If necessary, restore the power supply to the fuse box | Electrical installer/ electric motor technician General maintenance and repair worker |
| | There is a short circuit between connecting wires in the terminal box | Check the electrical connections in the terminal box (↳ *chapter "8.3.5 Checking the electrical connections in the terminal box" on page 108*) | Electrical installer/ electric motor technician |
| | There is a problem with the local power supply | Check the on site electrical installation | Electrician |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| The block motor is humming loudly | Motor damage | Repair/replace the block motor | Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) Manufacturer (Herborner Pumpentechnik) |
| The block motor is overheated | Overload due to the operating conditions | ↳ *"Faults on the pump" on page 115*, the pump switches itself off | |
| | There is a problem with the local power supply | Check the on site electrical installation | Electrician |
| | Motor damage | Repair/replace the block motor | Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) Manufacturer (Herborner Pumpentechnik) |
| | There is a problem with the connecting wires | Check the electrical connections in the terminal box (↳ *chapter "8.3.5 Checking the electrical connections in the terminal box" on page 108*) | Electrical installer/ electric motor technician |
| The block motor is running unevenly or is vibrating heavily | The block motor is not correctly fixed or aligned | Make sure the fasteners for the block motor are firmly seated (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*) | Electrical installer/ electric motor technician |
| | Motor damage | Repair/replace the block motor | Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) Manufacturer (Herborner Pumpentechnik) |
| Loud or unusual noises from the block motor | Impeller fan shroud is dirty (herborner.F-N and herborner.F-N-PM only) | Clean the fan hood (↳ *chapter "8.3.2 Cleaning the block motor's casing" on page 106*) | General maintenance and repair worker |

| Description of the fault | Cause | Remedy | Personnel |
|---|---|---|---|
| | The block motor is inadequate or has been excessively greased | Using the maintenance records, check whether there has been an insufficient or, if applicable, excessive amount of greasing. Depending on the result: Grease the herborner.F-N (see the block motor operating manual “Integral Horsepower AC Induction Motors (MN408), Baldor Electric Company”, Chapter 3) | General maintenance and repair worker Electrical installer/ electric motor technician Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) |
| | | Grease the herborner.F-N-PM while the impeller is rotating (↳ *chapter “13.5.3 Re-greasing and quantity of Klüberquiet BQH 72-102 with the herborner.F-N-PM and the herborner.F-N-C” on page 211*) | |
| | | Grease the herborner.F-N-C while the impeller is rotating (↳ *chapter “13.5.3 Re-greasing and quantity of Klüberquiet BQH 72-102 with the herborner.F-N-PM and the herborner.F-N-C” on page 211*) | |
| | | Remove the anti-friction bearing, clean it and replace if necessary (↳ *chapter “9.3.1 Disassembling and reassembling a pump” on page 126*) | |
| | | CAUTION! Anti-friction bearing may be damaged if lubrication is inadequate or excessive. | |
| | The block motor is not correctly fixed or aligned | Make sure the fasteners for the block motor are firmly seated (↳ *chapter “9.3.1 Disassembling and reassembling a pump” on page 126*) | Electrical installer/ electric motor technician |
| | The anti-friction bearing is dirty or damaged | Remove the anti-friction bearing, clean/replace it (↳ *chapter “9.3.1 Disassembling and reassembling a pump” on page 126*) | Electrical installer/ electric motor technician Manufacturer (Baldor Electric Company) Manufacturer (EMOD MOTOREN) Manufacturer (Herborner Pumpentechnik) |

## 9.3 Jobs to fix faults

### 9.3.1 Disassembling and reassembling a pump

**Strong magnetic fields**

**⚠ WARNING**

**Risk of death from strong magnetic fields!**

- **Persons with pacemakers or implants made from metal must not stand within the vicinity of the block motor.**
- **Keep magnetic materials or those containing iron away from the block motor. Such materials may be attracted and cause injuries to persons.**
- **Remove any metallic items (jewelry, watches, pens, etc.) prior to any disassembly work.**
- **Keep electronic devices, data storage devices or credit cards, etc. away from the block motor. These may be damaged.**

**During operation, the block motor may build up a strong electromagnetic field. Strong magnetic fields may cause serious or even fatal injuries as well as considerable damage to equipment.**

### Heavy weight

**⚠ WARNING**

**There is a danger of injury from the heavy weight of the components!**

- **Wear personal protective equipment during all disassembly and installation work.**
- **Put removed components in a safe place where they cannot fall down.**
- **Handle the components carefully and give them suitable support if necessary.**

**Individual parts such as the block motor and pump casing are very heavy (↳ *Chapter "13.2 Weight of components and packaging" on page 139*). Disassembled components can fall and cause injuries or damage.**

### Sharp edges

**⚠ CAUTION**

**There is a danger of injury from sharp edges!**

- **Be careful when working near sharp edges.**
- **Wear safety gloves during all disassembly and installation work.**

**The block motor and the pump's impeller have sharp edges. Sharp edges can cause abrasions and lacerations.**

### Disassembly

| | |
|---|---|
| Personnel: | ■ Crane and tower operator<br>■ Electrical installer/electric motor technician<br>■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety helmet<br>■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |

Special tool:

- Crane and lifting gear
- Socket wrench with a set of deep sockets

If components have to be replaced (seals, impeller, etc.), the pump will have to be removed and disassembled as follows:

*The complete disassembly of the pump is described in the following. Depending upon which component is to be replaced, the disassembly can of course be stopped as soon as the component concerned has been removed.*

1. **⚠ DANGER! Risk of death from electric shock and risk of injury due to the pump starting unexpectedly!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! Risk of injury from hot surfaces and hot water!**

   Allow the motor to cool down.

3. **⚠ WARNING! Risk of death from strong magnetic fields!**

   When disassembling the block motor on the herborner.F-N-PM, refer to the operating manual "Operating Instructions for three-phase-motors with permanent magnets (12.13), EMOD MOTOREN," Chapter 4.3.

4. ***NOTICE* There is a danger of flooding from leaking water!**

   Make sure that all of the gate valves are closed

5. Drain the pump (↳ *chapter "7.6.1 Flushing and draining the herborner.F-N and herborner.F-N-PM" on page 95 or ↳ chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*).


*Fig. 45 Block motor terminal box (example: herborner.F-N)*

6. ■ If a frequency converter is used, disconnect the mains connection cables from the frequency converter (see the frequency converter manual).
   ■ If no frequency converter is used, unscrew the cover of the motor's (Fig. 50/1) terminal box, remove it and disconnect the mains connection cables.
7. Undo the flange connections to the pipes both on the suction and pressure sides.
8. Undo the pump's foundation bolts.
9. **⚠ WARNING! There is a danger of injury from falling or toppling packages!**

   Attach the ropes, lashes or multi-point slings according to (Fig. 51) and attach to the crane's hook.

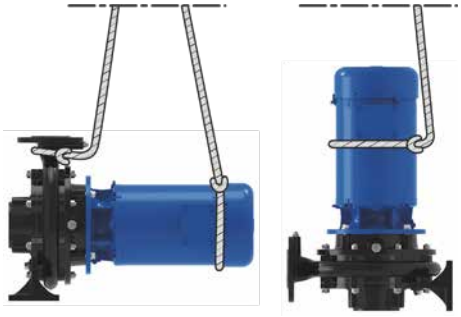


*Fig. 46 Lifting points on the pump (example: herborner.F-N)*

*Depending on the version of the pump, its center of gravity will be towards the block motor. Attach the lifting gear accordingly (if necessary using a traverse), so that the crane hook can be attached over the center of gravity.*

10. Transport the pump to the disassembly location (↳ *chapter "4.4 Transporting the pump to its installation site" on page 61*).
11. **⚠ WARNING! There is a danger of injury if the floor is unsuitable!**

    Set the pump down vertically on the motor on a level surface which is capable of supporting the weight.

## Draining the residue from the herborner.F-N-C pump

Materials:
- Container (with a capacity of at least ⅛ gal)


*Fig. 47 Opening the ball valve*

1. Open the ball valve (Fig. 52/1).

   ⇨ The pump is vented.

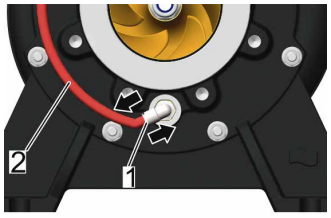



*Fig. 48 Removing the return pipe*

1 Pressure ring
2 Return pipe

2. Place the container under the return pipe (Fig. 51/2).
3. Press and hold down the (Fig. 53/1) pressure ring.
4. Pull the return pipe (Fig. 53/2) out of the right-angle connector.

   ⇨ The remaining water contained in the pipes is drained off.
5. Release the pressure ring (Fig. 53/1) again.
6. Wait until all of the water has run out. Subsequently empty the container.
7. Press and hold down the (Fig. 54/1) pressure ring.
8. Pull the cooling water pipe (Fig. 54/2) out of the right-angle connector.
9. Release the pressure ring (Fig. 54/1)again.

   ⇨ The pump can be disassembled.

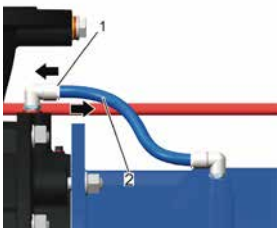



*Fig. 49 Removing the cooling water pipe*

1 Pressure ring
2 Cooling water pipe

## Disassembly of the standard version

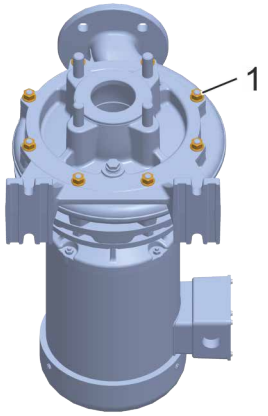



*Fig. 50 Nuts for fastening the casing cover (example: herborner.F-N)*

1. **⚠ WARNING! Risk of injury from unsuitable surface!**

   Set the pump down vertically on the block motor on a level surface which is capable of supporting the weight (Fig. 55) and secure against falling over.

2. Remove the nuts for fastening the casing cover (Fig. 55/1) on all sides and place them to one side for later assembly along with the washers.

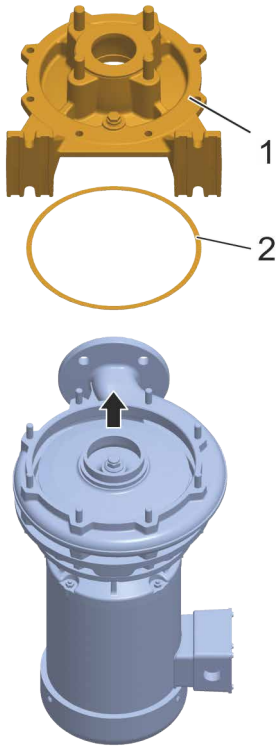



*Fig. 51 Removing the casing cover (example: herborner.F-N)*

3. **⚠ WARNING! There is a danger of injury from the heavy weight of the components!**

   Remove the casing cover (Fig. 56/1).

4. Remove the gasket (Fig. 56/2) and place to one side for later assembly.

1 Casing cover
2 Gasket

*If the gasket has visible damage (cracks, pores), it will need to be replaced.*

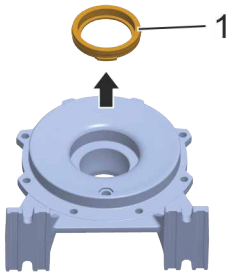



*Fig. 52 Removing the impeller protector*

5. Remove the impeller protector (Fig. 57/1) and place it to one side for later assembly.

*If there is visible damage to the impeller in the casing cover (cracks, pores), it will need to be replaced.*

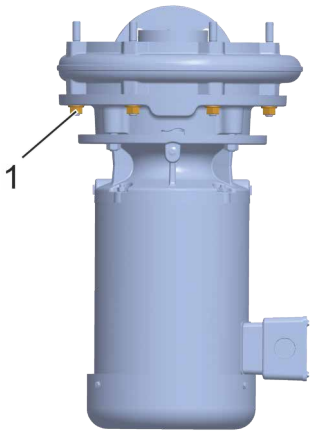



*Fig. 53 Nuts for fastening the pump casing (example: herborner.F-N)*

6. Remove the nuts for fastening the pump casing (Fig. 58/1) on all sides and place them to one side for later assembly along with the washers.

*For correct assembly of the pump casing, make markings that do not damage the casing (e.g., chalk marks) on the pump casing and on the intermediate casing.*

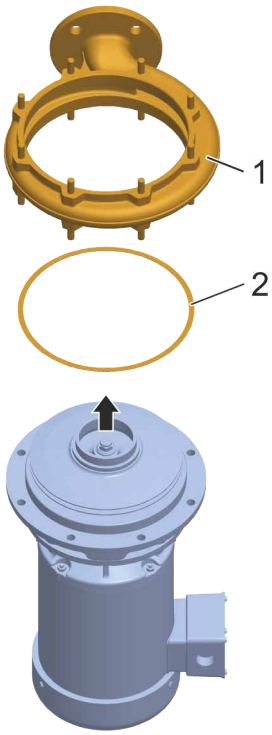



*Fig. 54 Removing the pump casing (example: herborner.F-N)*

1 Pump casing
2 Gasket

7. **⚠ WARNING! There is a danger of injury from the heavy weight of the components!**

   Carefully lift the loosened pump casing off the intermediate casing (Fig. 59/1).

8. Remove the gasket (Fig. 59/2) and place to one side for later assembly.

*If the gasket has visible damage (cracks, pores), it will need to be replaced.*

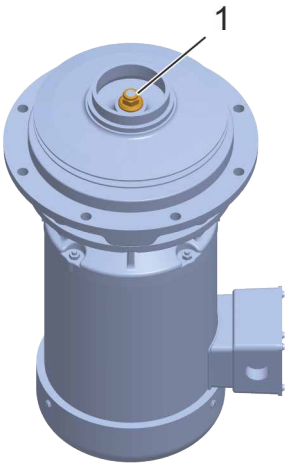



*Fig. 55 Nut for fastening the impeller (example: herborner.F-N)*

**9. ⚠ CAUTION! Risk of injury from impeller!**

Remove the nuts of the impeller (Fig. 60/1). Hold the impeller with a gloved hand when doing so.

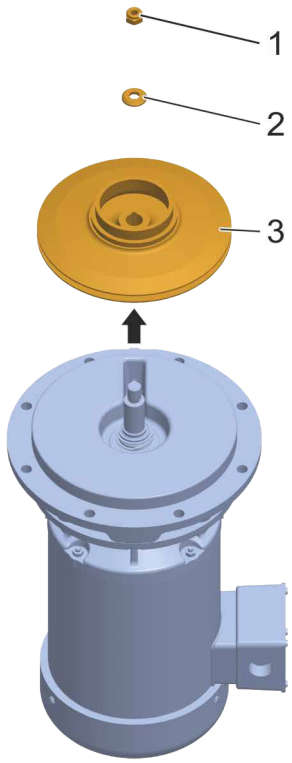



*Fig. 56 Removing the impeller (example: herborner.F-N)*

1 Nut for fastening
2 Washer
3 Impeller

**10.** Remove the nut for fastening the impeller (Fig. 61/1) and the washer (Fig. 61/2) and place them to one side for later assembly.

**11.** Remove the impeller (Fig. 61/3).

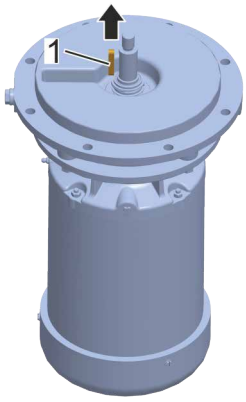



*Fig. 57 Key in the motor shaft (example: herborner.F-N)*

**12.** Remove the key (Fig. 62/1) from the motor shaft and put to one side for later assembly.

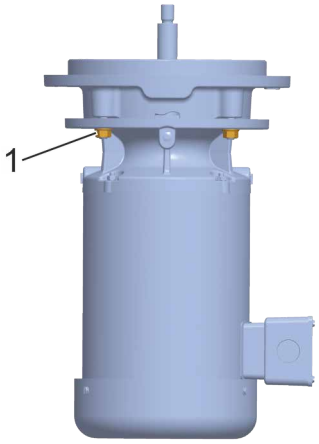



*Fig. 58 Nuts for fastening the intermediate casing (example: herborner.F-N)*

13. Remove the nuts for fastening the intermediate casing (Fig. 63/1) on all sides and place them to one side for later assembly along with the washers.

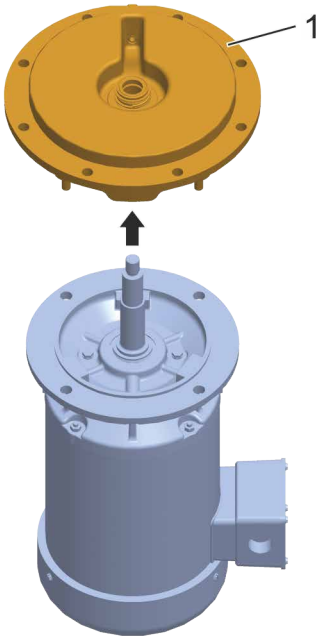



*Fig. 59 Removing the intermediate casing (example: herborner.F-N)*

14. **⚠ WARNING! Risk of injury from heavy components!**

    Carefully lift off the loosened intermediate casing (Fig. 64/1).

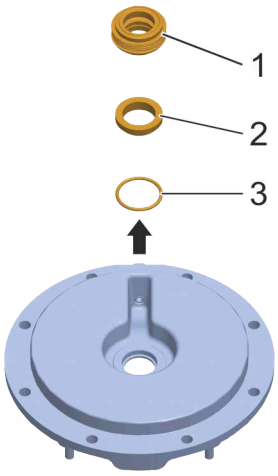



*Fig. 60 Removing the mechanical seal (example: herborner.F-N/ herborner.F-N-PM)*

1 Sealing ring with spring
2 Counter ring
3 O-ring

15. ***NOTICE*** **There is a danger of damage to the precision surfaces with tools!**

    Manually push the sliding ring with spring, (Fig. 65/1), the counter ring (Fig. 65/2) and the O-ring (Fig. 65/3) out of the intermediate casing. Do not use any tools.

    ⇨ The pump is now completely disassembled.

*The sliding ring with spring, the counter ring and the O-ring should be replaced with a new ones after removal regardless of their condition to avoid leaks and unnecessary work later on.*

## Disassembling the version with Seal Guard system

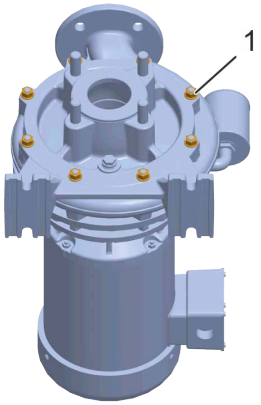



*Fig. 61 Nuts for fastening the casing cover (example: herborner.F-N)*

Materials:
- Container (with a capacity of at least 3 gal)

**16. ⚠ WARNING! Risk of injury from unsuitable surface!**

Set the pump down vertically on the block motor on a level surface which is capable of supporting the weight (Fig. 66) and secure against falling over.

**17.** Remove the nuts for fastening the casing cover (Fig. 66/1) on all sides and place them to one side for later assembly along with the washers.

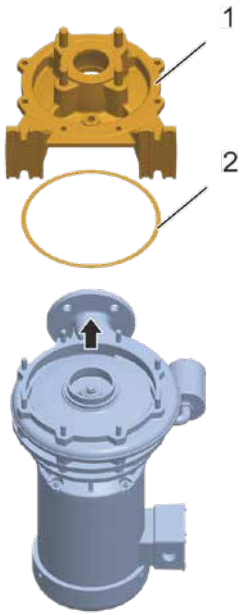



*Fig. 62 Removing the casing cover (example: herborner.F-N)*

1 Casing cover
2 Gasket

18. **⚠ WARNING! There is a danger of injury from the heavy weight of the components!**

    Remove the casing cover (Fig. 67/1).

19. Remove the gasket (Fig. 67/2) and place to one side for later assembly.

*If the gasket has visible damage (cracks, pores), it will need to be replaced.*

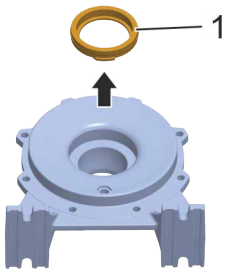



*Fig. 63 Removing the impeller protector*

20. Remove the impeller protector (Fig. 68/1) and place it to one side for later assembly.

*If there is visible damage to the impeller in the casing cover (cracks, pores), it will need to be replaced.*

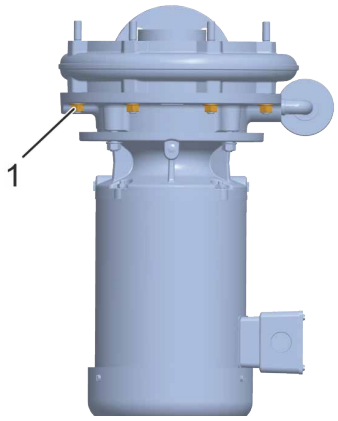



*Fig. 64 Nuts for fastening the pump casing (example: herborner.F-N)*

**21.** Remove the nuts for fastening the pump casing (Fig. 69/1) on all sides and place them to one side for later assembly along with the washers.

*For correct assembly of the pump casing, make markings that do not damage the casing (e.g., chalk marks) on the pump casing and on the intermediate casing.*

**22.** ⚠ **WARNING! There is a danger of injury from the heavy weight of the components!**

Carefully lift the loosened pump casing off the intermediate casing (Fig. 70/1).

**23.** Remove the gasket (Fig. 70/2) and place to one side for later assembly.

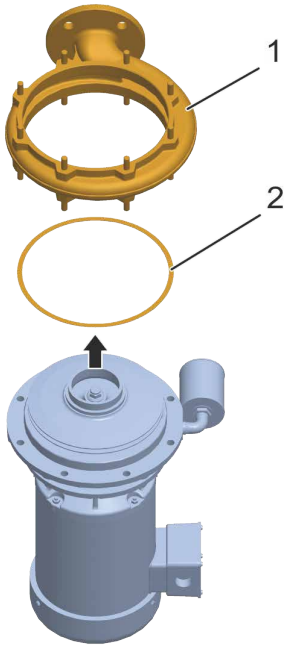



*Fig. 65 Removing the pump casing (example: herborner.F-N)*

1 Pump casing
2 Gasket

*If the gasket has visible damage (cracks, pores), it will need to be replaced.*

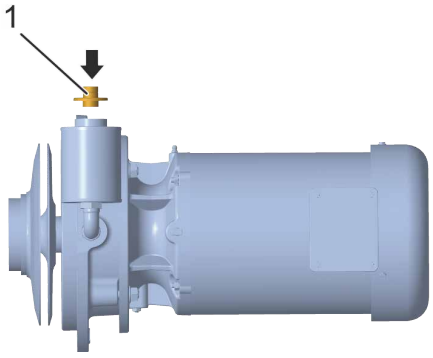



*Fig. 66 Seal Guard system compensation tank cap (example: herborner.F-N)*

**24.** ⚠ **WARNING! Risk of injury from heavy components!**

Lay the rest of the disassembled pump down horizontally (Fig. 71).

**25.** Place the container under the Seal Guard system compensation tank.

**26.** Remove the cap of the Seal Guard system compensation tank (Fig. 71/1) and place it to one side for later assembly.

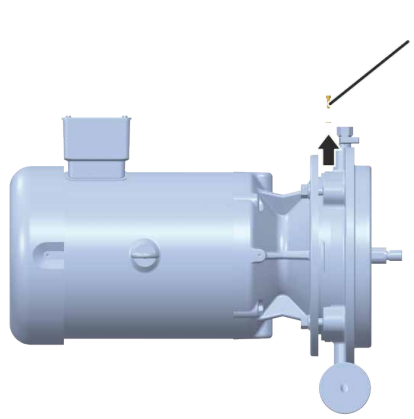



*Fig. 67 Seal cover screw (example: herborner.F-N)*

**27.** ⚠ **WARNING! Risk of injury from heavy components!**

Turn the rest of the disassembled pump so that the Seal Guard system compensation tank is at the bottom (Fig. 72).

**28.** Remove the screw in the seal cover (Fig. 72/1) and place to one side together with the sealing disk for later assembly.

⇨ The oil in the intermediate casing drains off.

**The sealing disk should be replaced with a new one after being removed regardless of its condition to avoid leaks and unnecessary work later on.**

**29.** Wait until all of the oil has run out. Now drain the container.

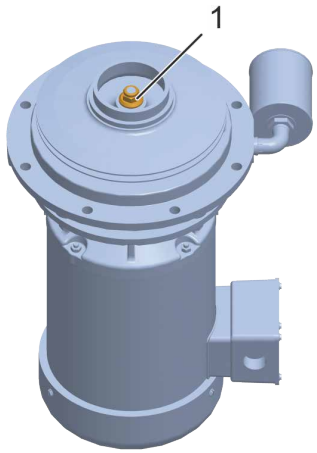



*Fig. 68 Nut for fastening the impeller (example: herborner.F-N)*

**30. ⚠ WARNING! Risk of injury from unsuitable surface!**

Stand the rest of the disassembled pump upright again on the block motor (Fig. 73) on a level surface which is capable of supporting the weight and secure against falling over.

**31. ⚠ CAUTION! Risk of injury from impeller!**

Remove the nut of the impeller (Fig. 73/1). Hold the impeller with a gloved hand when doing so.

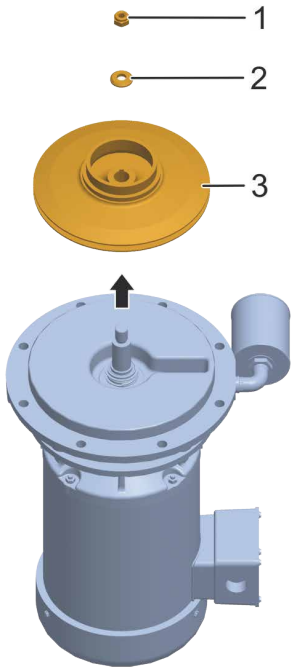



*Fig. 69 Removing the impeller (example: herborner.F-N)*

1 Nut for fastening
2 Washer
3 Impeller

**32.** Remove the nut for fastening the impeller (Fig. 74/1) and the washer (Fig. 74/2) and place them to one side for later assembly.

**33.** Remove the impeller (Fig. 74/3).

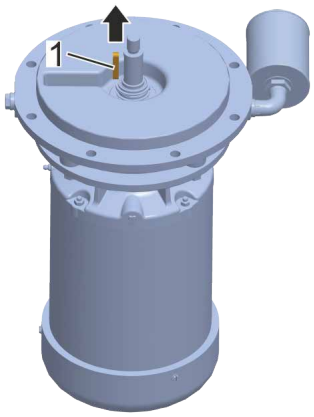



*Fig. 70 Key in the motor shaft (example: herborner.F-N)*

**34.** Remove the key (Fig. 75/1) from the motor shaft and put to one side for later assembly.

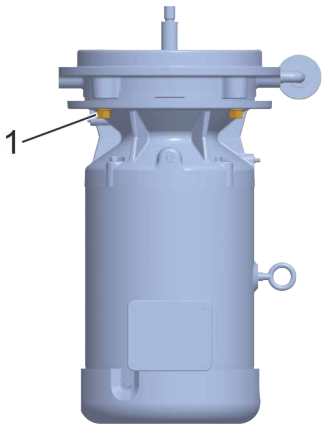



*Fig. 71 Nuts for fastening the intermediate casing (example: herborner.F-N)*

**35.** Remove the nuts for fastening the intermediate casing (Fig. 76/1) on all sides and place them to one side for later assembly along with the washers.

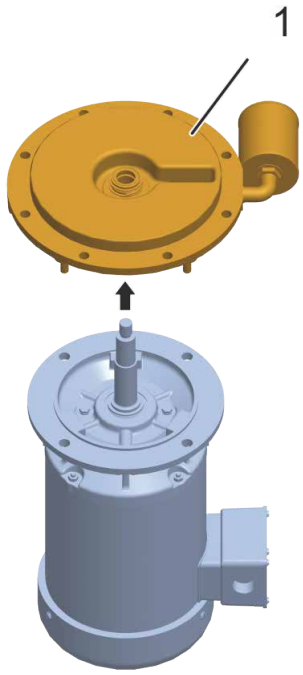



*Fig. 72 Removing the intermediate casing (example: herborner.F-N)*

**36. ⚠ WARNING! Risk of injury from heavy components!**

Carefully lift off the loosened intermediate casing (Fig. 77/1).

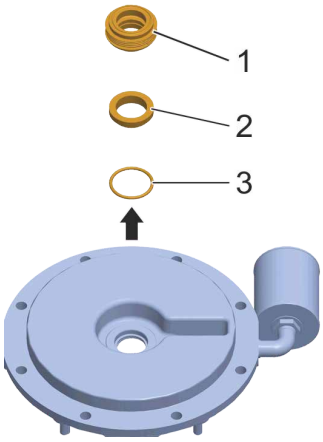



*Fig. 73 Removing the mechanical seal (example: herborner.F-N/ herborner.F-N-PM)*

1 Sealing ring with spring
2 Counter ring
3 O-ring

**37. *NOTICE* There is a danger of damage to the precision surfaces with tools!**

Manually push the sliding ring with spring, (Fig. 78/1), the counter ring (Fig. 78/2) and the O-ring (Fig. 78/3) out of the intermediate casing. Do not use any tools.

*The sliding ring with spring, the counter ring and the O-ring should be replaced with a new ones after removal regardless of their condition to avoid leaks and unnecessary work later on.*

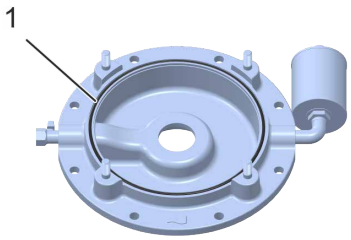



*Fig. 74 Removing the O-ring (example: herborner.F-N/herborner.F-N-PM)*

**38.** Remove the O-ring (Fig. 79/1) and place it to one side for later assembly.

*If the o-ring has visible damage (cracks, pores), it will need to be replaced.*

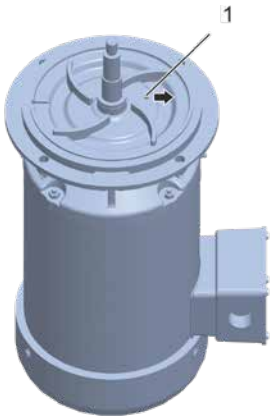



*Fig. 75 Mechanical seal locking screw (example: herborner.F-N)*

**39.** Remove the mechanical seal locking screw (Fig. 80/1) and place it do one side for later assembly.


*Fig. 76 Removing the sliding ring (example: herborner.F-N)*

**40.** ***NOTICE*** **There is a danger of damage to the precision surfaces with tools!**

Remove the sliding ring (Fig. 81/1) manually from the seal cover. Do not use any tools.

*The sliding ring should be replaced with a new one when removed regardless of its condition to avoid leaks and unnecessary work later on.*

**41.** Remove the seal cover (Fig. 82/1).

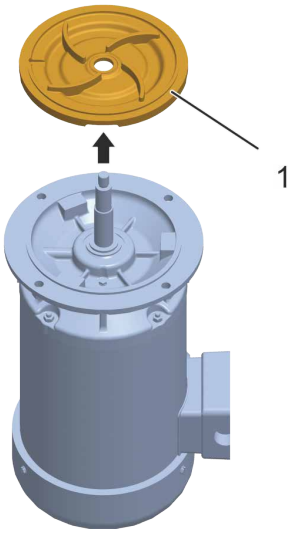



*Fig. 77 Removing the seal cover (example: herborner.F-N)*

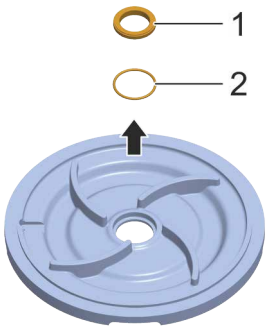



*Fig. 78 Removing the stationary ring and o-ring*

1 Counter ring
2 O-ring

**42. *NOTICE* There is a danger of damage to the precision surfaces with tools!**

Manually push the counter ring (Fig. 83/1) and the O-ring (Fig. 83/2) out of the seal cover. Do not use any tools.

⇨ The pump is now completely disassembled.

*When removing the counter ring and the o-ring, whatever their state, they should be replaced with a new one, to avoid leaks and unnecessary work later on.*

## Assembly

| | |
|---|---|
| Personnel: | ■ Electrical installer/electric motor technician<br>■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Special tool: | ■ Crane and lifting gear<br>■ Socket wrench with a set of deep sockets<br>■ Torque wrench<br>■ Assembly tool<br>■ Cellulose cloths |
| Materials: | ■ Ethyl alcohol |

**NOTICE**

**There is a danger of damage caused by incorrectly tightened screw connections!**

- **Tighten all bolts with a torque wrench to the required torques (↳ *chapter "13.9 Torque values" on page 223*).**

**Screws tightened to the improper torque can result in damage to the pump and to leaks. Leaks can cause considerable damage.**

If the pump had to be disassembled to remove parts, then it must be assembled as follows.

*Depending on how far the pump was disassembled, the assembly can start with a later step.*

1. **⚠ WARNING! Risk of death from strong magnetic fields!**

   When assembling the block motor on the herborner.F-N-PM, refer to the operating manual for three-phase motors with permanent magnets, Chapter 4.3.

## Assembling the standard version

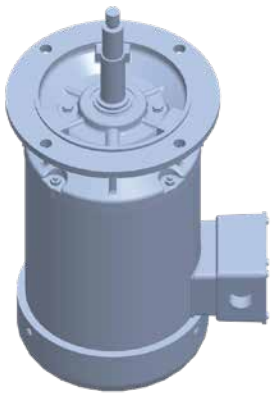


*Fig. 79 Placing the block motor on end (example: herborner.F-N)*

1. **⚠ WARNING! Risk of injury from heavy components!**

   Place the block motor upright on the fan hood (Fig. 84).

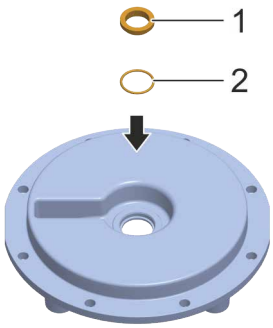



*Fig. 80 Inserting the O-ring and counter ring in the intermediate casing (example: herborner.F-N/herborner.F-N-PM)*

1 Sealing ring with spring
2 Counter ring

2. ***NOTICE* Risk of damage to counter ring and O-ring!**

   Fit the O-ring (Fig. 87/1) on the counter ring (Fig. 87/2) and then manually press them together into the intermediate casing. Carefully slide both rings downwards evenly. Keep horizontal and do not use force to push down.

*To make assembly easier, the o-ring and the counter ring can be lubricated with water containing some dishwashing liquid before pressing them on. Do not use oil or grease.*

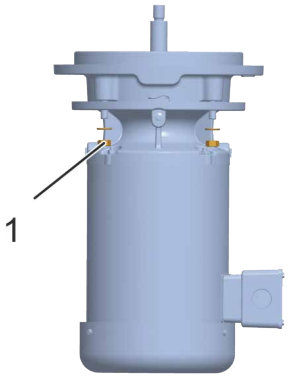



*Fig. 81 Fitting the intermediate casing (example: herborner.F-N)*

1 Intermediate casing
2 Fixing nuts with washers

3. **⚠ WARNING! Risk of injury from heavy components!**

   ***NOTICE* There is a danger of damaging the counter ring!**

   Put the pump casing the right way around with its studs onto the intermediate casing (Fig. 86/1) and fasten it firmly in place with the nuts and washers (Fig. 86/2). Be careful when setting it down and make sure that the counter ring is not damaged by the shaft.

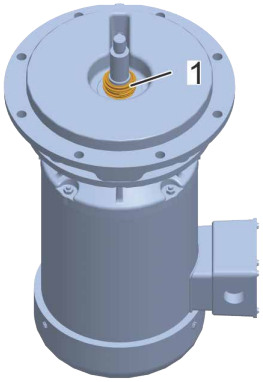



*Fig. 82 Pushing the sliding ring with the spring into position (example: herborner.F-N)*

4. ***NOTICE* There is a danger of damaging the sealing ring with the its spring!**

   Use ethyl alcohol and cellulose cloths to degrease the motor shaft and slide the sealing ring with its spring (Fig. 87/1) onto the motor shaft by twisting it up until the counter ring. Do not use force.

- **To make assembly easier, the sealing ring with its spring can be lubricated with water containing some dishwashing liquid before pressing them on. Do not use oil or grease.**
- **It is difficult to push the sealing ring with its spring onto the motor shaft. If necessary, use the assembly tool supplied by Herborner Pumps (↳ *chapter "3.5 Accessories" on page 53*).**

  ⇨ The sealing ring with its spring must be pushed up to the counter ring. The spring can then be tensioned by installing the impeller.

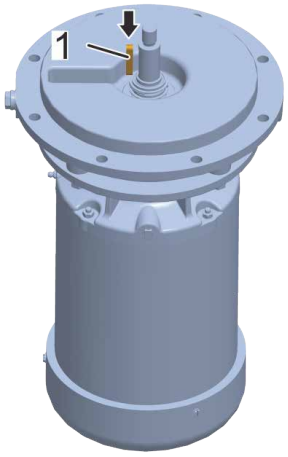



*Fig. 83 Inserting the key (example: herborner.F-N)*

**5.** Fit the key (Fig. 88/1) into the slot on the motor shaft and press it fully down.

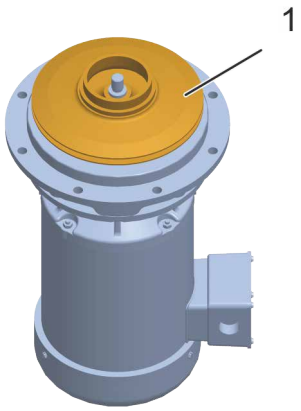



*Fig. 84 Impeller pushed on (example: herborner.F-N)*

**6.** Push the impeller (Fig. 89/1) onto the motor shaft.

7. Insert the (Fig. 90/1) washer.

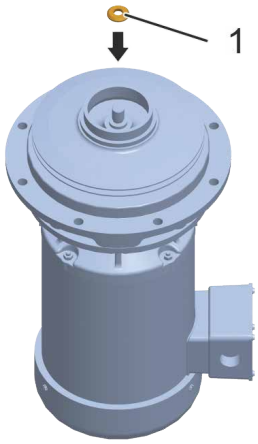



*Fig. 85 Inserting the washer (example: herborner.F-N)*

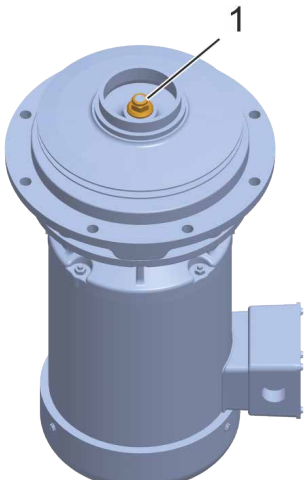



*Fig. 86 Nut for fastening the impeller (example: herborner.F-N)*

8. **⚠ CAUTION! Risk of injury from impeller!**

   Tighten the impeller securely with its nut (Fig. 91/1). Hold the impeller with a gloved hand when doing so.

*Use a new nut to avoid malfunctions.*

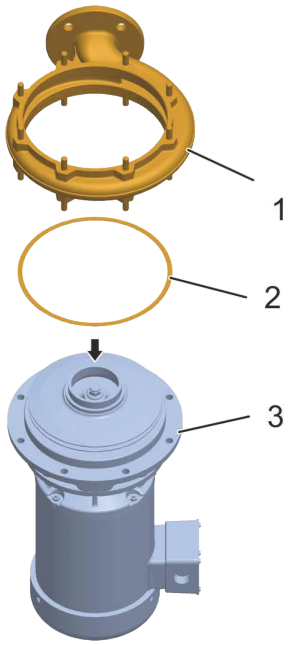



*Fig. 87 Installing the pump casing (example: herborner.F-N)*

1 Pump casing
2 Gasket
3 Intermediate casing

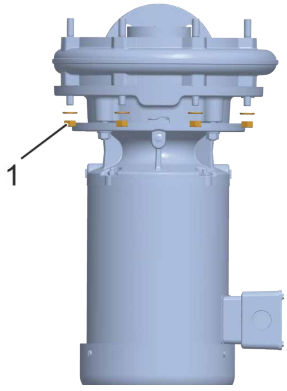



*Fig. 88 Tightening the nuts for fastening the pump casing (example: herborner.F-N)*

**9.** Place the seal (Fig. 92/2) on the intermediate casing (Fig. 92/3).

**10.** ⚠ **WARNING! Risk of injury from heavy components!**

Place the pump casing (Fig. 92/1) onto the intermediate casing (Fig. 92/3) with the studs so it fits the previously applied markings.

**11.** Tighten the nuts for fastening the pump casing together with the washers (Fig. 93/1).

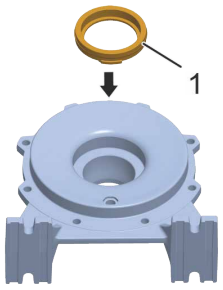



*Fig. 89 Inserting the impeller protector*

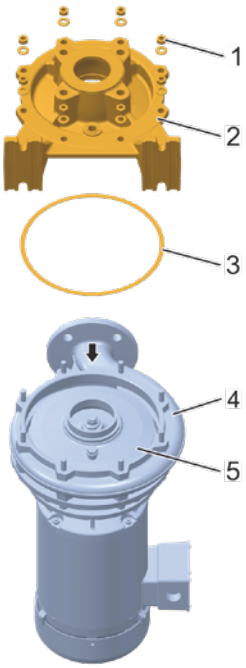



*Fig. 90 Installing the casing cover (example: herborner.F-N)*

1 Fixing nuts with washers
2 Casing cover
3 Gasket
4 Pump casing
5 Impeller

**12.** Insert the impeller protector (Fig. 94/1) with the chamfer pointing to the front into the casing cover.

**13.** Place the gasket (Fig. 95/3) on the pump casing (Fig. 95/4).

**14.** ⚠ **WARNING! Risk of injury from heavy components!**

Put the casing cover (Fig. 95/2) the right way around with its studs onto the pump casing (Fig. 95/4) and tighten it with the nuts and washers (Fig. 95/1).

**15.** ⚠ **CAUTION! Risk of injury from impeller!**

While wearing safety gloves, reach into the casing cover (Fig. 95/2) in the direction of the block motor and touch the impeller (Fig. 95/5).

**16.** Check whether or not the impeller can be moved easily.

⇨ If the impeller cannot be turned easily, the fastening nuts will have to loosened again(Fig. 95/1) and then retightened.

⇨ The pump is mounted.

**17.** Transport the pump to the installation site (↳ *chapter "4.4 Transporting the pump to its installation site" on page 61*), reinstall (↳ *chapter "5.3 Installing and aligning" on page 65)* and properly put it into operation (↳ *chapter "6 Installation and putting into operation for the first time" on page 76*).

## Assembling the version with Seal Guard system

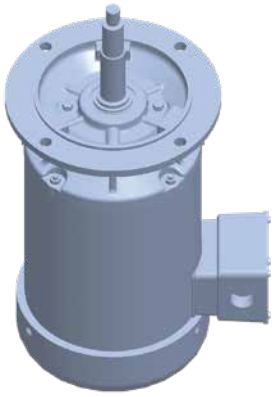


*Fig. 91 Placing the block motor on end (example: herborner.F-N)*

1. **⚠ WARNING! Risk of injury from heavy components!**

   Place the block motor upright on the fan hood (Fig. 96).

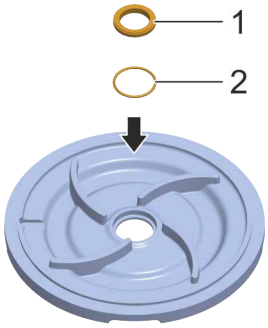



*Fig. 92 Fitting the o-ring and the counter ring*

1 O-ring
2 Counter ring

2. ***NOTICE* Risk of damage to counter ring and O-ring!**

   Fit the O-ring (Fig. 97/1) on the counter ring (Fig. 97/2) and then manually press them together into the seal cover. Carefully slide both rings downwards evenly. Keep horizontal and do not use force to push down.

*To make assembly easier, the o-ring and the counter ring can be lubricated with water containing some dishwashing liquid before pressing them on. Do not use oil or grease.*

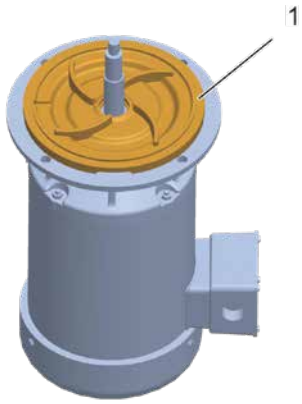



*Fig. 93 Attaching the seal cover (example: herborner.F-N)*

3. ***NOTICE*** **There is a danger of damaging the counter ring!**

   Place the seal cover (Fig. 98/1) on the block motor centering. Be careful when setting it down and make sure that the counter ring is not damaged by the shaft.

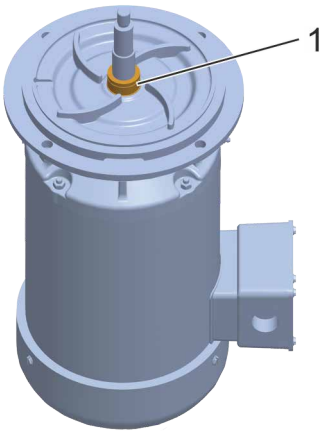



*Fig. 94 Pushing the sliding ring into position (example: herborner.F-N)*

4. ***NOTICE*** **Risk of damage to the sliding ring!**

   Use ethyl alcohol and cellulose cloths to degrease the motor shaft and slide the sealing ring with its sliding ring (Fig. 99/1) onto the motor shaft by turning it up until the counter ring. When doing this both pins have to be located in center position on the sliding ring. Do not use force.

- **Maintain a right-angle tolerance of 0.1 mm.**
- **To make assembly easier, the counter ring with its spring can be lubricated with water containing some dishwashing liquid before pressing them on. Do not use oil or grease.**
- **It is difficult to push the sliding ring onto the motor shaft. If necessary, use the assembly tool supplied by Herborner Pumps (*chapter "3.5 Accessories" on page 53*).**


*Fig. 95 Tightening the mechanical seal locking screws (example: herborner.F-N)*

**5.** Tighten the locking screws of the mechanical seal (Fig. 100/1) evenly.

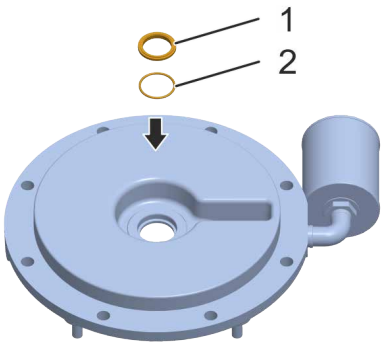



*Fig. 96 Inserting the O-ring and counter ring in the intermediate casing (example: herborner.F-N/herborner.F-N-PM)*

1 O-ring
2 Counter ring

**6.** ***NOTICE*** **Risk of damage to counter ring and O-ring!**

Fit the O-ring (Fig. 101/1) on the counter ring (Fig. 101/2) and then manually press them together into the intermediate casing. Carefully slide both rings downwards evenly. Keep horizontal and do not use force to push down.

*To make assembly easier, the o-ring and the counter ring can be lubricated with water containing some dishwashing liquid before pressing them on. Do not use oil or grease.*

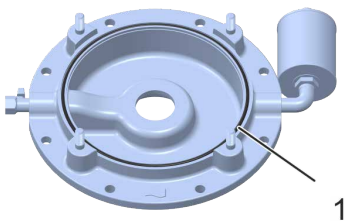



*Fig. 97 Inserting the O-ring (example: herborner.F-N/herborner.F-N-PM)*

**7.** Put the O-ring (Fig. 102/1) into the depression in the intermediate casing.

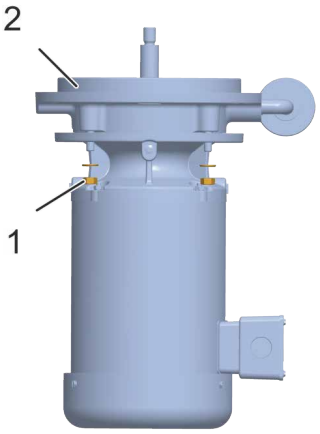



*Fig. 98 Fitting the intermediate casing (example: herborner.F-N)*

1 Intermediate casing
2 Fixing nuts with washers

8. **⚠ WARNING! Risk of injury from heavy components!**

   ***NOTICE* There is a danger of damaging the counter ring!**

   Put the pump casing the right way around with its studs onto the intermediate casing (Fig. 103/1) and fasten it firmly in place with the nuts and washers (Fig. 103/2). Be careful when setting it down and make sure that the counter ring is not damaged by the shaft.

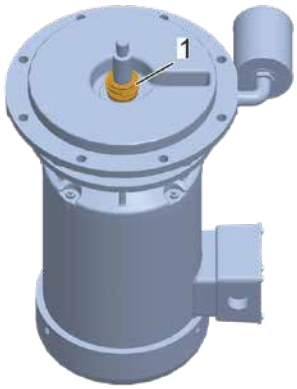



*Fig. 99 Pushing the sliding ring with the spring into position (example: herborner.F-N)*

9. ***NOTICE* There is a danger of damaging the sealing ring with the its spring!**

   Use ethyl alcohol and cellulose cloths to degrease the motor shaft and slide the sealing ring with its spring (Fig. 104/1) onto the motor shaft by twisting it up until the counter ring. Do not use force.

- **To make assembly easier, the sealing ring with its spring can be lubricated with water containing some dishwashing liquid before pressing them on. Do not use oil or grease.**
- **It is difficult to push the sealing ring with its spring onto the motor shaft. If necessary, use the assembly tool supplied by Herborner Pumps (↳ *chapter "3.5 Accessories" on page 53*).**

⇨ The sealing ring with its spring must be pushed up to the counter ring. The spring can then be tensioned by installing the impeller.

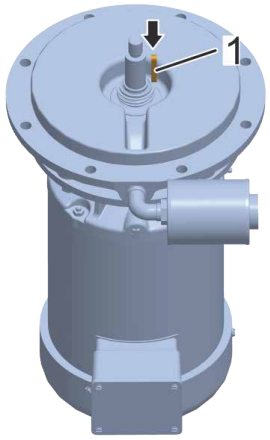



*Fig. 100 Inserting the key (example: herborner.F-N)*

**10.** Fit the key (Fig. 105/1) into the slot on the motor shaft and press it fully down.

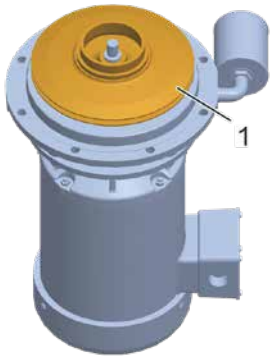



*Fig. 101 Impeller pushed on (example: herborner.F-N)*

**11.** Push the impeller (Fig. 106/1) onto the motor shaft.

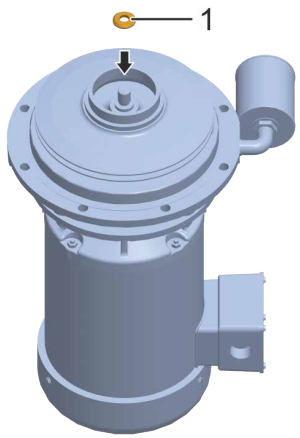



*Fig. 102 Inserting the washer (example: herborner.F-N)*

**12.** Insert the (Fig. 107/1) washer.

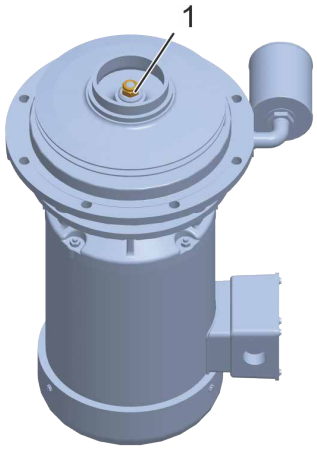



*Fig. 103 Nut for fastening the impeller (example: herborner.F-N)*

**13. ⚠ CAUTION! Risk of injury from impeller!**

Tighten the impeller securely with its nut (Fig. 108/1). Hold the impeller with a gloved hand when doing so.

*Use a new nut to avoid malfunctions.*

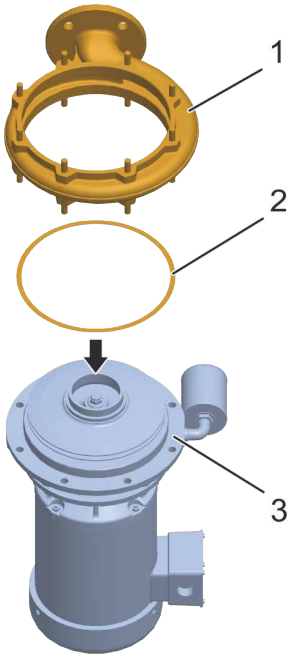



*Fig. 104 Installing the pump casing (example: herborner.F-N)*

1 Pump casing
2 Gasket
3 Intermediate casing

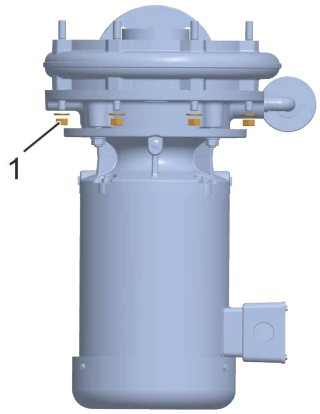



*Fig. 105 Tightening the nuts for fastening the pump casing (example: herborner.F-N)*

**14.** Place the seal (Fig. 109/2) on the intermediate casing (Fig. 109/3).

**15.** ⚠ **WARNING! Risk of injury from heavy components!**

Place the pump casing (Fig. 109/1) onto the intermediate casing (Fig. 109/3) with the studs so it fits the previously applied markings.

**16.** Tighten the nuts for fastening the pump casing together with the washers (Fig. 110/1).

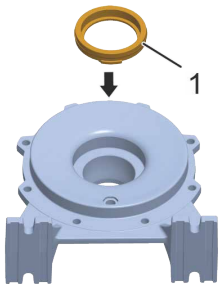



*Fig. 106 Inserting the impeller protector*

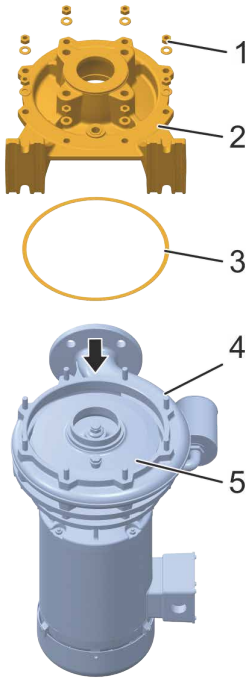



*Fig. 107 Installing the casing cover (example: herborner.F-N)*

1 Nut for the fastening of the casing cover
2 Casing cover
3 Gasket
4 Pump casing
5 Impeller

**17.** Insert the impeller protector (Fig. 111/1) with the chamfer pointing to the front into the casing cover.

**18.** Place the gasket (Fig. 112/3) on the intermediate casing (Fig. 112/4).

**19.** ⚠ **WARNING! Risk of injury from heavy components!**

Put the casing cover (Fig. 112/2) the right way around with its studs onto the pump casing (Fig. 112/4) and tighten it with the nuts and washers(Fig. 112/1) .

**20.** ⚠ **CAUTION! Risk of injury from impeller!**

While wearing safety gloves, reach into the filter casing (Fig. 112/2) in the direction of the block motor and touch the impeller (Fig. 112/5).

**21.** Check whether or not the impeller can be moved easily.

⇨ If the impeller cannot be turned easily, the fastening nuts will have to loosened again(Fig. 112/1) and then retightened.

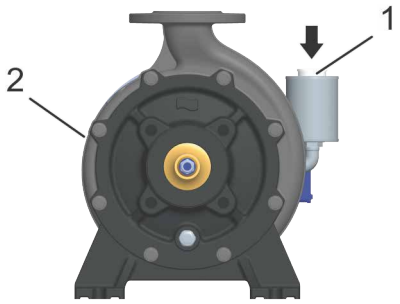



*Fig. 108 Adding oil (example: herborner.F-N)*

1 Seal Guard system compensation tank
2 Screw

**22.** Add oil into the opening of the Seal Guard system compensation tank (Fig. 113/1) until the oil comes out from the opening of the screw (Fig. 113/2).

- **The pump must be upright.**
- **Use Mobil SHC Cibus 46 with NSF H1 - license (↳ *chapter "13.5.1 Lubrication oil in intermediate casing on the version with Seal Guard system" on page 206*).**
- **Do not mix different types of oil together.**

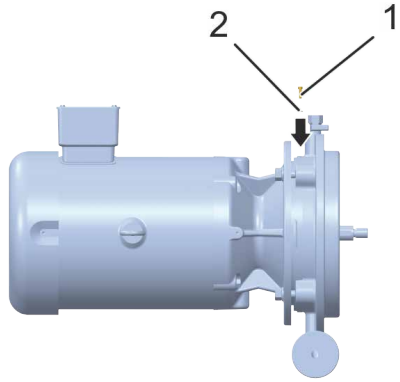



*Fig. 109 Tightening the screw (example: herborner.F-N)*

1 Screw
2 Sealing disk

**23.** Insert the sealing disk (Fig. 114/1) and tighten using the screw (Fig. 114/2).

*Use a new sealing disk to avoid malfunctions.*

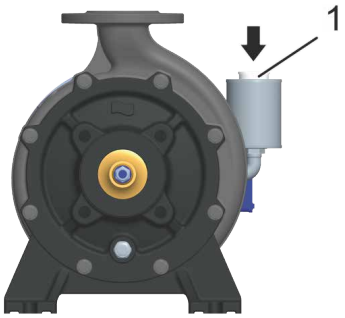



*Fig. 110 Refilling the oil (example: herborner.F-N)*

**24.** Refill the oil in the opening of the Seal Guard system compensation tank (Fig. 115/1) until it is half-full.

- **The pump must be upright.**
- **Use Mobil SHC Cibus with NSF H1 - license (***chapter "13.5.1 Lubrication oil in intermediate casing on the version with Seal Guard system" on page 206***).**
- **Do not mix different types of oil together.**

**25.** Tighten the cap of the Seal Guard system compensation tank (Fig. 116/1),

⇨ The pump is mounted.

**26.** Transport the pump to the installation site (*chapter "4.4 Transporting the pump to its installation site" on page 61*), reinstall (*chapter "5.3 Installing and aligning" on page 65*) and properly put it into operation (*chapter "6 Installation and putting into operation for the first time" on page 76*).

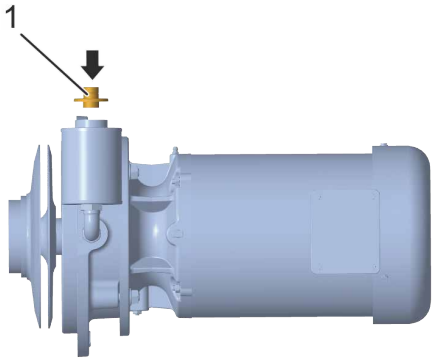



*Fig. 111 Tightening the Seal Guard system compensation tank cap (example: herborner.F-N)*

## Installing the pipes of the herborner.F-N-C pump


*Fig. 112 Fastening the return pipe*

1 Pressure ring
2 Return pipe

1. Press and hold down the (Fig. 117/1) pressure ring.
2. Push the return pipe (Fig. 117/2) into the right-angle connector.
3. Release the pressure ring (Fig. 117/1) again.

*Shorten the loose end of the return pipe by approx. ¼ in. to avoid malfunctions.*

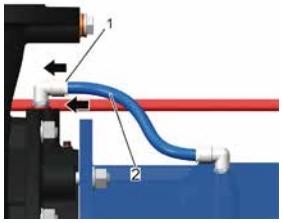



*Fig. 113 Fastening the cooling water pipe*

1 Pressure ring
2 Cooling water pipe

1. Press and hold down the (Fig. 118/1) pressure ring.
2. Push the cooling water pipe (Fig. 118/2) into the right angle connector.
3. Release the pressure ring (Fig. 118/1) again.

   ⇨ The pipelines are fitted.

*Shorten the loose end of the cooling water pipe by approx. ¼ in. to avoid malfunctions.*

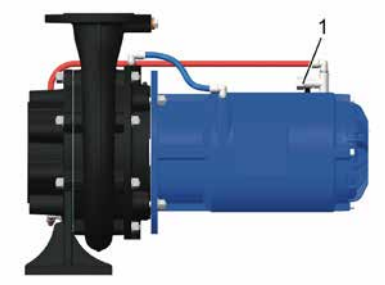



*Fig. 114 Closing the ball valve*

4. Close the ball valve (Fig. 119/1).

### 9.3.2 Checking the impeller and tightening

| | |
|---|---|
| Personnel: | ■ General maintenance and repair worker |
| Personal protective equipment: | ■ Safety clothing<br>■ Safety gloves<br>■ Safety shoes |
| Special tool: | ■ Socket wrench with a set of deep sockets |

Check the state and firm seating of the impeller as follows.

1. **⚠ WARNING! Risk of injury due to pump starting unexpectedly!**

   Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).

2. **⚠ WARNING! Risk of injury from hot surfaces and hot water!**

   Allow the motor to cool down.

3. ***NOTICE* There is a danger of flooding from leaking water!**

   Make sure that all of the gate valves are closed

4. Drain the pump (↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96*). ).


*Fig. 115 Checking the pump impeller (example: herborner.F-N)*

1 Impeller
2 Nut for fastening

5. Feel the impeller all round to see if it is worn or deformed.

   ⇨ If its surface is very uneven or is damaged, then the impeller must be removed and replaced (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126*).

6. Check whether the impeller can be moved axially.

   ⇨ If it can be moved, then it has come loose and must be tightened.

7. Tighten the impeller securely with the nut (Fig. 120/2). Hold the impeller with a gloved hand when doing so.

*Observe the screw tightening torque* (↳ *chapter "13.9 Torque values" on page 223 ).*

*If the impeller loosens again, the nut of the impeller will have to be replaced* (↳ *chapter "9.3.1 Disassembling and reassembling a pump" on page 126).*

## 9.4 After the fault has been fixed

Personnel:
- Electrical installer/electric motor technician
- General maintenance and repair worker

1. Clean up any water which leaked out.
2. Make sure that all of the jobs have been completed and all of the screwed connections which were undone have been properly retightened.
3. Make sure that all of the safety devices have been refitted and are in working order and that there is no danger to personnel.

   ⇨ The pump can be switched on again. (↳ *chapter "7.3 Switching on/off" on page 94*).

4. If the pump does not start, acknowledge the fault

# 10 Spare parts

## 10.1 Ordering spare parts

When ordering spare parts, specify the following:

- Pump designation (*chapter "13.8 Name plate" on page 220*)
- Order no. (*chapter "13.8 Name plate" on page 220*) or Serial Number (S/N) on the motor name plate
- The name of the spare part

## 10.2 List of spare parts

### herborner.F-N/herborner.F-N-PM

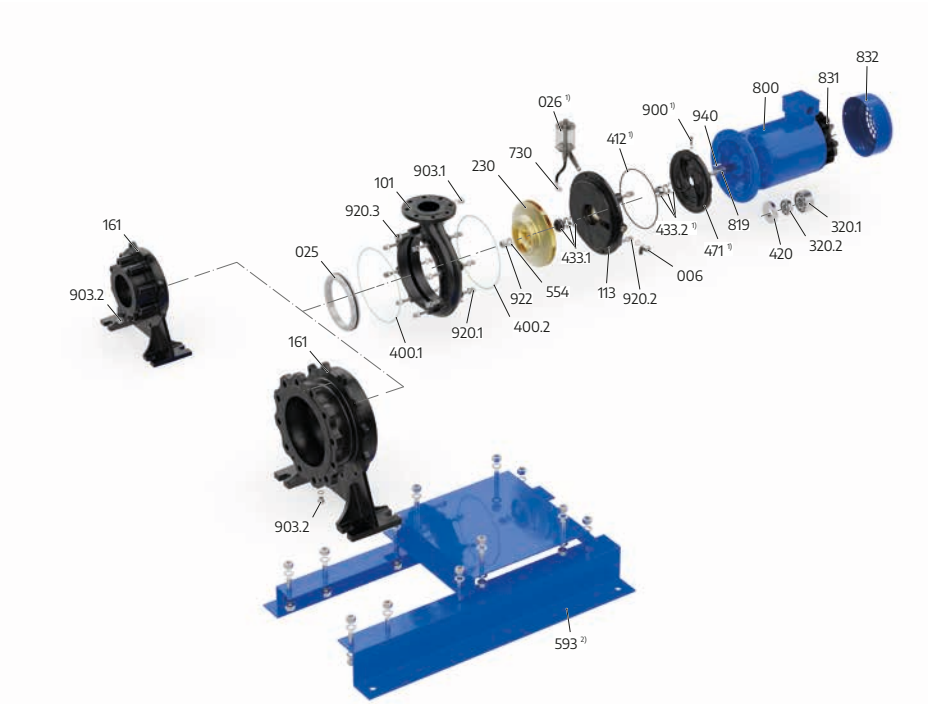



*Fig. 116 Spare parts for the herborner.F-N/herborner.F-N-PM pump (example: herborner.F-N)*

### herborner.F-N-C

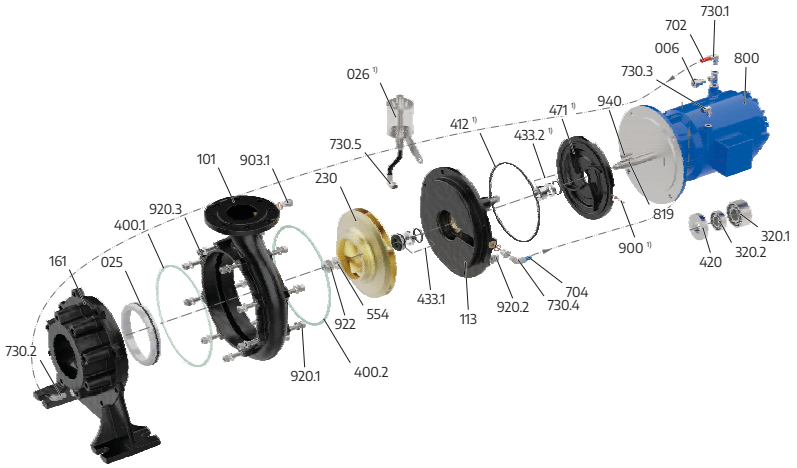



*Fig. 117 Spare parts for herborner.F-N-C pump*

| Order number | Name | Quantity |
|---|---|---|
| 006 | Ball valve | 1 |
| 025 | Impeller protector | 1 |
| 026[1)] | Seal Guard system | 1 |
| 101 | Pump casing | 1 |
| 113 | Intermediate casing | 1 |
| 161 | Casing cover | 1 |
| 230 | Impeller | 1 |
| 320.1 | Anti-friction bearing (non drive side) | 1 |
| 320.2 | Anti-friction bearing (drive side) | 1 |
| 400.1 | Gasket | 1 |
| 400.2 | Gasket | 1 |
| 412[1)] | O-ring | 1 |
| 420 | Shaft seal ring | 1 |
| 433.1 | Mechanical seal | 1 |
| 433.2[1)] | Mechanical seal | 1 |
| 471[1)] | Seal cover | 1 |
| 554 | Washer | 1 |
| 593[2)] | Rail | 1 |
| 702 | Return pipe | 1 |
| 704 | Cooling water pipe | 1 |
| 730.1 | Pipe connection | 1 |
| 730.2 | Pipe connection | 1 |
| 730.3 | Pipe connection | 1 |
| 730.4 | Pipe connection | 1 |
| 730.5 | Pipe connection | 1 |
| 800 | Motor | 1 |
| 819 | Motor shaft | 1 |
| 831 | Fan | 1 |

1) Special model/accessories

2) Motor ≥ 440lb

| Order number | Name | Quantity |
|---|---|---|
| 832 | Fan hood | 1 |
| 900[1)] | Screw | 1 |
| 903.1 | Screwed plug | 1 |
| 903.2 | Screwed plug | 1 |
| 903.3 | Screwed plug | 1 |
| 920.1 | Nut | 1 |
| 920.2 | Nut | |
| 920.3 | Nut | |
| 922 | Impeller Nut | |
| 940 | Key | 1 |

1) Special model/accessories

2) Motor ≥ 440lb

# 11 Special tools, materials

## 11.1 Special tools

The following special tools are needed for the work described in this operating manual:

**Fork lift truck**

To transport the packed pump on the pallet.

**Hand brush**

To remove collections of dust and coarse dirt.

**Crane and lifting gear**

To transport the unpacked pump.

**Assembly tool**

To help to fit the mechanical seal onto the motor shaft.

**Motor test unit**

To test the block motor for faulty windings.

**Screwdriver (flat)**

For prying out the shaft sealing ring on the motor on the flood-proof version.

**Socket wrench with a set of deep sockets**

To tighten and loosen hex. bolts in various sizes.

**Torque wrench**

To tighten screwed connections to a specified torque.

**Cellulose cloths**

To degrease the motor shaft.

## 11.2 Materials

The following materials are needed for the work described in the operating manual:

**Drain line (optional)**

For draining the pump directly into the drain.

**Gate valve**

To interrupt the pumped flow for maintenance work. A gate valve must be fitted in the pressure pipe after the non-return valve.

When operating in feed mode, a gate valve must also be fitted in the supply pipe.

**Container (with a capacity of at least ⅛ gal)**

For collecting water when draining the herborner.F-N-C.

**Container (with a capacity of at least 2 gal)**

For collecting water when rinsing and draining the pump.

**Container (with a capacity of at least 3 gal)**

For collecting oil when disassembling the pump with the Seal Guard system.

**Bucket/can**

For cleaning the pump with water.

**Air bleeding device**

To release air trapped in the system of pump and pipes. It must be used in the pressure pipe to avoid long term damage to the pump caused by air pockets.

**Ethyl alcohol**

To degrease the motor shaft.

### Foundation bolts $^{7}/_{16}$" or $^{5}/_{8}$" with washers

To fix the pump at its installation site.

### Compensators (optional)

To reduce the vibrations transmitted from the pump to the piping system and to compensate for mechanical stresses in the pipes.

Compensators should be used in the pressure pipe to avoid long term damage to the pipe system from material fatigue.

### Cloths

To remove dirt such as grease and stubborn dirt residues.

### Pressure gage (optional)

For reading the pressure on the pump's supply pipe.

### Profile sealing

As a replacement in the pump's filter strainer.

### Pipes and reducing adapters

To connect the pump with the swimming pool. Pipelines should be at least one size larger than the pump's flange.

Reducing adapters serve to adapt the diameter of the pipes to the pump's flange. They should be installed with the horizontal side at the top.

### Non-return valve (optional)

To prevent the water from flowing backwards. The non-return valve thus prevents dangerous pressure surges, which can lead to damage to the system of pump and pipework.

A non-return valve should be used before the gate valve in the pressure pipe to avoid long term damage to the system of pump and pipes.

### Vibration dampers

Vibration dampers between the pump and its foundations reduce the vibrations and thus the noise generated by the pump when it is operating.

Vibration dampers should be used to avoid long term damage through material fatigue and to minimize noise levels.

### Screw terminals

To connect and bridge the block motor connection cables to the cables from the electrical supply system.

### Water hose

For rinsing and cleaning the pump with water.

### Shaft seal ring

For replacement on the motor with the flood-proof version.

# 12 Disassembly, disposal

## 12.1 Safety instructions for disassembly and disposal

### Electrical voltage

**⚠ DANGER**

**Electrical voltage represents a possibly fatal danger!**

- **Only allow qualified electricians to work on the building's electrical installation.**
- **Only allow qualified electricians or electrical installers/electric motor technicians to disconnect the pump from the power supply.**
- **Before doing any work on the pump remove all live voltages from it and secure this state for the duration of the work. During this, conform with the following safety rules:**
  - **De-energize and secure against being switched on again (*chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26*).**
  - **Check that there are no live voltages present.**

**On contact with any live parts on the pump's block motor or on the frequency converter there is an immediate danger of death from an electric shock.**

**Improper disassembly**

**⚠ WARNING**

**Danger of injury if disassembled incorrectly!**

- **Before starting work, make sure that there is enough space.**
- **Handle components with open, sharp edges carefully.**
- **Keep the working area clean and tidy! Loosely stacked parts & tools are a source of accidents as is leaving them lying around.**
- **Disassemble components properly. Note that some of the parts are very heavy. If necessary, use lifting gear.**
- **Secure parts so that they cannot fall or topple over.**
- **If in doubt, please contact Herborner Pumpentechnik.**

**Angular parts, sharp points and corners on or in the pump or on the tools needed can cause injuries.**

## 12.2 Disassembly

Personnel:

- Electrician
- Electrical installer/electric motor technician
- Plumber/Pipefitter
- Millwright
- Crane and tower operator

Personal protective equipment:

- Safety helmet
- Safety clothing
- Safety gloves
- Safety shoes

1. **⚠ DANGER! Risk of death from electric shock and risk of injury due to the pump starting unexpectedly!**

Make sure that the pump is switched off and is secured against being switched back on again (↳ *chapter "2.6 Securing the unit to prevent it from being switched on again" on page 26).*

2. **⚠ WARNING! Risk of injury from hot surfaces and hot water!**

   Allow the motor to cool down.

3. ***NOTICE* There is a danger of flooding from leaking water!**

   Make sure that all of the gate valves are closed.

4. Drain the pump (↳ *chapter "7.6.2 Flushing and draining the herborner.F-N-C" on page 96).*

5. ■ If a frequency converter is used, disconnect the mains connection cables from the frequency converter (see the frequency converter manual).

   ■ If no frequency converter is used, unscrew the cover of the motor's (Fig. 123/1) terminal box, remove it and disconnect the installation site's connection cables.

6. Undo the flange connections to the pipes both on the suction and pressure sides.

7. Undo the pump's foundation bolts.

8. **⚠ WARNING! There is a danger of injury from falling or toppling packages!**

   Attach the ropes, lashes or multi-point slings according to (Fig. 124) and attach to the crane's hook.


*Fig. 118 Block motor terminal box (example: herborner.F-N)*

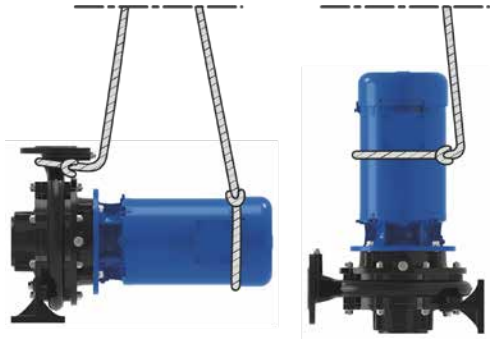


*Fig. 119 Lifting points on the pump (example: herborner.F-N)*

9.

*Depending on the version of the pump, its center of gravity will be towards the block motor. Attach the lifting gear accordingly (if necessary using a traverse), so that the crane hook can be attached over the center of gravity.*

10. Transport the pump to the disassembly location (↳ *chapter "4.4 Transporting the pump to its installation site" on page 61*).
11. **⚠ CAUTION! There is a danger of injury from sharp edges!**

    If necessary, completely disassemble the pump (↳ *chapter "Disassembly" on page 127*), clean the components properly, and then dispose of them according to applicable environmental protection regulations.

## 12.3 Disposal

If no agreement were made about returning the items or disposing of them, recycle the disassembled parts:

- Treat the metal parts as scrap metal.
- Recycle plastic parts.
- Dispose of the remaining components by material type.

**NOTICE**

**There is a danger to the environment through incorrect disposal!**

- **Have electrical scrap, electronic components, grease and other substances disposed of by approved specialist companies.**
- **If in doubt, ask for information about environmentally compatible waste disposal from your local institutions or specialist waste disposal companies.**

**Dangers to the environment can arise through incorrect disposal.**

# 13 Technical data

## 13.1 Pump dimensions and weight

### herborner.F-N

### Version with thread/flange

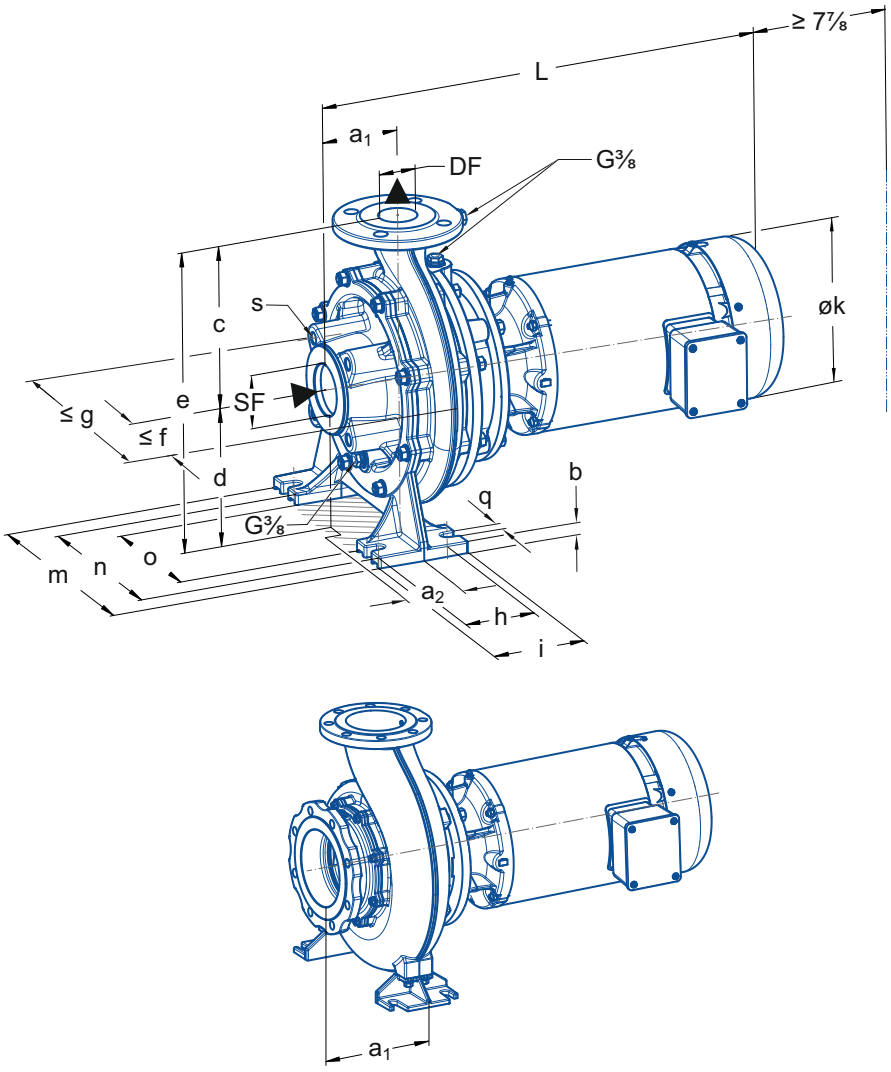



*Fig. 120 Dimensions of herborner.F-N pump*

## 1800 rpm

| | P2 | DF | SF | L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN032-200A-0104N | 1 | 1.25 (32) | 2 (50) | 18.34 (466) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.75 (146) | 10.87 (276) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 110 |
| FN032-200A-0154N | 1,5 | 1.25 (32) | 2 (50) | 19.37 (492) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.75 (146) | 10.87 (276) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 115 |
| FN032-200A-0204N | 2 | 1.25 (32) | 2 (50) | 18.3 (465) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.75 (146) | 10.87 (276) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 113 |
| FN032-200A-0304N | 3 | 1.25 (32) | 2 (50) | 21.77 (553) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 6.85 (174) | 11.97 (304) | 2.76 (70) | 3.94 (100) | 8.58 (218) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 242 |
| FN032-250A-0304N | 3 | 1.25 (32) | 2 (50) | 22.57 (574) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.85 (174) | 12.95 (329) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 288 |
| FN032-250A-0504N | 5 | 1.25 (32) | 2 (50) | 24.03 (611) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.85 (174) | 12.93 (329) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 214 |
| FN040-160A-0104N | 1 | 1.5 (40) | 2.5 (65) | 18.33 (466) | 2.87 (73) | 1.02 (26) | 0.47 (12) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.75 (146) | 10.06 (256) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 97 |
| FN040-160A-0154N | 1,5 | 1.5 (40) | 2.5 (65) | 19.35 (492) | 2.87 (73) | 1.02 (26) | 0.47 (12) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.75 (146) | 10.06 (256) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 102 |
| FN040-220A-0204N | 2 | 1.5 (40) | 2.5 (65) | 19.4 (493) | 3.98 (101) | 2.17 (55) | 0.51 (13) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.22 (158) | 11.73 (298) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 143 |
| FN040-220A-0304N | 3 | 1.5 (40) | 2.5 (65) | 22.87 (581) | 3.98 (101) | 2.17 (55) | 0.51 (13) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.85 (174) | 12.36 (314) | 2.76 (70) | 3.94 (100) | 8.58 (218) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 272 |
| FN040-270A-0504N | 5 | 1.5 (40) | 2.5 (65) | 24.5 (623) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 6.97 (177) | 13.46 (342) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 207 |
| FN040-270A-0754N | 7,5 | 1.5 (40) | 2.5 (65) | 25.05 (637) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 8.03 (204) | 14.53 (369) | 3.74 (95) | 4.92 (125) | 10.28 (261) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 236 |
| FN040-270A-1004N | 10 | 1.5 (40) | 2.5 (65) | 26.7 (679) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 8.03 (204) | 14.53 (369) | 3.74 (95) | 4.92 (125) | 10.28 (261) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 262 |
| FN050-140A-0104N | 1 | 2 (50) | 2.5 (65) | 20.47 (520) | 5.04 (128) | 3.15 (80) | 0.71 (18) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.75 (146) | 10.2 (259) | 2.56 (65) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | - | 106 |
| FN050-140A-0154N | 1,5 | 2 (50) | 2.5 (65) | 21.49 (546) | 5.04 (128) | 3.15 (80) | 0.71 (18) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.75 (146) | 10.2 (259) | 2.56 (65) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | - | 111 |
| FN050-140A-0204N | 2 | 2 (50) | 2.5 (65) | 20.55 (522) | 5.04 (128) | 3.15 (80) | 0.71 (18) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.75 (146) | 10.2 (259) | 2.56 (65) | 3.94 (100) | 7.2 (183) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | - | 111 |
| FN050-160A-0104N | 1 | 2 (50) | 2.5 (65) | 19.35 (492) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.75 (146) | 10.31 (262) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 111 |
| FN050-160A-0154N | 1,5 | 2 (50) | 2.5 (65) | 20.37 (518) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.75 (146) | 10.31 (262) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 116 |
| FN050-160A-0204N | 2 | 2 (50) | 2.5 (65) | 19.5 (496) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.75 (146) | 10.31 (262) | 2.76 (70) | 3.94 (100) | 7.2 (183) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 113 |
| FN050-190A-0304N | 3 | 2 (50) | 2.5 (65) | 22.73 (578) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.85 (174) | 11.89 (302) | 2.76 (70) | 3.94 (100) | 8.58 (218) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 250 |
| FN050-190A-0504N | 5 | 2 (50) | 2.5 (65) | 23.68 (602) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.85 (174) | 11.89 (302) | 2.76 (70) | 3.94 (100) | 8.58 (218) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 179 |
| FN050-240A-0304N | 3 | 2 (50) | 2.5 (65) | 22.78 (579) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.85 (174) | 12.76 (324) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 274 |
| FN050-240A-0504N | 5 | 2 (50) | 2.5 (65) | 24.09 (612) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.85 (174) | 12.76 (324) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 203 |
| FN050-240B-0504N | 5 | 2 (50) | 2.5 (65) | 24.09 (612) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.85 (174) | 12.76 (324) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 203 |

1) Total weight of the pump

Energy efficiency class NEMA Premium/ IE3

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN065-200A-0204N | 2 | 2.5 (65) | 3 (80) | 20.05 (510) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 5.94 (151) | 11.18 (284) | 3.74 (95) | 4.92 (125) | 7.2 (183) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x⅝" | 141 |
| FN065-200A-0304N | 3 | 2.5 (65) | 3 (80) | 23.52 (598) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.85 (174) | 12.09 (307) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x⅝" | 270 |
| FN065-200A-0504N | 5 | 2.5 (65) | 3 (80) | 24.54 (624) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.85 (174) | 12.09 (307) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x⅝" | 198 |
| FN065-220A-0504N | 5 | 2.5 (65) | 3 (80) | 23.76 (604) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 6.85 (174) | 12.72 (323) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x⅝" | 203 |
| FN065-220A-0754N | 7,5 | 2.5 (65) | 3 (80) | 24.86 (632) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 8.03 (204) | 13.9 (353) | 3.74 (95) | 4.92 (125) | 10.28 (261) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x⅝" | 233 |
| FN065-240A-0504N | 5 | 2.5 (65) | 3 (80) | 23.44 (596) | 3.8 (97) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 7.2 (183) | 13.39 (340) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x⅝" | 205 |
| FN065-240A-0754N | 7,5 | 2.5 (65) | 3 (80) | 24.96 (634) | 3.8 (97) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 8.03 (204) | 14.21 (361) | 3.74 (95) | 4.92 (125) | 10.28 (261) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x⅝" | 239 |
| FN065-270A-0754N | 7,5 | 2.5 (65) | 3 (80) | 25.03 (636) | 3.96 (101) | 2.05 (52) | 0.67 (17) | 9.45 (240) | 7.87 (200) | 17.32 (440) | 8.03 (204) | 14.53 (369) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x⅝" | 270 |
| FN065-270A-1004N | 10 | 2.5 (65) | 3 (80) | 26.68 (678) | 3.96 (101) | 2.05 (52) | 0.67 (17) | 9.45 (240) | 7.87 (200) | 17.32 (440) | 8.03 (204) | 14.53 (369) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x⅝" | 296 |
| FN065-270C-1004N | 10 | 2.5 (65) | 3 (80) | 26.96 (685) | 4.09 (104) | 2.05 (52) | 0.67 (17) | 9.84 (250) | 7.87 (200) | 17.72 (450) | 8.03 (204) | 14.84 (377) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x⅝" | 299 |
| FN065-300B-1504N | 15 | 2.5 (65) | 3 (80) | 31.68 (805) | 4.96 (126) | 2.44 (62) | 0.59 (15) | 10.83 (275) | 8.86 (225) | 19.69 (500) | 10.04 (255) | 17.56 (446) | 4.72 (120) | 6.3 (160) | 12.95 (329) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 453 |
| FN065-300B-2004N | 20 | 2.5 (65) | 3 (80) | 35.74 (908) | 4.96 (126) | 2.44 (62) | 0.59 (15) | 10.83 (275) | 8.86 (225) | 19.69 (500) | 13.11 (333) | 20.77 (528) | 4.72 (120) | 6.3 (160) | 15.31 (389) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 538 |
| FN080-170A-0204N | 2 | 3 (80) | 4 (100) | 21.06 (535) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.54 (166) | 11.89 (302) | 4.72 (120) | 6.3 (160) | 7.2 (183) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 140 |
| FN080-170A-0304N | 3 | 3 (80) | 4 (100) | 24.52 (623) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.85 (174) | 12.2 (310) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 269 |
| FN080-170A-0504N | 5 | 3 (80) | 4 (100) | 26.61 (676) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.85 (174) | 12.2 (310) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 204 |
| FN080-210A-0504N | 5 | 3 (80) | 4 (100) | 24.96 (634) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 7.4 (188) | 13.7 (348) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x⅝" | 202 |
| FN080-210A-0754N | 7,5 | 3 (80) | 4 (100) | 26.06 (662) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 8.03 (204) | 14.33 (364) | 3.74 (95) | 4.92 (125) | 10.28 (261) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x⅝" | 231 |
| FN080-210A-1004N | 10 | 3 (80) | 4 (100) | 27.71 (704) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 8.03 (204) | 14.33 (364) | 3.74 (95) | 4.92 (125) | 10.28 (261) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x⅝" | 261 |
| FN080-210A-1504N | 15 | 3 (80) | 4 (100) | 31.09 (790) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 10.04 (255) | 16.52 (420) | 3.74 (95) | 4.92 (125) | 12.95 (329) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x⅝" | 381 |
| FN080-255A-0504N | 5 | 3 (80) | 4 (100) | 24.84 (631) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.48 (190) | 14.02 (356) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x⅝" | 257 |
| FN080-255A-0754N | 7,5 | 3 (80) | 4 (100) | 25.94 (659) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 8.03 (204) | 14.57 (370) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x⅝" | 286 |
| FN080-255A-1004N | 10 | 3 (80) | 4 (100) | 27.6 (701) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 8.03 (204) | 14.57 (370) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x⅝" | 314 |
| FN080-330A-2004N | 20 | 3 (80) | 4 (100) | 36.1 (917) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 21.5 (546) | 4.72 (120) | 6.3 (160) | 15.31 (389) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x⅝" | 601 |
| FN080-330A-2504N | 25 | 3 (80) | 4 (100) | 36.06 (916) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 21.5 (546) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x⅝" | 689 |
| FN080-330A-3004N | 30 | 3 (80) | 4 (100) | 38.22 (971) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 21.5 (546) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x⅝" | 676 |

1) Total weight of the pump

Energy efficiency class NEMA Premium/ IE3

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN100-180A-0504N | 5 | 4 (100) | 5 (125) | 26.76 (680) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.2 (183) | 12.76 (324) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 242 |
| FN100-180A-0754N | 7,5 | 4 (100) | 5 (125) | 27.87 (708) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 8.03 (204) | 13.58 (345) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 272 |
| FN100-210A-1004N | 10 | 4 (100) | 5 (125) | 28.85 (733) | 5.96 (152) | 3.66 (93) | 0.79 (20) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 8.03 (204) | 14.41 (366) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 272 |
| FN100-210A-1504N | 15 | 4 (100) | 5 (125) | 32.24 (819) | 5.96 (152) | 3.66 (93) | 0.79 (20) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 10.04 (255) | 16.52 (420) | 4.72 (120) | 6.3 (160) | 12.95 (329) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 392 |
| FN100-240A-1004N | 10 | 4 (100) | 5 (125) | 28.26 (718) | 5.55 (141) | 3.35 (85) | 0.59 (15) | 11.02 (280) | 8.86 (225) | 19.88 (505) | 8.03 (204) | 14.57 (370) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 308 |
| FN100-240A-1504N | 15 | 4 (100) | 5 (125) | 31.65 (804) | 5.55 (141) | 3.35 (85) | 0.59 (15) | 11.02 (280) | 8.86 (225) | 19.88 (505) | 10.04 (255) | 16.57 (421) | 4.72 (120) | 6.3 (160) | 12.95 (329) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 427 |
| FN100-270A-1004N | 10 | 4 (100) | 5 (125) | 28.15 (715) | 5.53 (141) | 3.39 (86) | 0.59 (15) | 10.63 (270) | 8.86 (225) | 19.49 (495) | 8.03 (204) | 14.76 (375) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 328 |
| FN100-270A-1504N | 15 | 4 (100) | 5 (125) | 31.54 (801) | 5.53 (141) | 3.39 (86) | 0.59 (15) | 10.63 (270) | 8.86 (225) | 19.49 (495) | 10.04 (255) | 16.77 (426) | 4.72 (120) | 6.3 (160) | 12.95 (329) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 448 |
| FN100-330A-3004N | 30 | 4 (100) | 5 (125) | 37.8 (960) | 5.53 (141) | 2.95 (75) | 0.67 (17) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 21.34 (542) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 669 |
| FN100-330A-4004N | 40 | 4 (100) | 5 (125) | 37.8 (960) | 5.53 (141) | 2.95 (75) | 0.67 (17) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 21.34 (542) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 750 |
| FN100-330C-2004N | 20 | 4 (100) | 5 (125) | 36.22 (920) | 5.51 (140) | 3.19 (81) | 0.75 (19) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 20.98 (533) | 4.72 (120) | 6.3 (160) | 15.31 (389) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 602 |
| FN100-330C-2504N | 25 | 4 (100) | 5 (125) | 36.18 (919) | 5.51 (140) | 3.19 (81) | 0.75 (19) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 13.11 (333) | 20.98 (533) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 689 |
| FN125-250A-0504N | 5 | 5 (125) | 6 (150) | 25.53 (649) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 294 |
| FN125-250A-0754N | 7,5 | 5 (125) | 6 (150) | 26.63 (677) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 324 |
| FN125-250A-1004N | 10 | 5 (125) | 6 (150) | 28.29 (719) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 10.28 (261) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 349 |
| FN125-250A-1504N | 15 | 5 (125) | 6 (150) | 31.67 (805) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 12.95 (329) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 468 |
| FN125-270A-1504N | 15 | 5 (125) | 6 (150) | 31.9 (811) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.04 (255) | 17.13 (435) | 4.72 (120) | 6.3 (160) | 12.95 (329) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 471 |
| FN125-270A-2004N | 20 | 5 (125) | 6 (150) | 36.26 (921) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 13.11 (333) | 20.77 (528) | 4.72 (120) | 6.3 (160) | 15.31 (389) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 555 |
| FN125-270A-2504N | 25 | 5 (125) | 6 (150) | 36.22 (920) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 13.11 (333) | 20.49 (521) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 642 |
| FN125-270B-2004N | 20 | 5 (125) | 6 (150) | 36.57 (929) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 13.11 (333) | 21.38 (543) | 4.72 (120) | 6.3 (160) | 15.31 (389) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 566 |
| FN125-270B-2504N | 25 | 5 (125) | 6 (150) | 36.54 (928) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 13.11 (333) | 21.38 (543) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 653 |
| FN125-270B-3004N | 30 | 5 (125) | 6 (150) | 36.97 (939) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 13.11 (333) | 21.38 (543) | 4.72 (120) | 6.3 (160) | 14.76 (375) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 630 |
| FN150-250A-1004N | 10 | 6 (150) | 8 (200) | 29.19 (742) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 10.28 (261) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 382 |
| FN150-250A-1504N | 15 | 6 (150) | 8 (200) | 32.58 (828) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.95 (329) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 501 |
| FN150-250A-2004N | 20 | 6 (150) | 8 (200) | 37.17 (945) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 13.11 (333) | 21.06 (535) | 5.91 (150) | 7.87 (200) | 15.31 (389) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 588 |

1) Total weight of the pump

Energy efficiency class NEMA Premium/ IE3

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN150-270B-2504N | 25 | 6 (150) | 8 (200) | 37.36 (949) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 13.11 (333) | 22.87 (581) | 5.91 (150) | 7.87 (200) | 14.76 (375) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 664 |
| FN150-270B-3004N | 30 | 6 (150) | 8 (200) | 37.8 (960) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 13.11 (333) | 22.87 (581) | 5.91 (150) | 7.87 (200) | 14.76 (375) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 646 |
| FN150-300A-2504N | 25 | 6 (150) | 8 (200) | 36.96 (939) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 13.11 (333) | 21.46 (545) | 5.91 (150) | 7.87 (200) | 14.76 (375) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 693 |
| FN150-300A-3004N | 30 | 6 (150) | 8 (200) | 34.78 (884) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 13.11 (333) | 21.46 (545) | 5.91 (150) | 7.87 (200) | 14.76 (375) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 687 |
| FN200-250A-1504N | 15 | 8 (200) | 10 (250) | 33.15 (842) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.95 (329) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 512 |
| FN200-250A-2004N | 20 | 8 (200) | 10 (250) | 37.74 (959) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 13.11 (333) | 21.38 (543) | 5.91 (150) | 7.87 (200) | 15.31 (389) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 579 |
| FN200-250A-2504N | 25 | 8 (200) | 10 (250) | 37.7 (958) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 13.11 (333) | 21.38 (543) | 5.91 (150) | 7.87 (200) | 14.76 (375) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 666 |
| FN200-270B-2004N | 20 | 8 (200) | 10 (250) | 38.91 (989) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 13.11 (333) | 21.81 (554) | 5.91 (150) | 7.87 (200) | 15.31 (389) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 617 |
| FN200-270B-3004N | 30 | 8 (200) | 10 (250) | 39.67 (1008) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 13.11 (333) | 21.81 (554) | 5.91 (150) | 7.87 (200) | 14.76 (375) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 703 |

1) Total weight of the pump

Energy efficiency class NEMA Premium/ IE3

Flange connection dimensions according to ANSI B 16.5 Class150

## Version with base rail and thread/flange

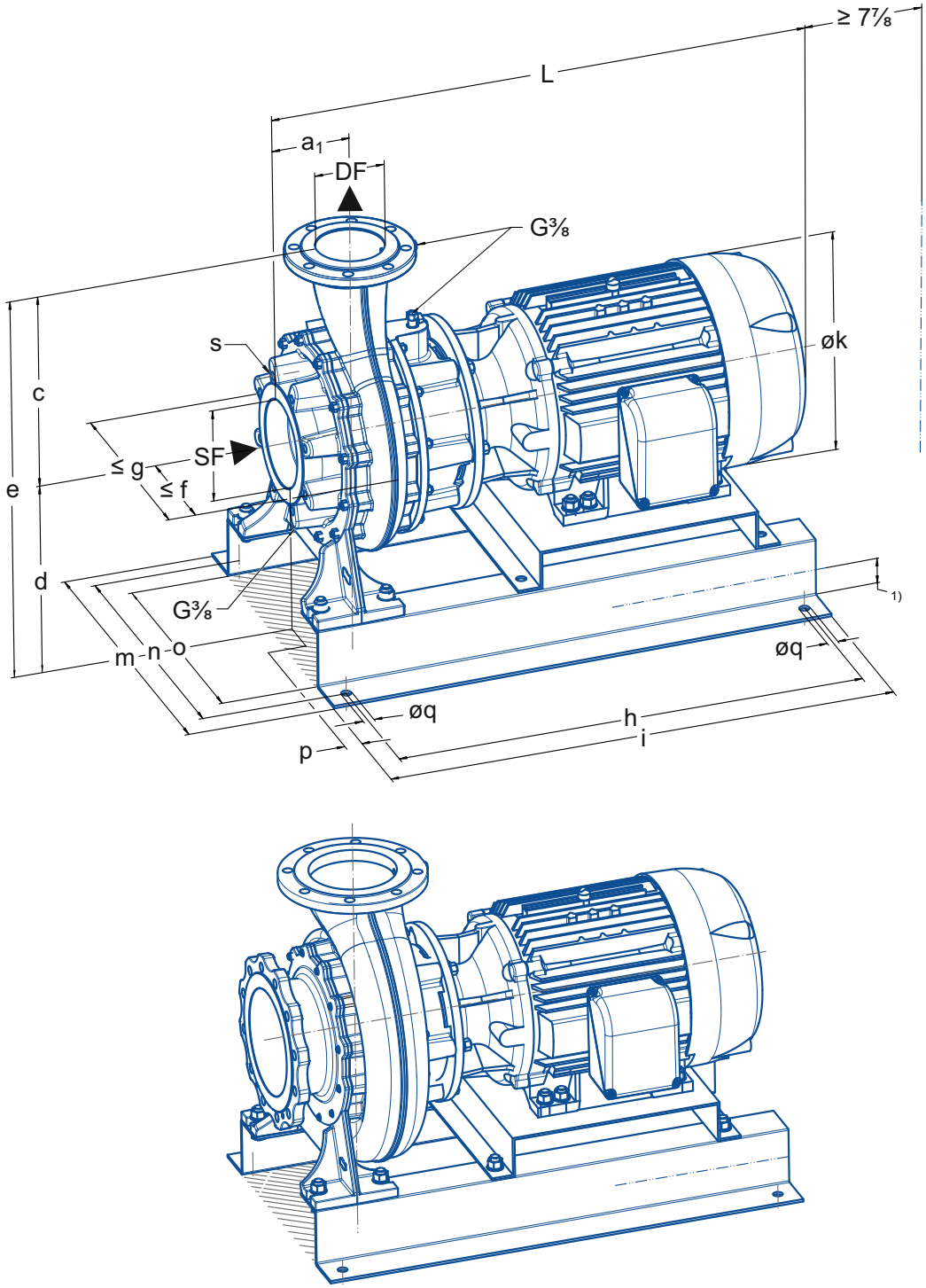



*Fig. 121 Dimensions of herborner.F-N pump (version with base rail ≥ 50hp)*

## 1800 rpm

| | P2 | DF | SF | L | $a_1$ | c | d | e | ≤ f | ≤ g | h | i | Ø k | m | n | o | p | q | s | m 2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN080-330A-4004N | 40 | 3 (80) | 4 (100) | 38.22 (971) | 4.92 (125) | 12.4 (315) | 15.35 (390) | 27.76 (705) | 13.11 (333) | 21.5 (546) | 41.34 (1050) | 44.88 (1140) | 14.76 (375) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -1.02 (-26) | 0.91 (23) | 8x5/8" | 935 |
| FN125-270B-4004N | 40 | 5 (125) | 6 (150) | 36.97 (939) | 5.55 (141) | 13.98 (355) | 15.35 (390) | 29.33 (745) | 13.11 (333) | 21.38 (543) | 41.34 (1050) | 44.88 (1140) | 14.76 (375) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.39 (-10) | 0.91 (23) | 8x3/4" | 889 |
| FN125-330A-4004N | 40 | 5 (125) | 6 (150) | 37.8 (960) | 12.32 (313) | 13.19 (335) | 16.54 (420) | 29.72 (755) | 13.11 (333) | 21.54 (547) | 41.34 (1050) | 44.88 (1140) | 14.76 (375) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.98 (-25) | 0.91 (23) | 8x3/4" | 949 |
| FN125-330A-5004N | 50 | 5 (125) | 6 (150) | 39.61 (1007) | 12.32 (313) | 13.19 (335) | 16.54 (420) | 29.72 (755) | 14.09 (358) | 22.52 (572) | 41.34 (1050) | 44.88 (1140) | 16.85 (428) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.98 (-25) | 0.91 (23) | 8x3/4" | 898 |
| FN150-270B-4004N | 40 | 6 (150) | 8 (200) | 37.8 (960) | 6.34 (161) | 14.76 (375) | 17.91 (455) | 20.28 (515) | 13.11 (333) | 22.87 (581) | 41.34 (1050) | 44.88 (1140) | 14.76 (375) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 2.34 (60) | 0.91 (23) | - | 905 |
| FN150-300A-4004N | 40 | 6 (150) | 8 (200) | 34.78 (884) | 6.34 (161) | 12.99 (330) | 16.54 (420) | 18.5 (470) | 13.11 (333) | 21.46 (545) | 41.34 (1050) | 44.88 (1140) | 14.76 (375) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 2.34 (60) | 0.91 (23) | - | 946 |
| FN150-400A-6004N | 60 | 6 (150) | 8 (200) | 46.04 (1170) | 6.32 (161) | 17.72 (450) | 17.91 (455) | 35.63 (905) | 18.11 (460) | 27.97 (711) | 41.34 (1050) | 44.88 (1140) | 19.72 (501) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.83 (-21) | 0.91 (23) | 8x3/4" | 1616 |
| FN150-400A-7504N | 75 | 6 (150) | 8 (200) | 46.04 (1170) | 6.32 (161) | 17.72 (450) | 17.91 (455) | 35.63 (905) | 18.11 (460) | 27.97 (711) | 41.34 (1050) | 44.88 (1140) | 19.72 (501) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.83 (-21) | 0.91 (23) | 8x3/4" | 1671 |
| FN150-400A-10004N | 100 | 6 (150) | 8 (200) | 49.27 (1252) | 6.32 (161) | 17.72 (450) | 17.91 (455) | 35.63 (905) | 19.13 (486) | 30.47 (774) | 41.34 (1050) | 44.88 (1140) | 22.68 (576) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.83 (-21) | 0.91 (23) | 8x3/4" | 2161 |
| FN200-270B-4004N | 40 | 8 (200) | 10 (250) | 39.67 (1008) | 6.75 (172) | 14.57 (370) | 16.54 (420) | 31.1 (790) | 13.11 (333) | 21.81 (554) | 41.34 (1050) | 44.88 (1140) | 14.76 (375) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.28 (-7) | 0.91 (23) | - | 962 |
| FN200-350A-5004N | 50 | 8 (200) | 10 (250) | 43.33 (1101) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 14.09 (358) | 24.45 (621) | 41.34 (1050) | 44.88 (1140) | 16.85 (428) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 1065 |
| FN200-350A-6004N | 60 | 8 (200) | 10 (250) | 46.63 (1185) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 18.11 (460) | 28.46 (723) | 41.34 (1050) | 44.88 (1140) | 19.72 (501) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 1570 |
| FN200-350A-7504N | 75 | 8 (200) | 10 (250) | 46.63 (1185) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 18.11 (460) | 28.46 (723) | 41.34 (1050) | 44.88 (1140) | 19.72 (501) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 1626 |
| FN200-350A-10004N | 100 | 8 (200) | 10 (250) | 49.86 (1267) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 19.13 (486) | 30.47 (774) | 41.34 (1050) | 44.88 (1140) | 22.68 (576) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 2115 |

1) Foundation the rail up to the middle of the rail.

2) Total weight of the pump

Energy efficiency class NEMA Premium/ IE3

Flange connection dimensions according to ANSI B 16.5 Class150

**herborner.F-N-PM**
**Version with thread/flange**

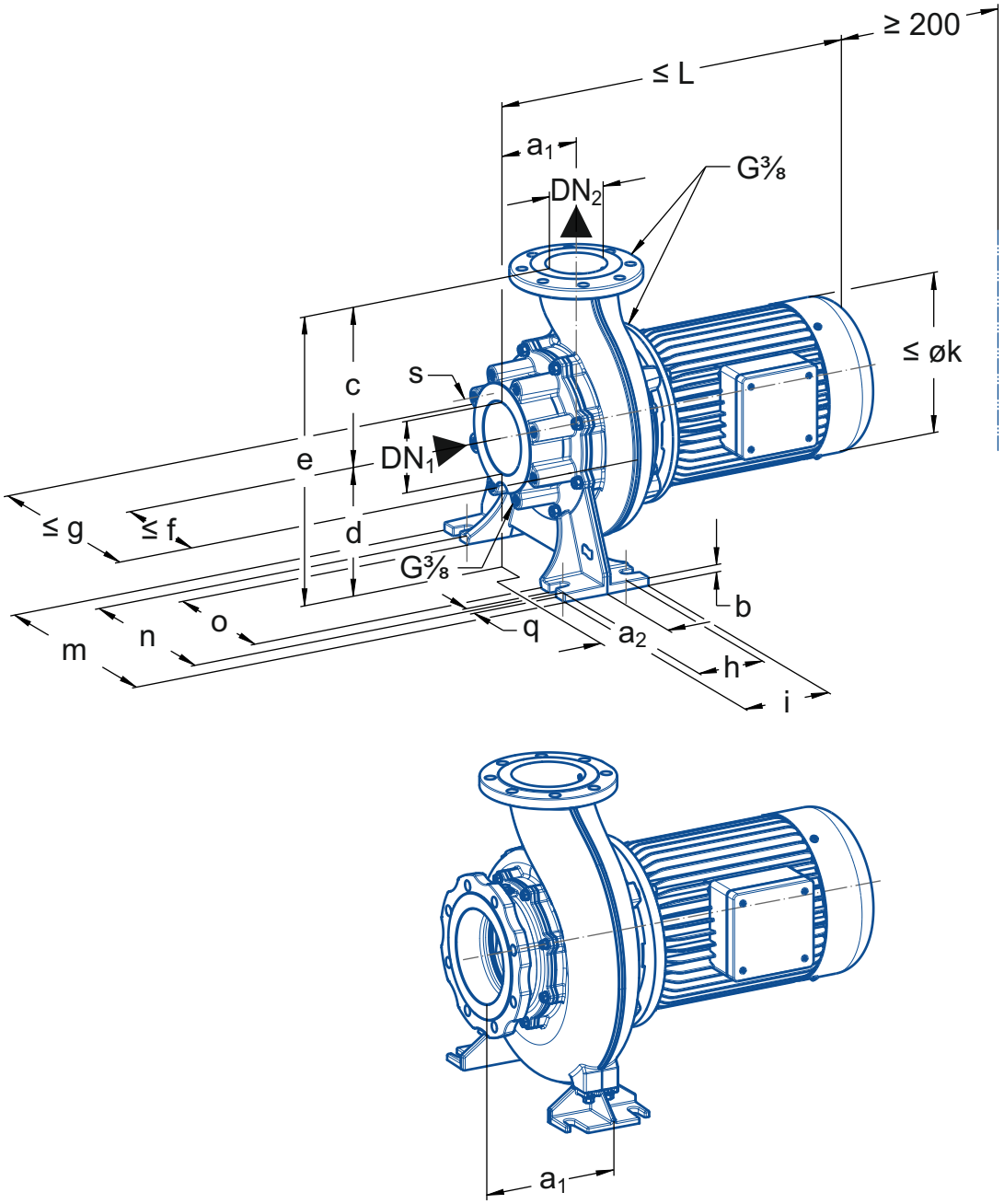



*Fig. 122 Dimensions of herborner.F-N-PM pump*

## 1800 rpm

| | P2 | DF | SF | ≤ L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN032-200A-0104P | 1 | 1.25 (32) | 2 (50) | 15.59 (396) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.51 (140) | 10.63 (270) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 104 |
| FN032-200A-0154P | 1,5 | 1.25 (32) | 2 (50) | 16.77 (426) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.51 (140) | 10.63 (270) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 113 |
| FN032-200A-0204P | 2 | 1.25 (32) | 2 (50) | 18.46 (469) | 3.19 (81) | 1.54 (39) | 0.51 (13) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.87 (149) | 10.98 (279) | 2.76 (70) | 3.94 (100) | 6.93 (176) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 131 |
| FN032-250A-0304P | 3 | 1.25 (32) | 2 (50) | 21.24 (540) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.1 (155) | 12.2 (310) | 3.74 (95) | 4.92 (125) | 6.93 (176) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 185 |
| FN032-250A-0504P | 5 | 1.25 (32) | 2 (50) | 20.01 (509) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.65 (169) | 12.74 (324) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 199 |
| FN032-250B-0504P | 5 | 1.25 (32) | 2 (50) | 20.01 (509) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.65 (169) | 12.74 (324) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 199 |
| FN040-160A-0074P | 0,75 | 1.5 (40) | 2.5 (65) | 16.16 (411) | 2.87 (73) | 1.02 (26) | 0.47 (12) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.51 (140) | 9.82 (250) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 89 |
| FN040-160A-0104P | 1 | 1.5 (40) | 2.5 (65) | 15.57 (396) | 2.87 (73) | 1.02 (26) | 0.47 (12) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.51 (140) | 9.82 (250) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | 4x5/8" | 91 |
| FN040-220A-0204P | 2 | 1.5 (40) | 2.5 (65) | 19.56 (497) | 3.98 (101) | 2.17 (55) | 0.51 (13) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.22 (158) | 11.73 (298) | 2.76 (70) | 3.94 (100) | 6.93 (176) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 161 |
| FN040-220A-0304P | 3 | 1.5 (40) | 2.5 (65) | 21.53 (547) | 3.98 (101) | 2.17 (55) | 0.51 (13) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.22 (158) | 11.73 (298) | 2.76 (70) | 3.94 (100) | 6.93 (176) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 170 |
| FN040-270A-0504P | 5 | 1.5 (40) | 2.5 (65) | 20.48 (521) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 6.97 (177) | 13.46 (342) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 192 |
| FN040-270A-0754P | 7,5 | 1.5 (40) | 2.5 (65) | 22.45 (571) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 6.97 (177) | 13.46 (342) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 225 |
| FN050-140A-0104P | 1 | 2 (50) | 2.5 (65) | 17.71 (450) | 5.04 (128) | 3.15 (80) | 0.71 (18) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.51 (140) | 9.96 (253) | 2.56 (65) | 3.94 (100) | 6.14 (156) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | - | 100 |
| FN050-140A-0154P | 1,5 | 2 (50) | 2.5 (65) | 18.89 (480) | 5.04 (128) | 3.15 (80) | 0.71 (18) | 6.3 (160) | 5.2 (132) | 11.5 (292) | 5.51 (140) | 9.96 (253) | 2.56 (65) | 3.94 (100) | 6.14 (156) | 9.45 (240) | 7.48 (190) | 5.51 (140) | 0.59 (15) | - | 109 |
| FN050-160A-0074P | 0,75 | 2 (50) | 2.5 (65) | 17.19 (437) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.51 (140) | 10.08 (256) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 97 |
| FN050-160A-0104P | 1 | 2 (50) | 2.5 (65) | 16.59 (422) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.51 (140) | 10.08 (256) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 105 |
| FN050-160A-0154P | 1,5 | 2 (50) | 2.5 (65) | 17.78 (452) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 7.09 (180) | 6.3 (160) | 13.39 (340) | 5.51 (140) | 10.08 (256) | 2.76 (70) | 3.94 (100) | 6.14 (156) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 114 |
| FN050-190A-0304P | 3 | 2 (50) | 2.5 (65) | 21.39 (544) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.02 (153) | 11.06 (281) | 2.76 (70) | 3.94 (100) | 6.93 (176) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 148 |
| FN050-190A-0504P | 5 | 2 (50) | 2.5 (65) | 20.21 (514) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.65 (169) | 11.69 (297) | 2.76 (70) | 3.94 (100) | 8.66 (220) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 165 |
| FN050-240A-0304P | 3 | 2 (50) | 2.5 (65) | 21.44 (545) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.61 (168) | 12.52 (318) | 3.74 (95) | 4.92 (125) | 6.93 (176) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 172 |
| FN050-240A-0504P | 5 | 2 (50) | 2.5 (65) | 20.63 (524) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.65 (169) | 12.56 (319) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 189 |
| FN050-240B-0504P | 5 | 2 (50) | 2.5 (65) | 20.63 (524) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.65 (169) | 12.56 (319) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 189 |
| FN065-200A-0204P | 2 | 2.5 (65) | 3 (80) | 20.21 (514) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 5.94 (151) | 11.18 (284) | 3.74 (95) | 4.92 (125) | 6.93 (176) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x5/8" | 159 |
| FN065-200A-0304P | 3 | 2.5 (65) | 3 (80) | 22.18 (564) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 5.94 (151) | 11.18 (284) | 3.74 (95) | 4.92 (125) | 6.93 (176) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x5/8" | 168 |

1) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | ≤ L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN065-200A-0504P | 5 | 2.5 (65) | 3 (80) | 20.53 (522) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.65 (169) | 11.89 (302) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x5/8" | 183 |
| FN065-220A-0504P | 5 | 2.5 (65) | 3 (80) | 20.3 (516) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 6.69 (170) | 12.56 (319) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x5/8" | 189 |
| FN065-220A-0754P | 7,5 | 2.5 (65) | 3 (80) | 22.26 (566) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 6.69 (170) | 12.56 (319) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x5/8" | 222 |
| FN065-240A-0504P | 5 | 2.5 (65) | 3 (80) | 20.14 (512) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 9.84 (250) | 7.87 (200) | 17.72 (450) | 7.2 (183) | 13.39 (340) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 204 |
| FN065-240A-0754P | 7,5 | 2.5 (65) | 3 (80) | 22.52 (572) | 3.96 (101) | 2.13 (54) | 0.67 (17) | 9.84 (250) | 7.87 (200) | 17.72 (450) | 7.2 (183) | 13.39 (340) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 242 |
| FN065-270A-0754P | 7,5 | 2.5 (65) | 3 (80) | 22.43 (570) | 3.96 (101) | 2.05 (52) | 0.67 (17) | 9.45 (240) | 7.87 (200) | 17.32 (440) | 7.24 (184) | 13.74 (349) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 259 |
| FN065-270A-1004P | 10 | 2.5 (65) | 3 (80) | 26.25 (667) | 3.96 (101) | 2.05 (52) | 0.67 (17) | 9.45 (240) | 7.87 (200) | 17.32 (440) | 7.24 (184) | 13.74 (349) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 277 |
| FN065-270C-1004P | 10 | 2.5 (65) | 3 (80) | 26.52 (674) | 4.09 (104) | 2.05 (52) | 0.67 (17) | 9.84 (250) | 7.87 (200) | 17.72 (450) | 7.56 (192) | 14.37 (365) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 280 |
| FN065-300B-1504P | 15 | 2.5 (65) | 3 (80) | 28.96 (736) | 4.96 (126) | 2.44 (62) | 0.59 (15) | 10.83 (275) | 8.86 (225) | 19.69 (500) | 8.27 (210) | 15.79 (401) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 367 |
| FN080-170A-0204P | 2 | 3 (80) | 4 (100) | 21.22 (539) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.54 (166) | 11.89 (302) | 4.72 (120) | 6.3 (160) | 6.93 (176) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 157 |
| FN080-170A-0304P | 3 | 3 (80) | 4 (100) | 23.19 (589) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.54 (166) | 11.89 (302) | 4.72 (120) | 6.3 (160) | 6.93 (176) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 166 |
| FN080-210A-0504P | 5 | 3 (80) | 4 (100) | 21.5 (546) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 7.4 (188) | 13.7 (348) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x5/8" | 187 |
| FN080-210A-0754P | 7,5 | 3 (80) | 4 (100) | 23.46 (596) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 7.4 (188) | 13.7 (348) | 3.74 (95) | 4.92 (125) | 8.66 (220) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x5/8" | 220 |
| FN080-255A-0504P | 5 | 3 (80) | 4 (100) | 21.38 (543) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.48 (190) | 14.02 (356) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 242 |
| FN080-255A-0754P | 7,5 | 3 (80) | 4 (100) | 23.35 (593) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.48 (190) | 14.02 (356) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 275 |
| FN080-330A-2004P | 20 | 3 (80) | 4 (100) | 29.25 (743) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 9.76 (248) | 18.15 (461) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 469 |
| FN080-330A-2504P | 25 | 3 (80) | 4 (100) | 31.18 (792) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 9.92 (252) | 18.31 (465) | 4.72 (120) | 6.3 (160) | 12.4 (315) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 601 |
| FN080-330A-3004P | 30 | 3 (80) | 4 (100) | 35.35 (898) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 9.92 (252) | 18.31 (465) | 4.72 (120) | 6.3 (160) | 12.4 (315) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 541 |
| FN100-180A-0504P | 5 | 4 (100) | 5 (125) | 23.3 (592) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.2 (183) | 12.76 (324) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 228 |
| FN100-180A-0754P | 7,5 | 4 (100) | 5 (125) | 25.27 (642) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.2 (183) | 12.76 (324) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 261 |
| FN100-210A-1004P | 10 | 4 (100) | 5 (125) | 28.42 (722) | 5.96 (152) | 3.66 (93) | 0.79 (20) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.76 (197) | 14.13 (359) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 253 |
| FN100-240A-1004P | 10 | 4 (100) | 5 (125) | 27.83 (707) | 5.55 (141) | 3.35 (85) | 0.59 (15) | 11.02 (280) | 8.86 (225) | 19.88 (505) | 7.95 (202) | 14.49 (368) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 288 |
| FN100-270A-1004P | 10 | 4 (100) | 5 (125) | 27.72 (704) | 5.53 (141) | 3.39 (86) | 0.59 (15) | 10.63 (270) | 8.86 (225) | 19.49 (495) | 7.76 (197) | 14.49 (368) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 309 |
| FN100-270A-1504P | 15 | 4 (100) | 5 (125) | 28.82 (732) | 5.53 (141) | 3.39 (86) | 0.59 (15) | 10.63 (270) | 8.86 (225) | 19.49 (495) | 7.76 (197) | 14.49 (368) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 362 |
| FN100-330A-3004P | 30 | 4 (100) | 5 (125) | 34.92 (887) | 5.53 (141) | 2.95 (75) | 0.67 (17) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 9.92 (252) | 18.15 (461) | 4.72 (120) | 6.3 (160) | 12.4 (315) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 534 |

1) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | ≤ L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN100-330C-2004P | 20 | 4 (100) | 5 (125) | 29.37 (746) | 5.51 (140) | 3.19 (81) | 0.75 (19) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 8.86 (225) | 16.73 (425) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 469 |
| FN100-330C-2504P | 25 | 4 (100) | 5 (125) | 31.3 (795) | 5.51 (140) | 3.19 (81) | 0.75 (19) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 9.92 (252) | 17.8 (452) | 4.72 (120) | 6.3 (160) | 12.4 (315) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 602 |
| FN125-250A-0504P | 5 | 5 (125) | 6 (150) | 22.07 (561) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 279 |
| FN125-250A-0754P | 7,5 | 5 (125) | 6 (150) | 24.04 (611) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 8.66 (220) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 313 |
| FN125-270A-1504P | 15 | 5 (125) | 6 (150) | 29.18 (742) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 8.23 (209) | 15.31 (389) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 385 |
| FN125-270A-2004P | 20 | 5 (125) | 6 (150) | 29.41 (747) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 8.23 (209) | 15.31 (389) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 422 |
| FN125-270B-2004P | 20 | 5 (125) | 6 (150) | 29.72 (755) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.24 (260) | 18.5 (470) | 4.72 (120) | 6.3 (160) | 10.24 (260) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 434 |
| FN125-270B-2504P | 25 | 5 (125) | 6 (150) | 31.65 (804) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.24 (260) | 18.5 (470) | 4.72 (120) | 6.3 (160) | 12.4 (315) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 566 |
| FN125-270B-3004P | 30 | 5 (125) | 6 (150) | 34.09 (866) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.24 (260) | 18.5 (470) | 4.72 (120) | 6.3 (160) | 12.4 (315) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 495 |
| FN150-250A-1004P | 10 | 6 (150) | 8 (200) | 28.76 (731) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 8.66 (220) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 362 |
| FN150-250A-1504P | 15 | 6 (150) | 8 (200) | 29.86 (759) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 10.24 (260) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 415 |
| FN150-270B-2004P | 20 | 6 (150) | 8 (200) | 30.55 (776) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 12.32 (313) | 22.09 (561) | 5.91 (150) | 7.87 (200) | 10.24 (260) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 445 |
| FN150-270B-2504P | 25 | 6 (150) | 8 (200) | 32.48 (825) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 12.32 (313) | 22.09 (561) | 5.91 (150) | 7.87 (200) | 12.4 (315) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 577 |
| FN150-270B-3004P | 30 | 6 (150) | 8 (200) | 34.92 (887) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 12.32 (313) | 22.09 (561) | 5.91 (150) | 7.87 (200) | 12.4 (315) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 512 |
| FN150-300A-2504P | 25 | 6 (150) | 8 (200) | 32.07 (815) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 10.51 (267) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.4 (315) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 606 |
| FN150-300A-3004P | 30 | 6 (150) | 8 (200) | 31.91 (811) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 10.51 (267) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.4 (315) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 552 |
| FN200-250A-1004P | 10 | 8 (200) | 10 (250) | 29.33 (745) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 8.66 (220) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 373 |
| FN200-250A-1504P | 15 | 8 (200) | 10 (250) | 30.89 (785) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 10.24 (260) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 425 |
| FN200-250A-2004P | 20 | 8 (200) | 10 (250) | 30.89 (785) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 10.24 (260) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 447 |
| FN200-270B-2004P | 20 | 8 (200) | 10 (250) | 32.06 (815) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 11.22 (285) | 19.92 (506) | 5.91 (150) | 7.87 (200) | 10.24 (260) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 485 |
| FN200-270B-3004P | 30 | 8 (200) | 10 (250) | 36.79 (935) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 11.22 (285) | 19.92 (506) | 5.91 (150) | 7.87 (200) | 12.4 (315) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 568 |

1) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

## Version with base rail and thread

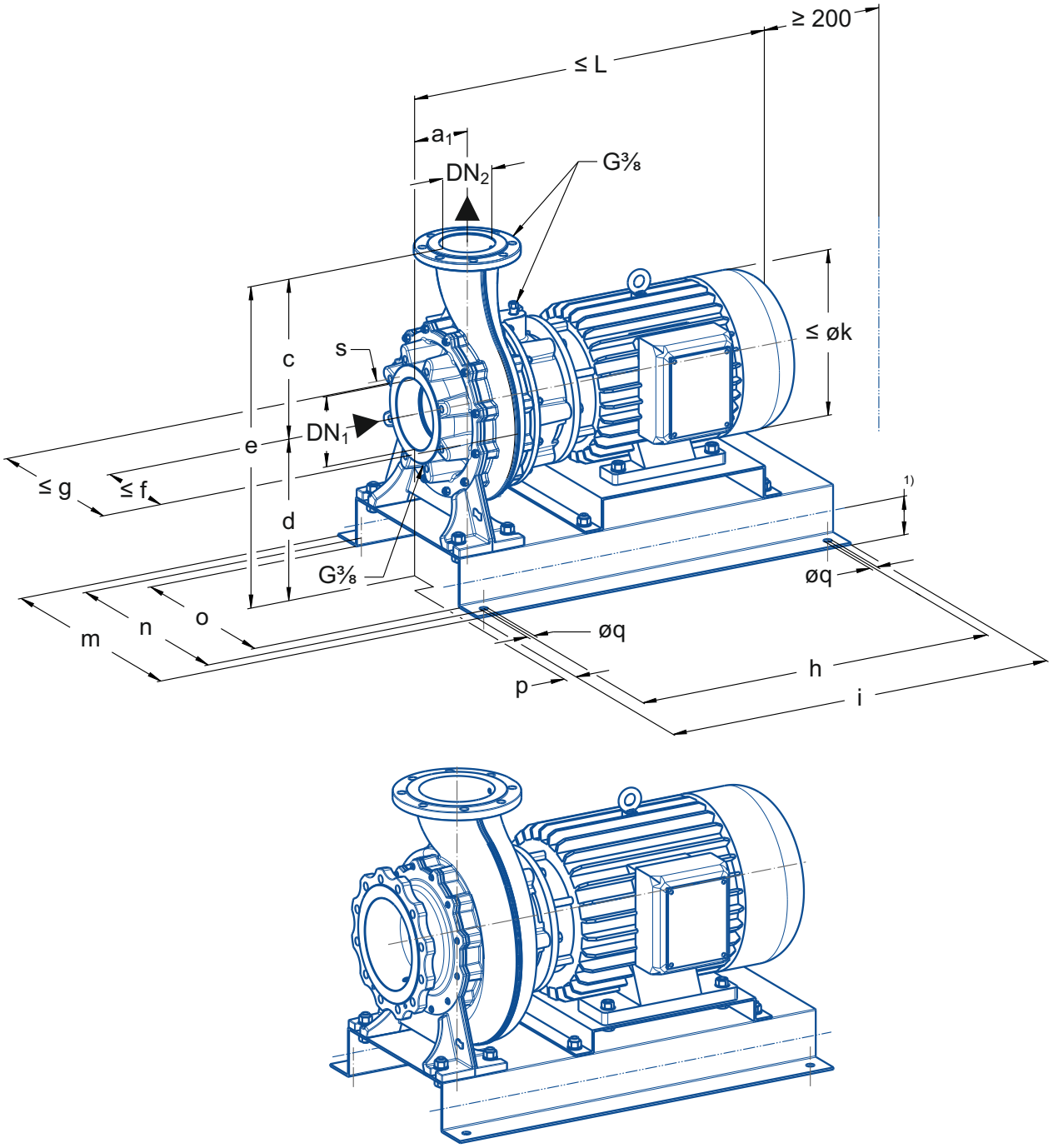



*Fig. 123 Dimensions of herborner.F-N-PM pump (version with base rail ≥ 50hp)*

## 1800 rpm

| | $P_2$ | DF | SF | ≤ L | $a_1$ | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | p | q | s | m [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN125-330A-4004P | 40 | 5 (125) | 6 (150) | 35.24 (895) | 12.32 (313) | 13.19 (335) | 16.54 (420) | 29.72 (755) | 10.63 (270) | 19.06 (484) | 41.34 (1050) | 44.88 (1140) | 13.78 (350) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.98 (-25) | 0.91 (23) | 8x¾" | 910 |
| FN150-270B-4004P | 40 | 6 (150) | 8 (200) | 35.24 (895) | 6.34 (161) | 14.76 (375) | 17.91 (455) | 20.28 (515) | 12.32 (313) | 22.09 (561) | 41.34 (1050) | 44.88 (1140) | 13.78 (350) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 2.34 (60) | 0.91 (23) | - | 866 |
| FN150-400A-6004P | 60 | 6 (150) | 8 (200) | 42.62 (1083) | 6.32 (161) | 17.72 (450) | 17.91 (455) | 35.63 (905) | 12.09 (307) | 21.65 (550) | 41.34 (1050) | 44.88 (1140) | 15.28 (388) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.83 (-21) | 0.91 (23) | 8x¾" | 1367 |
| FN200-270B-4004P | 40 | 8 (200) | 10 (250) | 37.11 (943) | 6.75 (172) | 14.57 (370) | 16.54 (420) | 31.1 (790) | 11.22 (285) | 19.92 (506) | 41.34 (1050) | 44.88 (1140) | 13.78 (350) | 29.13 (740) | 25.51 (648) | 21.42 (544) | -0.28 (-7) | 0.91 (23) | - | 922 |
| FN200-350A-5004P | 50 | 8 (200) | 10 (250) | 38.25 (972) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 13.11 (333) | 23.46 (596) | 41.34 (1050) | 44.88 (1140) | 13.78 (350) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 1102 |
| FN200-350A-6004P | 60 | 8 (200) | 10 (250) | 43.21 (1098) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 13.11 (333) | 23.46 (596) | 41.34 (1050) | 44.88 (1140) | 15.28 (388) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 1321 |
| FN200-350A-7504P | 75 | 8 (200) | 10 (250) | 45.26 (1150) | 8.27 (210) | 15.75 (400) | 17.91 (455) | 33.66 (855) | 13.11 (333) | 23.46 (596) | 41.34 (1050) | 44.88 (1140) | 15.28 (388) | 29.13 (740) | 25.51 (648) | 21.42 (544) | 0.83 (21) | 0.91 (23) | - | 1365 |

1) Foundation the rail up to the middle of the rail.

2) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

## herborner.F-N-C
## Version with thread

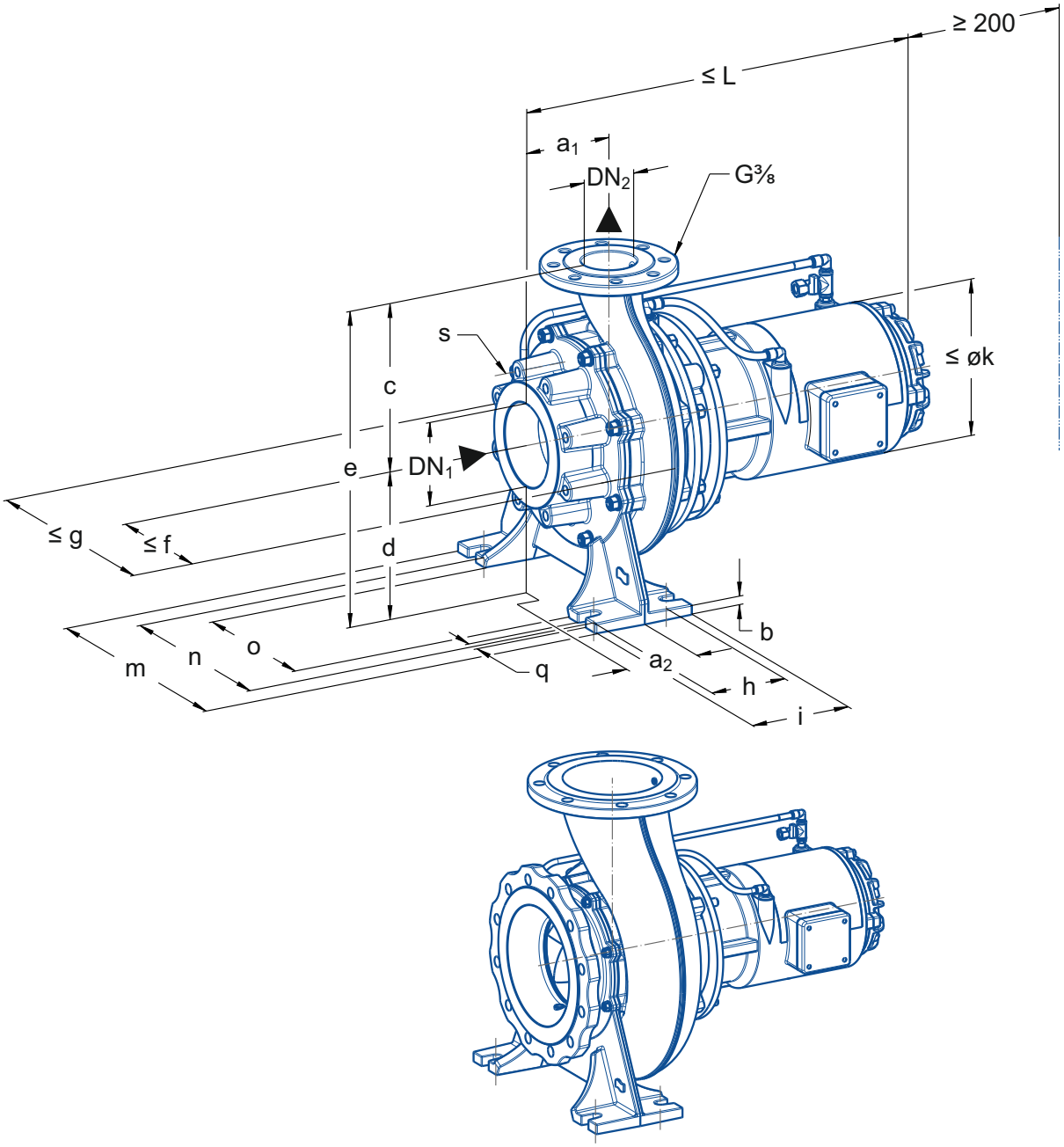



*Fig. 124 Dimensions of herborner.F-N-C pump*

## 1800 rpm

| | P2 | DF | SF | ≤ L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN032-250A-0304C | 3 | 1.25 (32) | 2 (50) | 18.99 (483) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.1 (155) | 12.2 (310) | 3.74 (95) | 4.92 (125) | 6.89 (175) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 145 |
| FN032-250A-0504C | 5 | 1.25 (32) | 2 (50) | 20.26 (515) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.3 (160) | 12.4 (315) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 172 |
| FN032-250B-0504C | 5 | 1.25 (32) | 2 (50) | 20.01 (509) | 3.96 (101) | 1.81 (46) | 0.59 (15) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.3 (160) | 12.38 (315) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 167 |
| FN040-220A-0304C | 3 | 1.5 (40) | 2.5 (65) | 19.29 (490) | 3.98 (101) | 2.17 (55) | 0.51 (13) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.22 (158) | 11.73 (298) | 2.76 (70) | 3.94 (100) | 6.89 (175) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 141 |
| FN040-270A-0504C | 5 | 1.5 (40) | 2.5 (65) | 20.48 (521) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 6.97 (177) | 13.46 (342) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 172 |
| FN040-270A-0754C | 7.5 | 1.5 (40) | 2.5 (65) | 21.74 (553) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 7.28 (185) | 13.78 (350) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 181 |
| FN040-270A-1004C | 10 | 1.5 (40) | 2.5 (65) | 23.59 (600) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 7.28 (185) | 13.78 (350) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 174 |
| FN040-270B-0504C | 5 | 1.5 (40) | 2.5 (65) | 20.48 (521) | 3.98 (101) | 2.05 (52) | 0.51 (13) | 9.19 (234) | 7.09 (180) | 16.28 (414) | 6.97 (177) | 13.46 (342) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 172 |
| FN050-190A-0304C | 3 | 2 (50) | 2.5 (65) | 19.15 (487) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.02 (153) | 11.06 (281) | 2.76 (70) | 3.94 (100) | 6.89 (175) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 120 |
| FN050-190A-0504C | 5 | 2 (50) | 2.5 (65) | 20.21 (514) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.3 (160) | 11.34 (288) | 2.76 (70) | 3.94 (100) | 7.56 (192) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 147 |
| FN050-190B-0504C | 5 | 2 (50) | 2.5 (65) | 20.21 (514) | 3.86 (98) | 2.13 (54) | 0.63 (16) | 7.87 (200) | 6.3 (160) | 14.17 (360) | 6.3 (160) | 11.34 (288) | 2.76 (70) | 3.94 (100) | 7.56 (192) | 10.43 (265) | 8.35 (212) | 6.5 (165) | 0.59 (15) | 4x5/8" | 145 |
| FN050-240A-0304C | 3 | 2 (50) | 2.5 (65) | 19.19 (488) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.61 (168) | 12.52 (318) | 3.74 (95) | 4.92 (125) | 6.89 (175) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 146 |
| FN050-240A-0504C | 5 | 2 (50) | 2.5 (65) | 20.63 (524) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.61 (168) | 12.52 (318) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 172 |
| FN050-240B-0504C | 5 | 2 (50) | 2.5 (65) | 20.23 (514) | 4.15 (106) | 2.44 (62) | 0.67 (17) | 8.66 (220) | 7.09 (180) | 15.75 (400) | 6.61 (168) | 12.52 (318) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 4x5/8" | 169 |
| FN065-200A-0304C | 3 | 2.5 (65) | 3 (80) | 19.93 (507) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 5.94 (151) | 11.18 (284) | 3.74 (95) | 4.92 (125) | 6.89 (175) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x5/8" | 134 |
| FN065-200A-0504C | 5 | 2.5 (65) | 3 (80) | 20.53 (522) | 3.96 (101) | 1.34 (34) | 0.67 (17) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.3 (160) | 11.54 (293) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 6.69 (170) | 0.59 (15) | 8x5/8" | 157 |
| FN065-220A-0504C | 5 | 2.5 (65) | 3 (80) | 20.3 (516) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 6.69 (170) | 12.56 (319) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x5/8" | 171 |
| FN065-220A-0754C | 7.5 | 2.5 (65) | 3 (80) | 21.56 (548) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 7.28 (185) | 13.15 (334) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x5/8" | 180 |
| FN065-220B-0504C | 5 | 2.5 (65) | 3 (80) | 20.3 (516) | 3.96 (101) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 6.69 (170) | 12.56 (319) | 3.74 (95) | 4.92 (125) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x5/8" | 170 |
| FN065-240A-0754C | 7.5 | 2.5 (65) | 3 (80) | 21.65 (550) | 3.8 (97) | 1.97 (50) | 0.59 (15) | 9.84 (250) | 7.09 (180) | 16.93 (430) | 7.28 (185) | 13.46 (342) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.59 (15) | 8x5/8" | 187 |
| FN065-270A-0754C | 7.5 | 2.5 (65) | 3 (80) | 21.72 (552) | 3.96 (101) | 2.05 (52) | 0.67 (17) | 9.45 (240) | 7.87 (200) | 17.32 (440) | 7.28 (185) | 13.78 (350) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 209 |
| FN065-270A-1004C | 10 | 2.5 (65) | 3 (80) | 23.57 (599) | 3.96 (101) | 2.05 (52) | 0.67 (17) | 9.45 (240) | 7.87 (200) | 17.32 (440) | 7.28 (185) | 13.78 (350) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 230 |
| FN065-270C-1004C | 10 | 2.5 (65) | 3 (80) | 23.85 (606) | 4.09 (104) | 2.05 (52) | 0.67 (17) | 9.84 (250) | 7.87 (200) | 17.72 (450) | 7.56 (192) | 14.37 (365) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | 8x5/8" | 222 |
| FN065-300B-1504C | 10 | 2.5 (65) | 3 (80) | 25.11 (638) | 4.96 (126) | 2.44 (62) | 0.59 (15) | 10.83 (275) | 8.86 (225) | 19.69 (500) | 8.27 (210) | 15.79 (401) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 272 |
| FN065-300B-2004C | 20 | 2.5 (65) | 3 (80) | 27.27 (693) | 4.96 (126) | 2.44 (62) | 0.59 (15) | 10.83 (275) | 8.86 (225) | 19.69 (500) | 8.27 (210) | 15.79 (401) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x3/4" | 370 |

1) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | ≤ L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN080-170A-0304C | 3 | 3 (80) | 4 (100) | 20.94 (532) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.54 (166) | 11.89 (302) | 4.72 (120) | 6.3 (160) | 6.89 (175) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 140 |
| FN080-170A-0504C | 5 | 3 (80) | 4 (100) | 22.59 (574) | 5.59 (142) | 3.15 (80) | 0.75 (19) | 8.86 (225) | 7.09 (180) | 15.94 (405) | 6.54 (166) | 11.89 (302) | 4.72 (120) | 6.3 (160) | 7.56 (192) | 12.6 (320) | 9.84 (250) | 7.48 (190) | 0.75 (19) | - | 172 |
| FN080-210A-0754C | 7.5 | 3 (80) | 4 (100) | 22.76 (578) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 7.4 (188) | 13.7 (348) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x5/8" | 167 |
| FN080-210A-1004C | 10 | 3 (80) | 4 (100) | 24.6 (625) | 4.94 (126) | 2.8 (71) | 0.75 (19) | 9.84 (250) | 7.48 (190) | 17.32 (440) | 7.4 (188) | 13.7 (348) | 3.74 (95) | 4.92 (125) | 8.58 (218) | 13.58 (345) | 11.02 (280) | 8.46 (215) | 0.59 (15) | 8x5/8" | 184 |
| FN080-255A-0504C | 5 | 3 (80) | 4 (100) | 21.38 (543) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.48 (190) | 14.02 (356) | 4.72 (120) | 6.3 (160) | 7.56 (192) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 227 |
| FN080-255A-0754C | 7.5 | 3 (80) | 4 (100) | 22.64 (575) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.48 (190) | 14.02 (356) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 224 |
| FN080-255A-1004C | 10 | 3 (80) | 4 (100) | 24.49 (622) | 4.94 (126) | 2.68 (68) | 0.67 (17) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.48 (190) | 14.02 (356) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 231 |
| FN080-330A-2004C | 20 | 3 (80) | 4 (100) | 27.71 (704) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 9.76 (248) | 18.15 (461) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 440 |
| FN080-330A-2504C | 25 | 3 (80) | 4 (100) | 30.19 (767) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 10.31 (262) | 18.7 (475) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 712 |
| FN080-330A-3004C | 30 | 3 (80) | 4 (100) | 34.37 (873) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 10.31 (262) | 18.7 (475) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 719 |
| FN080-330A-4004C | 40 | 3 (80) | 4 (100) | 34.37 (873) | 4.92 (125) | 2.13 (54) | 0.59 (15) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 10.31 (262) | 18.7 (475) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 748 |
| FN100-180A-0504C | 5 | 4 (100) | 5 (125) | 23.3 (592) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.2 (183) | 12.76 (324) | 4.72 (120) | 6.3 (160) | 7.56 (192) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 203 |
| FN100-180A-0754C | 7.5 | 4 (100) | 5 (125) | 24.56 (624) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.28 (185) | 12.83 (326) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 212 |
| FN100-180B-0504C | 5 | 4 (100) | 5 (125) | 23.05 (586) | 5.94 (151) | 3.15 (80) | 0.75 (19) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.2 (183) | 12.76 (324) | 4.72 (120) | 6.3 (160) | 7.56 (192) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 196 |
| FN100-210A-1004C | 10 | 4 (100) | 5 (125) | 25.74 (654) | 5.96 (152) | 3.66 (93) | 0.79 (20) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 7.76 (197) | 14.13 (359) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 185 |
| FN100-210A-1504C | 15 | 4 (100) | 5 (125) | 27.98 (711) | 5.96 (152) | 3.66 (93) | 0.79 (20) | 11.02 (280) | 7.87 (200) | 18.9 (480) | 8.19 (208) | 14.57 (370) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 14.17 (360) | 11.02 (280) | 7.87 (200) | 0.75 (19) | - | 267 |
| FN100-240A-1004C | 10 | 4 (100) | 5 (125) | 25.15 (639) | 5.55 (141) | 3.35 (85) | 0.59 (15) | 11.02 (280) | 8.86 (225) | 19.88 (505) | 7.95 (202) | 14.49 (368) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 232 |
| FN100-240A-1504C | 15 | 4 (100) | 5 (125) | 27.4 (696) | 5.55 (141) | 3.35 (85) | 0.59 (15) | 11.02 (280) | 8.86 (225) | 19.88 (505) | 8.19 (208) | 14.72 (374) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 315 |
| FN100-270A-1004C | 10 | 4 (100) | 5 (125) | 25.04 (636) | 5.53 (141) | 3.39 (86) | 0.59 (15) | 10.63 (270) | 8.86 (225) | 19.49 (495) | 7.76 (197) | 14.49 (368) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 252 |
| FN100-270A-1504C | 15 | 4 (100) | 5 (125) | 27.28 (693) | 5.53 (141) | 3.39 (86) | 0.59 (15) | 10.63 (270) | 8.86 (225) | 19.49 (495) | 8.19 (208) | 14.92 (379) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 332 |
| FN100-330A-3004C | 30 | 4 (100) | 5 (125) | 33.94 (862) | 5.53 (141) | 2.95 (75) | 0.67 (17) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 10.31 (262) | 18.54 (471) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 714 |
| FN100-330A-4004C | 40 | 4 (100) | 5 (125) | 33.94 (862) | 5.53 (141) | 2.95 (75) | 0.67 (17) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 10.31 (262) | 18.54 (471) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 764 |
| FN100-330C-2004C | 20 | 4 (100) | 5 (125) | 27.83 (707) | 5.51 (140) | 3.19 (81) | 0.75 (19) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 8.86 (225) | 16.73 (425) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 418 |
| FN100-330C-2504C | 25 | 4 (100) | 5 (125) | 30.31 (770) | 5.51 (140) | 3.19 (81) | 0.75 (19) | 12.4 (315) | 9.84 (250) | 22.24 (565) | 10.31 (262) | 18.19 (462) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x5/8" | 712 |
| FN125-250A-0504C | 5 | 5 (125) | 6 (150) | 22.07 (561) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 7.56 (192) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 265 |
| FN125-250A-0754C | 7.5 | 5 (125) | 6 (150) | 23.33 (593) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 268 |

1) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

| | P2 | DF | SF | ≤ L | $a_1$ | $a_2$ | b | c | d | e | ≤ f | ≤ g | h | i | ≤ Ø k | m | n | o | q | s | m [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | hp | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | | lb |
| FN125-250A-1004C | 10 | 5 (125) | 6 (150) | 25.18 (640) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 8.58 (218) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 274 |
| FN125-250A-1504C | 15 | 5 (125) | 6 (150) | 27.42 (697) | 5.57 (142) | - | 0.55 (14) | 13.98 (355) | 12.4 (315) | 26.38 (670) | 10.2 (259) | 17.64 (448) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.71 (18) | - | 356 |
| FN125-270A-1504C | 15 | 5 (125) | 6 (150) | 27.65 (703) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 8.23 (209) | 15.31 (389) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 361 |
| FN125-270A-2004C | 20 | 5 (125) | 6 (150) | 27.87 (708) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 8.23 (209) | 15.31 (389) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 377 |
| FN125-270A-2504C | 25 | 5 (125) | 6 (150) | 30.35 (771) | 5.53 (141) | 3.03 (77) | 0.59 (15) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.31 (262) | 17.4 (442) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 648 |
| FN125-270B-2004C | 20 | 5 (125) | 6 (150) | 28.19 (716) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.24 (260) | 18.5 (470) | 4.72 (120) | 6.3 (160) | 9.92 (252) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 385 |
| FN125-270B-2504C | 25 | 5 (125) | 6 (150) | 30.67 (779) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.31 (262) | 18.58 (472) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 673 |
| FN125-270B-3004C | 30 | 5 (125) | 6 (150) | 33.11 (841) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.31 (262) | 18.58 (472) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 678 |
| FN125-270B-4004C | 40 | 5 (125) | 6 (150) | 33.11 (841) | 5.55 (141) | 2.76 (70) | 0.67 (17) | 13.98 (355) | 9.84 (250) | 23.82 (605) | 10.31 (262) | 18.58 (472) | 4.72 (120) | 6.3 (160) | 12.01 (305) | 15.75 (400) | 12.4 (315) | 9.45 (240) | 0.75 (19) | 8x¾" | 707 |
| FN125-330A-4004C | 40 | 5 (125) | 6 (150) | 33.94 (862) | 12.32 (313) | 2.95 (75) | 0.59 (15) | 13.19 (335) | 11.02 (280) | 24.21 (615) | 10.31 (262) | 18.74 (476) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | 8x¾" | 760 |
| FN150-250A-1004C | 10 | 6 (150) | 8 (200) | 26.08 (663) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 8.58 (218) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 303 |
| FN150-250A-1504C | 15 | 6 (150) | 8 (200) | 28.33 (720) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 9.92 (252) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 389 |
| FN150-250A-2004C | 20 | 6 (150) | 8 (200) | 28.78 (732) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 11.02 (280) | 25.79 (655) | 10.91 (277) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 9.92 (252) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 412 |
| FN150-270B-2504C | 25 | 6 (150) | 8 (200) | 31.5 (800) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 12.32 (313) | 22.09 (561) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 689 |
| FN150-270B-3004C | 30 | 6 (150) | 8 (200) | 33.94 (862) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 12.32 (313) | 22.09 (561) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 696 |
| FN150-270B-4004C | 40 | 6 (150) | 8 (200) | 33.94 (862) | 6.34 (161) | - | 0.55 (14) | 14.76 (375) | 12.4 (315) | 27.17 (690) | 12.32 (313) | 22.09 (561) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 724 |
| FN150-300A-2504C | 25 | 6 (150) | 8 (200) | 31.09 (790) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 10.51 (267) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 719 |
| FN150-300A-3004C | 30 | 6 (150) | 8 (200) | 30.93 (786) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 10.51 (267) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 755 |
| FN150-300A-4004C | 40 | 6 (150) | 8 (200) | 30.93 (786) | 6.34 (161) | - | 0.55 (14) | 12.99 (330) | 11.02 (280) | 24.02 (610) | 10.51 (267) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 784 |
| FN200-250A-1504C | 15 | 8 (200) | 10 (250) | 28.9 (734) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 9.92 (252) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 395 |
| FN200-250A-2004C | 20 | 8 (200) | 10 (250) | 29.35 (746) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 9.92 (252) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 409 |
| FN200-250A-2504C | 25 | 8 (200) | 10 (250) | 31.83 (809) | 6.34 (161) | - | 0.55 (14) | 13.78 (350) | 11.02 (280) | 24.8 (630) | 10.59 (269) | 18.86 (479) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 21.65 (550) | 17.72 (450) | 13.78 (350) | 0.87 (22) | - | 681 |
| FN200-270B-2004C | 20 | 8 (200) | 10 (250) | 30.52 (776) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 11.22 (285) | 19.92 (506) | 5.91 (150) | 7.87 (200) | 9.92 (252) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 466 |
| FN200-270B-3004C | 30 | 8 (200) | 10 (250) | 35.81 (910) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 11.22 (285) | 19.92 (506) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 741 |
| FN200-270B-4004C | 40 | 8 (200) | 10 (250) | 35.81 (910) | 6.75 (172) | 3.66 (93) | 0.79 (20) | 14.57 (370) | 11.02 (280) | 25.59 (650) | 11.22 (285) | 19.92 (506) | 5.91 (150) | 7.87 (200) | 12.01 (305) | 19.69 (500) | 15.75 (400) | 11.81 (300) | 0.91 (23) | - | 770 |

1) Total weight of the pump

Flange connection dimensions according to ANSI B 16.5 Class150

## 13.2 Configuration of motor

### herborner.F-N

| Motor power (HP) | Designation of motor | Manufacturer |
|---|---|---|
| 1 | 35E1576L315G1 | Baldor Electric Company |
| 1.5 | 35E1576M493G1 | Baldor Electric Company |
| 2 | 35E1542N909G1 | Baldor Electric Company |
| 3 | 36N713R947G1 | Baldor Electric Company |
| 5 | 36N722R119G1 | Baldor Electric Company |
| 5 | 36N725R119G1 | Baldor Electric Company |
| 7.5 | 37M800R244G1 | Baldor Electric Company |
| 10 | 37M804S518G1 | Baldor Electric Company |
| 15 | 09J997X661H2 | Baldor Electric Company |
| 20 | 09J985Y583G1 | Baldor Electric Company |
| 25 | 10J957X209G1 | Baldor Electric Company |
| 30 | 10J190Y538G1 | Baldor Electric Company |
| 40 | 10J212X465G1 | Baldor Electric Company |
| 50 | 12G690Z076G1 | Baldor Electric Company |
| 60 | A36-5974-1207 | Baldor Electric Company |
| 75 | A36-5982-1512 | Baldor Electric Company |
| 100 | A40-6370-0692 | Baldor Electric Company |

## herborner.F-N-PM

| Motor power (HP) | Designation of motor | Manufacturer |
|---|---|---|
| 1 | IPM 80L/42-70 | EMOD MOTOREN |
| 1.5 | IPM 80LA/42-100 | EMOD MOTOREN |
| 2 | IPM 90S/42-80 | EMOD MOTOREN |
| 3 | IPM 90LA/42-120 | EMOD MOTOREN |
| 5 | IPM 112M/62-130 | EMOD MOTOREN |
| 7.5 | IPM 112L/62-170 | EMOD MOTOREN |
| 10 | IPM 112LB/62-240 | EMOD MOTOREN |
| 15 | IPM 132L/62-210 | EMOD MOTOREN |
| 20 | IPM 132L/62-240 | EMOD MOTOREN |
| 25 | IPM 160L/62-220 | EMOD MOTOREN |
| 30 | IPM 160L/62-250 | EMOD MOTOREN |
| 40 | IPM 180L/82-230 | EMOD MOTOREN |
| 50 | IPM 180L/82-290 | EMOD MOTOREN |
| 60 | IPM 200L/82-310 | EMOD MOTOREN |
| 75 | IPM 200L/82-360 | EMOD MOTOREN |

## herborner.F-N-C

| Motor power (HP) | Designation of motor | Manufacturer |
|---|---|---|
| 2 | WK90/4-75 | EMOD MOTOREN |
| 3 | WK90/4-100 | EMOD MOTOREN |
| 5 | WK100/4-120 | EMOD MOTOREN |
| 7.5 | WK1174-130 | EMOD MOTOREN |
| 10 | WK11/4-165 | EMOD MOTOREN |
| 15 | WK13/4-190 | EMOD MOTOREN |
| 20 | WK13/4-230 | EMOD MOTOREN |
| 25 | WK160/4-215 | EMOD MOTOREN |
| 30 | WK160/4-250 | EMOD MOTOREN |
| 40 | WK160/4-290 | EMOD MOTOREN |

## 13.3 Electrical power parameters

### herborner.F-N

| Motor power (HP) | Voltage (V) | Frequency (Hz) | Maximum current consumption (A) at (208–)230 V | Maximum current consumption (A) at 460 V | Maximum power consumption (hp) |
|---|---|---|---|---|---|
| 1 | 230/460 | 60 | 3 | 1.5 | 1 1/8 |
| 1.5 | 230/460 | 60 | 4.4 | 2.2 | 1 6/8 |
| 2 | 230/460 | 60 | 5.8 | 2.9 | 2 1/3 |
| 3 | 230/460 | 60 | 8.4 | 4.2 | 3 3/8 |
| 5 | 230/460 | 60 | 5 | 2.5 | 2 2/8 |
| 5 | 230/460 | 60 | 5 | 2.5 | 2 2/8 |
| 7.5 | 208–230/460 | 60 | 20.8-21.4 | 10.7 | 8 1/4 |
| 10 | 208–230/460 | 60 | 25.4-24 | 12 | 10 1/2 |
| 15 | 208–230/460 | 60 | 38-36.8 | 18.4 | 16 6/8 |
| 20 | 230/460 | 60 | 48 | 24 | 21 1/2 |
| 25 | 230/460 | 60 | 60 | 30 | 27 |
| 30 | 208-230/460 | 60 | 78-76 | 38 | 32 1/2 |
| 40 | 230/460 | 60 | 96 | 48 | 42 5/8 |
| 50 | 208-230/460 | 60 | 126-122 | 61 | 52 3/4 |
| 60 | 230/460 | 60 | 136 | 68 | 63 1/4 |
| 75 | 230/460 | 60 | 171 | 85.9 | 79 |
| 100 | 230/460 | 60 | 224 | 112 | 104 1/8 |

## herborner.F-N-PM

| Motor power (HP) | Voltage (V) | Frequency (Hz) | Maximum current consumption (A) | Maximum power consumption (hp) |
|---|---|---|---|---|
| 1 | 450 | 50 | 1.18 | 1 |
| 1.5 | 450 | 50 | 1.43 | 1 1/8 |
| 2 | 450 | 50 | 2.95 | 2 1/3 |
| 3 | 450 | 50 | 4.4 | 3 1/2 |
| 5 | 450 | 75 | 7.2 | 5 3/4 |
| 7.5 | 450 | 75 | 10.7 | 8 1/2 |
| 10 | 450 | 75 | 14.6 | 11 5/8 |
| 15 | 450 | 75 | 22 | 17 1/2 |
| 20 | 450 | 75 | 30 | 24 |
| 25 | 450 | 75 | 35 | 27 7/8 |
| 30 | 450 | 75 | 42 | 33 1/2 |
| 40 | 450 | 100 | 57 | 45 2/4 |
| 50 | 450 | 100 | 73 | 58 1/4 |
| 60 | 450 | 100 | 81 | 64 1/2 |
| 75 | 450 | 100 | 109 | 86 7/8 |

## herborner.F-N-C

| Motor power (HP) | Voltage (V) | Frequency (Hz) | Maximum current consumption (A) | Maximum power consumption (hp) |
|---|---|---|---|---|
| 2 | 460 | 60 | 3.5 | 3 |
| 3 | 460 | 60 | 4.61 | 4 |
| 5 | 460 | 60 | 7.3 | 6 1/3 |
| 7.5 | 460 | 60 | 11 | 9 1/2 |
| 10 | 460 | 60 | 15.1 | 12 3/8 |

| Motor power (HP) | Voltage (V) | Frequency (Hz) | Maximum current consumption (A) | Maximum power consumption (hp) |
|---|---|---|---|---|
| 15 | 460 | 60 | 20 | 17 3/4 |
| 20 | 460 | 60 | 27 | 23 3/8 |
| 25 | 460 | 60 | 31.5 | 28 |
| 30 | 460 | 60 | 37.8 | 33 1/2 |
| 40 | 460 | 60 | 49.6 | 45 |

**Permissible variations in the mains supply**

| Item | Value | Unit |
|---|---|---|
| Permissible voltage variations | ± 10 | % |
| Permissible frequency variations | ± 5 | % |
| Permissible total voltage/frequency variation (determination of amount) | ± 10 | % |

**Water to be pumped**

| Item | Value | Unit |
|---|---|---|
| Maximum density | 8.35 | lb/gal |
| Maximum viscosity | 1.08 x $10^{-5}$ | sq ft/s |
| Temperature range | | |
| herborner.F-N | 32 – 100 | °F |
| herborner.F-N-PM | 32 – 100 | °F |
| herborner.F-N-C | 59 – 100 | °F |
| Maximum chlorine content | 0.13 | oz/gal |

## 13.4 Operating conditions

### Requirements for the foundations

| Item | Value | Unit |
|---|---|---|
| Minimum compressive strength (characteristic compressive cylinder strength) | 1200 | lbf/sq in |
| Hole spacing for threaded fittings | ↳ *chapter "13.1 Pump dimensions and weight" on page 181* | |
| Diameter of threaded fittings | ↳ *chapter "13.1 Pump dimensions and weight" on page 181* | |

1) To remove the motor, ensure sufficient space is available for the lifting device.
2) Total weight of the pump

All dimensions in inches (in).

## Environment

| Item | Value | Unit |
|---|---|---|
| Temperature range | 32 – 104 | °F |
| Maximum height above sea level | 0.62 | miles |

## Operating period

| Item | Value | Unit |
|---|---|---|
| Operating period | Designed for continuous operation | |

## 13.5 Operating materials

| Operating material | Type |
|---|---|
| Intermediate casing lubrication oil | Mobil SHC Cibus 46 mit NSF H1 - license |
| herborner.F-N grease | Polyrex EM (Exxon Mobil) |
| herborner.F-N-PM grease | Klüberquiet BQH 72-102 (Klüber Lubrication) |
| herborner.F-N-C grease | Klüberquiet BQH 72-102 (Klüber Lubrication) |

### 13.5.1 Lubrication oil in intermediate casing on the version with Seal Guard system

| Type | Motor power (HP) | Oil volume (gal) |
|---|---|---|
| FN032-200A | 1 | 0.7 |
| FN032-200A | 1.5 | 0.7 |
| FN032-200A | 2 | 0.6 |
| FN032-200A | 3 | 0.6 |
| FN032-250A | 3 | 0.6 |
| FN032-250A | 5 | 1.3 |
| FN040-160A | 1 | 0.7 |
| FN040-160A | 1.5 | 0.7 |
| FN040-220A | 2 | 0.2 |
| FN040-220A | 3 | 0.2 |
| FN040-270A | 5 | 0.4 |
| FN040-270A | 7.5 | 0.5 |
| FN040-270A | 10 | 0.7 |
| FN050-140A | 1 | 0.7 |
| FN050-140A | 1.5 | 0.7 |

| Type | Motor power (HP) | Oil volume (gal) |
|---|---|---|
| FN050-140A | 2 | 0.7 |
| FN050-160A | 1 | 0.7 |
| FN050-160A | 1.5 | 0.7 |
| FN050-160A | 2 | 0.8 |
| FN050-190A | 3 | 0.2 |
| FN050-190A | 5 | 0.5 |
| FN050-240A | 3 | 0.2 |
| FN050-240A | 5 | 0.4 |
| FN050-240B | 5 | 0.4 |
| FN065-200A | 2 | 0.6 |
| FN065-200A | 3 | 0.6 |
| FN065-200A | 5 | 1.7 |
| FN065-220A | 5 | 0.4 |
| FN065-220A | 7.5 | 0.4 |
| FN065-240A | 5 | 0.4 |
| FN065-240A | 7.5 | 0.5 |
| FN065-270A | 7.5 | 0.5 |
| FN065-270A | 10 | 0.7 |
| FN065-270C | 10 | 0.7 |
| FN065-300B | 15 | 0.6 |
| FN065-300B | 20 | 0.9 |
| FN080-170A | 2 | 0.6 |
| FN080-170A | 3 | 0.6 |
| FN080-170A | 5 | 1.9 |
| FN080-210A | 5 | 0.4 |
| FN080-210A | 7.5 | 0.4 |
| FN080-210A | 10 | 0.6 |
| FN080-255A | 5 | 0.3 |
| FN080-255A | 7.5 | 0.3 |
| FN080-255A | 10 | 0.6 |
| FN080-330A | 20 | 0.9 |
| FN080-330A | 25 | 0.9 |
| FN080-330A | 30 | 1.5 |
| FN080-330A | 40 | 1.5 |
| FN100-180A | 7.5 | 1.6 |

| Type | Motor power (HP) | Oil volume (gal) |
|---|---|---|
| FN100-210A | 10 | 0.6 |
| FN100-210A | 15 | 0.6 |
| FN100-240A | 10 | 0.6 |
| FN100-240A | 15 | 0.6 |
| FN100-270A | 10 | 0.6 |
| FN100-270A | 15 | 0.6 |
| FN100-330A | 30 | 1.3 |
| FN100-330A | 40 | 1.3 |
| FN100-330C | 20 | 0.9 |
| FN100-330C | 25 | 0.9 |
| FN125-250A | 5 | 0.3 |
| FN125-250A | 7.5 | 0.3 |
| FN125-250A | 10 | 0.6 |
| FN125-270A | 15 | 0.6 |
| FN125-270A | 20 | 0.9 |
| FN125-270A | 25 | 0.9 |
| FN125-270B | 20 | 0.9 |
| FN125-270B | 25 | 0.9 |
| FN125-270B | 30 | 1.0 |
| FN125-270B | 40 | 1.0 |
| FN125-330A | 40 | 1.3 |
| FN125-330A | 50 | 1.5 |
| FN150-250A | 10 | 0.6 |
| FN150-250A | 15 | 0.6 |
| FN150-250A | 20 | 1.0 |
| FN150-270B | 25 | 0.9 |
| FN150-270B | 30 | 1.0 |
| FN150-270B | 40 | 1.0 |
| FN150-300A | 25 | 0.9 |
| FN150-300A | 30 | 1.4 |
| FN150-300A | 40 | 1.4 |
| FN150-400A | 60 | 1.5 |
| FN150-400A | 75 | 1.5 |
| FN150-400A | 100 | 1.5 |

| Type | Motor power (HP) | Oil volume (gal) |
|---|---|---|
| FN200-250A | 15 | 0.6 |
| FN200-250A | 20 | 0.9 |
| FN200-250A | 25 | 0.9 |
| FN200-270B | 20 | 1.1 |
| FN200-270B | 30 | 1.4 |
| FN200-270B | 40 | 1.4 |
| FN200-350A | 50 | 1.5 |
| FN200-350A | 60 | 1.5 |
| FN200-350A | 75 | 1.5 |
| FN200-350A | 100 | 1.5 |

## 13.5.2 Regreasing of herborner.F-N with Polyrex EM

| | Motor | Anti-friction bearing (drive side) | | Anti-friction bearing (non drive side) | |
|---|---|---|---|---|---|
| | [HP] | Regreasing interval [h] | Quantity of grease [oz] | Regreasing interval [h] | Quantity of grease [oz] |
| 1800 rpm | 1,00 | 12000 | 0,14 | 12000 | 0,11 |
| | 1,50 | 12000 | 0,14 | 12000 | 0,11 |
| | 2,00 | 12000 | 0,21 | 12000 | 0,11 |
| | 3,00 | 12000 | 0,21 | 12000 | 0,14 |
| | 5,00 | 12000 | 0,35 | 12000 | 0,14 |
| | 7,50 | 12000 | 0,46 | 12000 | 0,18 |
| | 10,00 | 12000 | 0,46 | 12000 | 0,18 |
| | 15,00 | 9500 | 0,71 | 9500 | 0,25 |
| | 20,00 | 9500 | 0,88 | 9500 | 0,25 |
| | 25,00 | 9500 | 1,06 | 9500 | 0,25 |
| | 30,00 | 9500 | 0,81 | 9500 | 0,46 |
| | 40,00 | 9500 | 1,23 | 9500 | 0,46 |
| | 50,00 | 7500 | 0,81 | 7500 | 0,60 |
| | 60,00 | 7500 | 1,16 | 7500 | 0,81 |
| | 75,00 | 7500 | 1,16 | 7500 | 0,81 |
| | 100,00 | 3500 | 1,16 | 3500 | 1,16 |

### 13.5.3 Regreasing of herborner.F-N-PM and herborner.F-N-C with Klüberquiet BQH 72-102

| Motor power (hp) | Anti-friction bearing (drive side) | | Anti-friction bearing (non drive side) | |
|---|---|---|---|---|
| | Regreasing interval (h) | Quantity of grease (oz) | Regreasing interval (h) | Quantity of grease (oz) |
| 2 | 15000 | 0.21 | 20000 | 0.11 |
| 3 | 15000 | 0.21 | 20000 | 0.11 |
| 5 | 13000 | 0.32 | 20000 | 0.11 |
| 7.5 | 13000 | 0.32 | 18000 | 0.14 |
| 10 | 10000 | 0.71 | 16000 | 0.25 |
| 15 | 10000 | 0.71 | 16000 | 0.25 |
| 20 | 10000 | 0.71 | 14000 | 0.35 |
| 25 | 10000 | 0.71 | 14000 | 0.35 |
| 30 | 8000 | 0.99 | 12000 | 0.49 |
| 40 | 8000 | 0.99 | 12000 | 0.49 |
| 50 | 7000 | 1.16 | 10000 | 0.63 |
| 60 | 6000 | 1.34 | 10000 | 0.63 |
| 75 | 6000 | 1.34 | 10000 | 0.63 |

## 13.6 Emissions

### herborner.F-N

| Motor power (HP) | Noise emission dB (A) |
|---|---|
| 1 | 50 |
| 1.5 | 55 |
| 2 | 63 |
| 3 | 66 |
| 5 | 71 |
| 7.5 | 71 |
| 10 | 72 |
| 15 | 74 |
| 20 | 74 |
| 25 | 76 |
| 30 | 76 |
| 40 | 78 |
| 50 | 78 |
| 60 | 79 |
| 75 | 80 |
| 100 | 81 |

### herborner.F-N-PM

| Motor power (HP) | Noise emission dB (A) |
|---|---|
| 1 | 52 |
| 1.5 | 52 |
| 2 | 55 |
| 3 | 55 |
| 5 | 55 |

| Motor power (HP) | Noise emission dB (A) |
|---|---|
| 7.5 | 59 |
| 10 | 59 |
| 15 | 63 |
| 20 | 63 |
| 25 | 63 |
| 30 | 63 |
| 40 | 65 |
| 50 | 65 |
| 60 | 68 |
| 75 | 68 |

**herborner.F-N-C**

| Motor power (HP) | Noise emission dB (A) |
|---|---|
| 2 | 53 |
| 3 | 53 |
| 5 | 53 |
| 7.5 | 53 |
| 10 | 53 |
| 15 | 54 |
| 20 | 54 |
| 25 | 56 |
| 30 | 56 |
| 40 | 56 |

## 13.7 Pump performance

### herborner.F-N

| Type | Model | Motor power [hp] | Nominal speed [rpm] | QBEP [US g.p.m.] | $H_{BEP}$ [ft] | $PEI_{CL}$ | Ø Impeller [inch] |
|---|---|---|---|---|---|---|---|
| FN032-200A-0104N-W2B | FN032-200A | 1 | 1,800 | 50,1 | 28,8 | 0,71 | 5,63 |
| FN032-200A-0154N-W2B | FN032-200A | 1,5 | 1,800 | 65,5 | 38,1 | 0,75 | 6,38 |
| FN032-200A-0204N-W2B | FN032-200A | 2 | 1,800 | 76,9 | 48,5 | 0,68 | 7,09 |
| FN032-200A-0304N-W2B | FN032-200A | 3 | 1,800 | 95 | 59,9 | 0,71 | 7,87 |
| FN032-250A-0304N-W2B | FN032-250A | 3 | 1,800 | 82,7 | 76,9 | 0,75 | 8,46 |
| FN032-250A-0504N-W2B | FN032-250A | 5 | 1,800 | 98,4 | 88,7 | 0,69 | 9,25 |
| FN040-160A-0104N-W2B | FN040-160A | 1 | 1,800 | 51,5 | 30,1 | 0,58 | 5,39 |
| FN040-160A-0154N-W2B | FN040-160A | 1,5 | 1,800 | 96,9 | 34,2 | 0,71 | 5,98 |
| FN040-220A-0204N-W2B | FN040-220A | 2 | 1,800 | 95,7 | 42,9 | 0,71 | 6,69 |
| FN040-220A-0304N-W2B | FN040-220A | 3 | 1,800 | 105,2 | 51,6 | 0,77 | 7,28 |
| FN040-270A-0504N-W2B | FN040-270A | 5 | 1,800 | 167,7 | 63,9 | 0,79 | 8,58 |
| FN040-270A-0754N-W2B | FN040-270A | 7,5 | 1,800 | 233,4 | 73,2 | 0,89 | 9,41 |
| FN040-270A-1004N-W2B | FN040-270A | 10 | 1,800 | 233,1 | 93,7 | 0,85 | 10,2 |
| FN050-140A-0104N-W2B | FN050-140A | 1 | 1,800 | 117,8 | 19,5 | 0,61 | 4,72 |
| FN050-140A-0154N-W2B | FN050-140A | 1,5 | 1,800 | 137,7 | 24,9 | 0,75 | 5,16 |
| FN050-140A-0204N-W2B | FN050-140A | 2 | 1,800 | 160,3 | 29,9 | 0,75 | 5,51 |
| FN050-160A-0104N-W2B | FN050-160A | 1 | 1,800 | 88,9 | 24,4 | 0,69 | 5,12 |
| FN050-160A-0154N-W2B | FN050-160A | 1,5 | 1,800 | 112,7 | 31 | 0,72 | 5,75 |
| FN050-160A-0204N-W2B | FN050-160A | 2 | 1,800 | 111,7 | 39,6 | 0,66 | 6,22 |
| FN050-190A-0304N-W2B | FN050-190A | 3 | 1,800 | 149,7 | 49,2 | 0,77 | 6,61 |
| FN050-190A-0504N-W2B | FN050-190A | 5 | 1,800 | 175,8 | 57,7 | 0,77 | 7,17 |
| FN050-240A-0304N-W2B | FN050-240A | 3 | 1,800 | 103,6 | 48,8 | 0,91 | 7,2 |
| FN050-240A-0504N-W2B | FN050-240A | 5 | 1,800 | 147,6 | 72 | 0,79 | 8,46 |
| FN050-240B-0504N-W2B | FN050-240B | 5 | 1,800 | 127,7 | 62,3 | 0,78 | 7,87 |
| FN065-200A-0204N-W2B | FN065-200A | 2 | 1,800 | 124,5 | 30,9 | 0,83 | 5,75 |
| FN065-200A-0304N-W2B | FN065-200A | 3 | 1,800 | 156,5 | 40,5 | 0,8 | 6,42 |
| FN065-200A-0504N-W2B | FN065-200A | 5 | 1,800 | 158 | 52,3 | 0,74 | 7,01 |
| FN065-220A-0504N-W2B | FN065-220A | 5 | 1,800 | 234,9 | 50,1 | 0,76 | 7,28 |
| FN065-220A-0754N-W2B | FN065-220A | 7,5 | 1,800 | 287,5 | 62,2 | 0,82 | 8,07 |
| FN065-240A-0504N-W2B | FN065-240A | 5 | 1,800 | 196 | 58,6 | 0,78 | 7,76 |
| FN065-240A-0754N-W2B | FN065-240A | 7,5 | 1,800 | 238,5 | 71,4 | 0,81 | 8,54 |
| FN065-270A-0754N-W2B | FN065-270A | 7,5 | 1,800 | 193,7 | 76,4 | 0,81 | 8,74 |
| FN065-270A-1004N-W2B | FN065-270A | 10 | 1,800 | 207,9 | 90,7 | 0,81 | 9,37 |
| FN065-270C-1004N-W2B | FN065-270C | 10 | 1,800 | 305,8 | 77,9 | 0,84 | 9,06 |
| FN065-300B-1504N-W2B | FN065-300B | 15 | 1,800 | 342,5 | 96,9 | 0,88 | 9,84 |
| FN065-300B-2004N-W2B | FN065-300B | 20 | 1,800 | 415,2 | 123 | 0,85 | 11,02 |
| FN080-170A-0204N-W2B | FN080-170A | 2 | 1,800 | 300,5 | 17,4 | 0,86 | 5,12 |
| FN080-170A-0304N-W2B | FN080-170A | 3 | 1,800 | 347 | 23,3 | 0,88 | 5,67 |
| FN080-170A-0504N-W2B | FN080-170A | 5 | 1,800 | 450,1 | 30,2 | 0,9 | 6,46 |
| FN080-210A-0504N-W2B | FN080-210A | 5 | 1,800 | 352,7 | 36,1 | 0,82 | 6,3 |
| FN080-210A-0754N-W2B | FN080-210A | 7,5 | 1,800 | 431,5 | 47,4 | 0,86 | 7,13 |
| FN080-210A-1004N-W2B | FN080-210A | 10 | 1,800 | 487,7 | 57,2 | 0,84 | 7,13 |
| FN080-210A-1504N-W2B | FN080-210A | 15 | 1,800 | 583,5 | 68,4 | 0,86 | 8,27 |
| FN080-255A-0504N-W2B | FN080-255A | 5 | 1,800 | 279,4 | 48,3 | 0,79 | 7,68 |
| FN080-255A-0754N-W2B | FN080-255A | 7,5 | 1,800 | 304,7 | 61,1 | 0,87 | 8,58 |
| FN080-255A-1004N-W2B | FN080-255A | 10 | 1,800 | 386,4 | 70,5 | 0,85 | 9,25 |

| Type | Model | Motor power [hp] | Nominal speed [rpm] | QBEP [US g.p.m.] | $H_{BEP}$ [ft] | $PEI_{CL}$ | Ø Impeller [inch] |
|---|---|---|---|---|---|---|---|
| FN080-330A-2004N-W2B | FN080-330A | 20 | 1,800 | 576,8 | 71,7 | 0,95 | 9,45 |
| FN080-330A-2504N-W2B | FN080-330A | 25 | 1,800 | 655,6 | 100,4 | 0,9 | 10,91 |
| FN080-330A-3004N-W2B | FN080-330A | 30 | 1,800 | 767,2 | 111,3 | 0,89 | 12,44 |
| FN080-330A-4004N-W2B | FN080-330A | 40 | 1,800 | 833,2 | 137,7 | 0,98 | 12,99 |
| FN100-180A-0504N-W2B | FN100-180A | 5 | 1,800 | 535,9 | 27,6 | 0,83 | 5,98 |
| FN100-180A-0754N-W2B | FN100-180A | 7,5 | 1,800 | 650,6 | 35,5 | 0,84 | 6,54 |
| FN100-210A-1004N-W2B | FN100-210A | 10 | 1,800 | 693,4 | 39,8 | 0,92 | 7,17 |
| FN100-210A-1504N-W2B | FN100-210A | 15 | 1,800 | 796,5 | 54,7 | 0,91 | 7,99 |
| FN100-240A-1004N-W2B | FN100-240A | 10 | 1,800 | 391,9 | 62,6 | 0,88 | 8,39 |
| FN100-240A-1504N-W2B | FN100-240A | 15 | 1,800 | 498,9 | 76,1 | 0,88 | 9,29 |
| FN100-270A-1004N-W2B | FN100-270A | 10 | 1,800 | 418,1 | 56,5 | 0,91 | 7,72 |
| FN100-270A-1504N-W2B | FN100-270A | 15 | 1,800 | 494,8 | 69,9 | 0,95 | 8,62 |
| FN100-330A-3004N-W2B | FN100-330A | 30 | 1,800 | 567,4 | 132,3 | 0,85 | 11,38 |
| FN100-330A-4004N-W2B | FN100-330A | 40 | 1,800 | 607,3 | 160,9 | 0,87 | 12,4 |
| FN100-330C-2004N-W2B | FN100-330C | 20 | 1,800 | 385,2 | 95,7 | 0,91 | 10,24 |
| FN100-330C-2504N-W2B | FN100-330C | 25 | 1,800 | 429,8 | 114,9 | 0,86 | 11,18 |
| FN125-250A-0504N-W2B | FN125-250A | 5 | 1,800 | 571,2 | 27,8 | 0,84 | 6,34 |
| FN125-250A-0754N-W2B | FN125-250A | 7,5 | 1,800 | 694,7 | 34,1 | 0,88 | 7,17 |
| FN125-250A-1004N-W2B | FN125-250A | 10 | 1,800 | 724,7 | 43,1 | 0,86 | 7,72 |
| FN125-250A-1504N-W2B | FN125-250A | 15 | 1,800 | 880,1 | 52,3 | 0,89 | 8,5 |
| FN125-270A-1504N-W2B | FN125-270A | 15 | 1,800 | 664,1 | 62,7 | 0,91 | 8,5 |
| FN125-270A-2004N-W2B | FN125-270A | 20 | 1,800 | 690,8 | 74,6 | 0,94 | 9,37 |
| FN125-270A-2504N-W2B | FN125-270A | 25 | 1,800 | 712,1 | 84,1 | 0,91 | 9,57 |
| FN125-270B-2004N-W2B | FN125-270B | 20 | 1,800 | 1082,5 | 54,7 | 0,91 | 8,27 |
| FN125-270B-2504N-W2B | FN125-270B | 25 | 1,800 | 1059,2 | 68 | 0,88 | 8,82 |
| FN125-270B-3004N-W2B | FN125-270B | 30 | 1,800 | 1228,6 | 73,1 | 0,89 | 9,29 |
| FN125-270B-4004N-W2B | FN125-270B | 40 | 1,800 | 1322,8 | 85,3 | 0,91 | 9,88 |
| FN125-330A-4004N-W2B | FN125-330A | 40 | 1,800 | 785,2 | 108,5 | 1 | 10,12 |
| FN125-330A-5004N-W2B | FN125-330A | 50 | 1,800 | 916,9 | 125,1 | 1 | 10,63 |
| FN150-250A-1004N-W2B | FN150-250A | 10 | 1,800 | 802,7 | 38,9 | 0,92 | 7,32 |
| FN150-250A-1504N-W2B | FN150-250A | 15 | 1,800 | 949,6 | 50,5 | 0,89 | 8,35 |
| FN150-250A-2004N-W2B | FN150-250A | 20 | 1,800 | 952,8 | 62,9 | 0,9 | 8,98 |
| FN150-270B-2504N-W2B | FN150-270B | 25 | 1,800 | 1613,6 | 41,5 | 0,96 | 8,86 |
| FN150-270B-3004N-W2B | FN150-270B | 30 | 1,800 | 1679,6 | 53,5 | 0,92 | 8,7 |
| FN150-270B-4004N-W2B | FN150-270B | 40 | 1,800 | 1886 | 63,4 | 0,94 | 9,33 |
| FN150-300A-2504N-W2B | FN150-300A | 25 | 1,800 | 1085,2 | 74,3 | 0,91 | 9,84 |
| FN150-300A-3004N-W2B | FN150-300A | 30 | 1,800 | 1144,3 | 77,7 | 0,95 | 9,88 |
| FN150-300A-4004N-W2B | FN150-300A | 40 | 1,800 | 1299,8 | 91,4 | 0,96 | 10,59 |
| FN150-400A-6004N-W2B | FN150-400A | 60 | 1,800 | 803,6 | 177,7 | 0,9 | 13,19 |
| FN150-400A-7504N-W2B | FN150-400A | 75 | 1,800 | 966,3 | 193,9 | 0,94 | 14,09 |
| FN150-400A-10004N-W2B | FN150-400A | 100 | 1,800 | 1063,3 | 232 | 0,94 | 15,2 |
| FN200-250A-1504N-W2B | FN200-250A | 15 | 1,800 | 1245,7 | 43,2 | 0,9 | 8,46 |
| FN200-250A-2004N-W2B | FN200-250A | 20 | 1,800 | 1352,2 | 46,9 | 0,9 | 8,82 |
| FN200-250A-2504N-W2B | FN200-250A | 25 | 1,800 | 1513,7 | 52,5 | 0,92 | 9,37 |
| FN200-270B-2004N-W2B | FN200-270B | 20 | 1,800 | 1791,7 | 39,1 | 0,96 | 8,82 |
| FN200-270B-3004N-W2B | FN200-270B | 30 | 1,800 | 1701,2 | 54,8 | 0,92 | 8,78 |
| FN200-270B-4004N-W2B | FN200-270B | 40 | 1,800 | 1791,8 | 64,7 | 0,98 | 9,49 |
| FN200-350A-5004N-W2B | FN200-350A | 50 | 1,800 | 1718 | 81,3 | 1,05 | 10,59 |
| FN200-350A-6004N-W2B | FN200-350A | 60 | 1,800 | 1914,3 | 90,4 | 1,02 | 11,18 |
| FN200-350A-7504N-W2B | FN200-350A | 75 | 1,800 | 2062,6 | 109,6 | 0,99 | 12,13 |
| FN200-350A-10004N-W2B | FN200-350A | 100 | 1,800 | 2342,7 | 124,1 | 1,04 | 12,87 |

## herborner.F-N-PM

| Type | Model | Motor power [hp] | Nominal speed [rpm] | $Q_{BEP}$ [US g.p.m.] | $H_{BEP}$ [ft] | $PEI_{VL}$ | Ø Impeller [inch] |
|---|---|---|---|---|---|---|---|
| FN032-200A-0104P-W2B | FN032-200A | 1 | 1,500 | 51 | 24.9 | 0.65 | 6.14 |
| FN032-200A-0154P-W2B | FN032-200A | 1.5 | 1,500 | 73.5 | 35.4 | 0.63 | 7.17 |
| FN032-200A-0204P-W2B | FN032-200A | 2 | 1,500 | 73.6 | 42.2 | 0.58 | 7.87 |
| FN032-250A-0304P-W2B | FN032-250A | 3 | 1,500 | 75.4 | 52.9 | 0.77 | 8.58 |
| FN032-250A-0504P-W2B | FN032-250A | 5 | 1,500 | 91.4 | 77.6 | 0.55 | 9.84 |
| FN032-250B-0504P-W2B | FN032-250B | 5 | 1,500 | 79.4 | 67.4 | 0.54 | 9.13 |
| FN040-160A-0074P-W2B | FN040-160A | 0.75 | 1,500 | 81.5 | 19.3 | - | 6.3 |
| FN040-160A-0104P-W2B | FN040-160A | 1 | 1,500 | 94.5 | 27.6 | 0.4 | 6.3 |
| FN040-220A-0204P-W2B | FN040-220A | 2 | 1,500 | 75 | 43.3 | 0.5 | 7.48 |
| FN040-220A-0304P-W2B | FN040-220A | 3 | 1,500 | 85.4 | 54.2 | 0.57 | 8.27 |
| FN040-270A-0504P-W2B | FN040-270A | 5 | 1,500 | 166.5 | 60.3 | 0.63 | 9.61 |
| FN040-270A-0754P-W2B | FN040-270A | 7.5 | 1,500 | 192.8 | 74.5 | 0.67 | 10.63 |
| FN050-140A-0104P-W2B | FN050-140A | 1 | 1,500 | 85.1 | 20.7 | 0.44 | 5.16 |
| FN050-140A-0154P-W2B | FN050-140A | 1.5 | 1,500 | 98.7 | 24 | 0.45 | 5.51 |
| FN050-160A-0074P-W2B | FN050-160A | 0.75 | 1,500 | 125.9 | 16 | - | 6.3 |
| FN050-160A-0104P-W2B | FN050-160A | 1 | 1,500 | 128.7 | 20.6 | 0.64 | 5.83 |
| FN050-160A-0154P-W2B | FN050-160A | 1.5 | 1,500 | 104.6 | 28.8 | 0.55 | 6.3 |
| FN050-190A-0304P-W2B | FN050-190A | 3 | 1,500 | 127.8 | 39.3 | 0.63 | 6.85 |
| FN050-190A-0504P-W2B | FN050-190A | 5 | 1,500 | 150.3 | 47 | 0.58 | 748 |
| FN050-240A-0304P-W2B | FN050-240A | 3 | 1,500 | 111.5 | 49 | 0.62 | 8.07 |
| FN050-240A-0504P-W2B | FN050-240A | 5 | 1,500 | 142.6 | 68.8 | 0.58 | 9.45 |
| FN050-240B-0504P-W2B | FN050-240B | 5 | 1,500 | 125.2 | 58.1 | 0.58 | 8.86 |
| FN065-200A-0204P-W2B | FN065-200A | 2 | 1,500 | 131 | 30.4 | 0.57 | 6.5 |
| FN065-200A-0304P-W2B | FN065-200A | 3 | 1,500 | 148.3 | 36.5 | 0.65 | 7.05 |
| FN065-200A-0504P-W2B | FN065-200A | 5 | 1,500 | 133.3 | 50.2 | 0.56 | 7.87 |
| FN065-220A-0504P-W2B | FN065-220A | 5 | 1,500 | 232.1 | 44.5 | 0.65 | 7.95 |
| FN065-220A-0754P-W2B | FN065-220A | 7.5 | 1,500 | 256.8 | 54.5 | 0.63 | 8.66 |
| FN065-240A-0504P-W2B | FN065-240A | 5 | 1,500 | 178.1 | 55.7 | 0.61 | 8.54 |
| FN065-240A-0754P-W2B | FN065-240A | 7.5 | 1,500 | 252.7 | 65.8 | 0.61 | 9.45 |
| FN065-270A-0754P-W2B | FN065-270A | 7.5 | 1,500 | 202.9 | 67.8 | 0.7 | 9.69 |
| FN065-270A-1004P-W2B | FN065-270A | 10 | 1,500 | 229.9 | 81.7 | 0.63 | 10.59 |
| FN065-270C-1004P-W2B | FN065-270C | 10 | 1,500 | 324.1 | 73.4 | 0.65 | 10.28 |
| FN065-300B-1504P-W2B | FN065-300B | 15 | 1,500 | 353.7 | 106.5 | 0.57 | 11.81 |
| FN080-170A-0204P-W2B | FN080-170A | 2 | 1,500 | 308.5 | 17.7 | 0.67 | 583 |
| FN080-170A-0304P-W2B | FN080-170A | 3 | 1,500 | 329.9 | 26.6 | 0.64 | 6.69 |
| FN080-210A-0504P-W2B | FN080-210A | 5 | 1,500 | 369.9 | 34.4 | 0.68 | 7.13 |
| FN080-210A-0754P-W2B | FN080-210A | 7.5 | 1,500 | 459 | 45.7 | 0.65 | 8.15 |
| FN080-255A-0504P-W2B | FN080-255A | 5 | 1,500 | 263.6 | 45.2 | 0.7 | 8.58 |
| FN080-255A-0754P-W2B | FN080-255A | 7.5 | 1,500 | 351.9 | 57.9 | 0.68 | 10 |
| FN080-330A-2004P-W2B | FN080-330A | 20 | 1,500 | 696.8 | 80.8 | 0.69 | 11.81 |
| FN080-330A-2504P-W2B | FN080-330A | 25 | 1,500 | 726 | 94.7 | 0.69 | 12.32 |
| FN080-330A-3004P-W2B | FN080-330A | 30 | 1,500 | 776.1 | 100.9 | 0.75 | 12.83 |
| FN100-180A-0504P-W2B | FN100-180A | 5 | 1,500 | 533.5 | 26.7 | 0.69 | 6.61 |
| FN100-180A-0754P-W2B | FN100-180A | 7.5 | 1,500 | 676.1 | 30.2 | 0.66 | 7.87 |
| FN100-210A-1004P-W2B | FN100-210A | 10 | 1,500 | 700.4 | 43 | 0.68 | 8.27 |
| FN100-240A-1004P-W2B | FN100-240A | 10 | 1,500 | 401.8 | 57.2 | 0.69 | 9.45 |
| FN100-270A-1004P-W2B | FN100-270A | 10 | 1,500 | 448.3 | 53.3 | 0.7 | 8.9 |
| FN100-270A-1504P-W2B | FN100-270A | 15 | 1,500 | 487.4 | 70.3 | 0.71 | 10.04 |
| FN100-330A-3004P-W2B | FN100-330A | 30 | 1,500 | 591.1 | 125.7 | 0.69 | 12.99 |

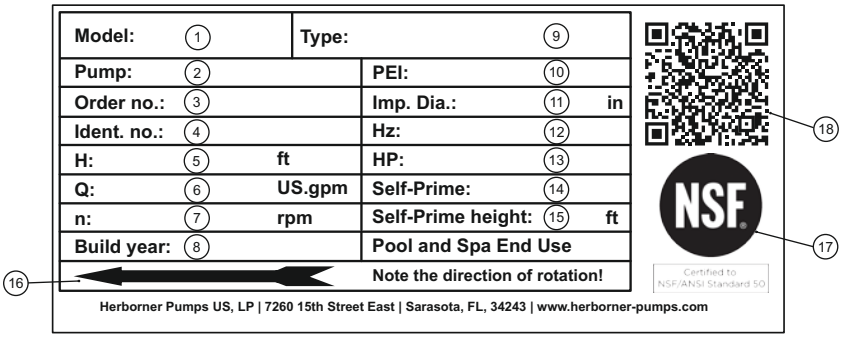
| Type | Model | Motor power [hp] | Nominal speed [rpm] | $Q_{BEP}$ [US g.p.m.] | $H_{BEP}$ [ft] | $PEI_{VL}$ | Ø Impeller [inch] |
|---|---|---|---|---|---|---|---|
| FN100-330C-2004P-W2B | FN100-330C | 20 | 1,500 | 472.2 | 89.5 | 0.7 | 12.09 |
| FN100-330C-2504P-W2B | FN100-330C | 25 | 1,500 | 437.6 | 109.9 | 0.7 | 12.99 |
| FN125-250A-0504P-W2B | FN125-250A | 5 | 1,500 | 622.5 | 25.6 | 0.7 | 7.17 |
| FN125-250A-0754P-W2B | FN125-250A | 7.5 | 1,500 | 673.9 | 36 | 0.71 | 8.39 |
| FN125-270A-1504P-W2B | FN125-270A | 15 | 1,500 | 579.4 | 62.6 | 0.74 | 9.76 |
| FN125-270A-2004P-W2B | FN125-270A | 20 | 1,500 | 609.5 | 73.9 | 0.69 | 10.28 |
| FN125-270B-2004P-W2B | FN125-270B | 20 | 1,500 | 1113.8 | 56.6 | 0.66 | 9.53 |
| FN125-270B-2504P-W2B | FN125-270B | 25 | 1,500 | 1100.8 | 66.1 | 0.67 | 10.12 |
| FN125-270B-3004P-W2B | FN125-270B | 30 | 1,500 | 1348.9 | 65.2 | 0.74 | 10.55 |
| FN125-330A-4004P-W2B | FN125-330A | 40 | 1,500 | 860 | 100.2 | 0.81 | 11.61 |
| FN150-250A-1004P-W2B | FN150-250A | 10 | 1,500 | 844.3 | 37.3 | 0.76 | 8.5 |
| FN150-250A-1504P-W2B | FN150-250A | 15 | 1,500 | 931.6 | 53.1 | 0.66 | 9.76 |
| FN150-270B-2004P-W2B | FN150-270B | 20 | 1,500 | 1421.6 | 44.2 | 0.74 | 8.98 |
| FN150-270B-2504P-W2B | FN150-270B | 25 | 1,500 | 1588.3 | 49.3 | 0.76 | 9.49 |
| FN150-270B-3004P-W2B | FN150-270B | 30 | 1,500 | 1736.7 | 54 | 0.76 | 9.92 |
| FN150-270B-4004P-W2B | FN150-270B | 40 | 1,500 | 2032.6 | 64 | 0.74 | 10.63 |
| FN150-300A-2504P-W2B | FN150-300A | 25 | 1,500 | 1073.6 | 67.3 | 0.81 | 10.63 |
| FN150-300A-3004P-W2B | FN150-300A | 30 | 1,500 | 1133.8 | 76.3 | 0.82 | 11.26 |
| FN150-400A-6004P-W2B | FN150-400A | 60 | 1,500 | 877.1 | 182 | 0.66 | 15.75 |
| FN200-250A-1004P-W2B | FN200-250A | 10 | 1,500 | 1096.6 | 31.7 | 0.75 | 8.58 |
| FN200-250A-1504P-W2B | FN200-250A | 15 | 1,500 | 1329.1 | 38.4 | 0.77 | 9.45 |
| FN200-250A-2004P-W2B | FN200-250A | 20 | 1,500 | 1382.6 | 41.6 | 0.76 | 9.65 |
| FN200-270B-2004P-W2B | FN200-270B | 20 | 1,500 | 1462.8 | 42.8 | 0.73 | 8.98 |
| FN200-270B-2504P-W2B | FN200-270B | 25 | 1,500 | 1596.7 | 47.8 | 0.78 | 9.53 |
| FN200-270B-3004P-W2B | FN200-270B | 30 | 1,500 | 1712.4 | 55.4 | 0.81 | 10.24 |
| FN200-350A-5004P-W2B | FN200-350A | 50 | 1,500 | 1724.3 | 84.3 | 0.85 | 12.44 |
| FN200-350A-6004P-W2B | FN200-350A | 60 | 1,500 | 2009 | 91 | 0.8 | 12.87 |
| FN200-350A-7504P-W2B | FN200-350A | 75 | 1,500 | 2061.8 | 114.3 | 0.7 | 13.78 |

## herborner.F-N-C

| Type | Model | Motor power [hp] | Nominal speed [rpm] | $Q_{BEP}$ [US g.p.m.] | $H_{BEP}$ [ft] | $PEI_{CL}$ | Ø Impeller [inch] |
|---|---|---|---|---|---|---|---|
| FN032-250A-0304C-W2B | FN032-250A | 3 | 1,800 | 76.7 | 63.3 | 0.78 | 7.99 |
| FN032-250A-0504C-W2B | FN032-250A | 5 | 1,800 | 97.6 | 92.8 | 0.66 | 9.45 |
| FN032-250B-0504C-W2B | FN032-250B | 5 | 1,800 | 86.6 | 82.3 | 0.65 | 8.9 |
| FN040-220A-0304C-W2B | FN040-220A | 3 | 1,800 | 109.5 | 55.2 | 0.75 | 7.48 |
| FN040-270A-0504C-W2B | FN040-270A | 5 | 1,800 | 167.7 | 63.9 | 0.79 | 8.58 |
| FN040-270A-0754C-W2B | FN040-270A | 7.5 | 1,800 | 195.5 | 84.9 | 0.78 | 9.61 |
| FN040-270A-1004C-W2B | FN040-270A | 10 | 1,800 | 228.6 | 95 | 0.84 | 10.35 |
| FN040-270B-0504C-W2B | FN040-270B | 5 | 1,800 | 149.7 | 57.1 | 0.78 | 8.11 |
| FN050-190A-0304C-W2B | FN050-190A | 3 | 1,800 | 153 | 41.2 | 0.79 | 6.26 |
| FN050-190A-0504C-W2B | FN050-190A | 5 | 1,800 | 179.3 | 61.6 | 0.68 | 7.48 |
| FN050-190B-0504C-W2B | FN050-190B | 5 | 1,800 | 187.6 | 52.5 | 0.78 | 7.01 |
| FN050-240A-0304C-W2B | FN050-240A | 3 | 1,800 | 104.9 | 48.1 | 0.91 | 7.2 |
| FN050-240A-0504C-W2B | FN050-240A | 5 | 1,800 | 153.1 | 76.7 | 0.69 | 8.74 |
| FN050-240B-0504C-W2B | FN050-240B | 5 | 1,800 | 128 | 60.1 | 0.75 | 7.87 |
| FN065-200A-0304C-W2B | FN065-200A | 3 | 1,800 | 155.3 | 40.8 | 0.79 | 6.42 |
| FN065-200A-0504C-W2B | FN065-200A | 5 | 1,800 | 174.9 | 61.6 | 0.7 | 7.56 |
| FN065-220A-0504C-W2B | FN065-220A | 5 | 1,800 | 242.4 | 51.5 | 0.73 | 7.44 |
| FN065-220A-0754C-W2B | FN065-220A | 7.5 | 1,800 | 297.3 | 65.5 | 0.76 | 8.27 |
| FN065-220B-0504C-W2B | FN065-220B | 5 | 1,800 | 208.6 | 42.7 | 0.75 | 6.77 |
| FN065-240A-0754C-W2B | FN065-240A | 7.5 | 1,800 | 253.3 | 74.4 | 0.77 | 8.74 |
| FN065-270A-0754C-W2B | FN065-270A | 7.5 | 1,800 | 194.7 | 79.3 | 0.76 | 8.86 |
| FN065-270A-1004C-W2B | FN065-270A | 10 | 1,800 | 204.8 | 93.4 | 0.77 | 9.61 |
| FN065-270C-1004C-W2B | FN065-270C | 10 | 1,800 | 309.3 | 80.4 | 0.82 | 9.33 |
| FN065-300B-1504C-W2B | FN065-300B | 15 | 1,800 | 351 | 100 | 0.83 | 10.24 |
| FN065-300B-2004C-W2B | FN065-300B | 20 | 1,800 | 410.5 | 125.4 | 0.84 | 11.22 |
| FN080-170A-0304C-W2B | FN080-170A | 3 | 1,800 | 352.1 | 26 | 0.81 | 5.83 |
| FN080-170A-0504C-W2B | FN080-170A | 5 | 1,800 | 448.7 | 35.8 | 0.76 | 6.69 |
| FN080-210A-0754C-W2B | FN080-210A | 7.5 | 1,800 | 424.3 | 47.5 | 0.83 | 7.13 |
| FN080-210A-1004C-W2B | FN080-210A | 10 | 1,800 | 486.3 | 57.6 | 0.83 | 7.68 |
| FN080-255A-0504C-W2B | FN080-255A | 5 | 1,800 | 251.7 | 50.3 | 0.75 | 7.87 |
| FN080-255A-0754C-W2B | FN080-255A | 7.5 | 1,800 | 330.3 | 64 | 0.79 | 8.86 |
| FN080-255A-1004C-W2B | FN080-255A | 10 | 1,800 | 377.1 | 72.7 | 0.83 | 9.49 |
| FN080-330A-2004C-W2B | FN080-330A | 20 | 1,800 | 635.8 | 80.8 | 0.95 | 10.16 |
| FN080-330A-2504C-W2B | FN080-330A | 25 | 1,800 | 654.7 | 98.9 | 0.93 | 10.91 |
| FN080-330A-3004C-W2B | FN080-330A | 30 | 1,800 | 863.7 | 105.3 | 0.85 | 11.54 |
| FN080-330A-4004C-W2B | FN080-330A | 40 | 1,800 | 847.8 | 126.5 | 0.93 | 12.17 |
| FN100-180A-0504C-W2B | FN100-180A | 5 | 1,800 | 541.4 | 28.9 | 0.78 | 6.14 |
| FN100-180A-0754C-W2B | FN100-180A | 7.5 | 1,800 | 619.6 | 38.7 | 0.8 | 6.65 |
| FN100-180B-0504C-W2B | FN100-180B | 5 | 1,800 | 467.7 | 25 | 0.76 | 5.71 |
| FN100-210A-1004C-W2B | FN100-210A | 10 | 1,800 | 649.7 | 41.9 | 0.95 | 7.17 |
| FN100-210A-1504C-W2B | FN100-210A | 15 | 1,800 | 757.5 | 57.9 | 0.87 | 8.15 |
| FN100-240A-1004C-W2B | FN100-240A | 10 | 1,800 | 390.6 | 63.6 | 0.84 | 8.46 |
| FN100-240A-1504C-W2B | FN100-240A | 15 | 1,800 | 475.2 | 76.9 | 0.83 | 9.45 |
| FN100-270A-1004C-W2B | FN100-270A | 10 | 1,800 | 413.2 | 59.4 | 0.87 | 7.95 |
| FN100-270A-1504C-W2B | FN100-270A | 15 | 1,800 | 478.8 | 75.3 | 0.86 | 8.98 |
| FN100-330A-3004C-W2B | FN100-330A | 30 | 1,800 | 613 | 136 | 0.81 | 11.65 |
| FN100-330A-4004C-W2B | FN100-330A | 40 | 1,800 | 651.3 | 161.9 | 0.85 | 12.6 |
| FN100-330C-2004C-W2B | FN100-330C | 20 | 1,800 | 358 | 97.6 | 0.87 | 10.31 |
| FN100-330C-2504C-W2B | FN100-330C | 25 | 1,800 | 434.7 | 114.5 | 0.87 | 11.26 |
| FN125-250A-0504C-W2B | FN125-250A | 5 | 1,800 | 572.7 | 29 | 0.81 | 6.61 |

| Type | Model | Motor power [hp] | Nominal speed [rpm] | $Q_{BEP}$ [US g.p.m.] | $H_{BEP}$ [ft] | $PEI_{CL}$ | Ø Impeller [inch] |
|---|---|---|---|---|---|---|---|
| FN125-250A-0754C-W2B | FN125-250A | 7.5 | 1,800 | 666 | 36 | 0.85 | 7.28 |
| FN125-250A-1004C-W2B | FN125-250A | 10 | 1,800 | 752.9 | 42.6 | 0.87 | 7.95 |
| FN125-250A-1504C-W2B | FN125-250A | 15 | 1,800 | 852.4 | 48.2 | 0.88 | 8.5 |
| FN125-270A-1504C-W2B | FN125-270A | 15 | 1,800 | 647.8 | 61.2 | 0.96 | 8.66 |
| FN125-270A-2004C-W2B | FN125-270A | 20 | 1,800 | 684.3 | 79.6 | 0.88 | 9.65 |
| FN125-270A-2504C-W2B | FN125-270A | 25 | 1,800 | 681.2 | 87.3 | 0.9 | 9.65 |
| FN125-270B-2004C-W2B | FN125-270B | 20 | 1,800 | 1061.2 | 54.8 | 0.92 | 8.27 |
| FN125-270B-2504C-W2B | FN125-270B | 25 | 1,800 | 1043.1 | 69.5 | 0.88 | 8.94 |
| FN125-270B-3004C-W2B | FN125-270B | 30 | 1,800 | 1245.6 | 77.2 | 0.81 | 9.49 |
| FN125-270B-4004C-W2B | FN125-270B | 40 | 1,800 | 1270.8 | 84.3 | 0.86 | 9.8 |
| FN125-330A-4004C-W2B | FN125-330A | 40 | 1,800 | 842.5 | 107.9 | 0.96 | 10.35 |
| FN150-250A-1004C-W2B | FN150-250A | 10 | 1,800 | 806.2 | 40.5 | 0.84 | 7.56 |
| FN150-250A-1504C-W2B | FN150-250A | 15 | 1,800 | 975.2 | 47.5 | 0.89 | 8.5 |
| FN150-250A-2004C-W2B | FN150-250A | 20 | 1,800 | 1047.9 | 58.1 | 0.92 | 9.06 |
| FN150-270B-2504C-W2B | FN150-270B | 25 | 1,800 | 1530.4 | 41.5 | 1 | 8.86 |
| FN150-270B-3004C-W2B | FN150-270B | 30 | 1,800 | 1728 | 57.1 | 0.86 | 8.98 |
| FN150-270B-4004C-W2B | FN150-270B | 40 | 1,800 | 1815.1 | 65.6 | 0.94 | 9.41 |
| FN150-300A-2504C-W2B | FN150-300A | 25 | 1,800 | 1035.2 | 72.6 | 0.91 | 9.76 |
| FN150-300A-3004C-W2B | FN150-300A | 30 | 1,800 | 1164.6 | 86 | 0.86 | 10.24 |
| FN150-300A-4004C-W2B | FN150-300A | 40 | 1,800 | 1329 | 94.3 | 0.91 | 10.83 |
| FN200-250A-1504C-W2B | FN200-250A | 15 | 1,800 | 1262.3 | 41.8 | 0.9 | 8.46 |
| FN200-250A-2004C-W2B | FN200-250A | 20 | 1,800 | 1394.8 | 46.2 | 0.9 | 8.9 |
| FN200-250A-2504C-W2B | FN200-250A | 25 | 1,800 | 1559.8 | 51.6 | 0.92 | 9.45 |
| FN200-270B-2004C-W2B | FN200-270B | 20 | 1,800 | 1672.6 | 39.8 | 0.96 | 8.82 |
| FN200-270B-3004C-W2B | FN200-270B | 30 | 1,800 | 1764.8 | 59.7 | 0.85 | 9.06 |
| FN200-270B-4004C-W2B | FN200-270B | 40 | 1,800 | 1887.8 | 67.7 | 0.91 | 9.65 |

## 13.8 Name plate




The name plate is located on the fan hood (herborner.F-N and herborner.F-N-PM) or the motor casing (herborner.F-N-C) and contains the following information:

*Fig. 125 Name plate*

1. Model
2. Pump
3. Order No.
4. Ident. No.
5. Nominal Head [ft]
6. Nominal rate of flow [US.gpm]
7. Nominal speed [rpm]
8. Build year [year/month]
9. Type
10. PEI
11. Impeller Diameter [in]
12. Frequency [Hz]
13. Power output [hp]
14. Self-prime [yes or no]
15. Self-prime hight [ft]
16. Direction of rotation
17. NSF logo
18. QR-Code

1) Either power input of pump at the duty point or power output of motor (check by comparing with motor name plate)

## Type code

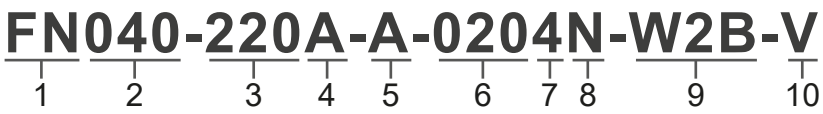



*Fig. 126 Type code*

1 Design
2 Flange nominal diameter
3 Designdimensions
4 Version
5 Type
6 Motor power
7 Speed
8 Motor type
9 Type of material
10 Flange position

| Name | Type code identification | Meaning |
|---|---|---|
| Design | FN | herborner.F-N |
| Nominal diameter of outlet/pressure side flange | 040 | ø: 1 ½" |
| | 050 | ø: 2" |
| | 065 | ø: 2 ½" |
| | 080 | ø: 3" |
| | 100 | ø: 4" |
| | 125 | ø: 5" |
| | 150 | ø: 6" |
| | 200 | ø: 8" |
| Design dimension | 220 | ø: centering |
| Version | A-Z | Design version |
| | A | Pump to ANSI standard |
| Type | 010 | 1 hp |
| | 015 | 1.5 hp |
| | 020 | 2 hp |
| | 030 | 3 hp |
| | 050 | 5 hp |
| | 075 | 7.5 hp |
| | 100 | 10 hp |
| | 150 | 15 hp |
| | 200 | 20 hp |

| Name | Type code identification | Meaning |
|---|---|---|
| | 250 | 25 hp |
| | 300 | 30 hp |
| | 400 | 40 hp |
| | 500 | 50 hp |
| | 600 | 60 hp |
| | 750 | 75 hp |
| | 1000 | 100 hp |
| Speed | 4 | 1800 rpm |
| Motor type | N | Standard motor |
| | P | Permanent magnet motor |
| | C | Heat exchanger motor |
| Type of material | W2B | See table type of material |
| | W30 | See table type of material |
| | W40 | See table type of material |
| | W60 | See table type of material |
| Flange position | V | Front |
| | VL | Center between front and left |
| | L | Left |
| | HL | Center between rear and left |
| | H | Rear |
| | HR | Center between rear and right |
| | R | Right |
| | VR | Center between front and left |

### Type of material

| Individual parts | W2B | W30 | W40 | W60 |
|---|---|---|---|---|
| Impeller protector | POM/FKM | POM | POM | POM |
| Pump casing | AISI A48-40B [1)] | C90700 | ASTM A351 CF8M | ASTM A890 Grade 1B |
| Intermediate casing | AISI A48-40B [1)] | C90700 | ASTM A351 CF8M | ASTM A890 Grade 1B |
| Casing cover | AISI A48-40B [1)] | C90700 | ASTM A351 CF8M | ASTM A890 Grade 1B |
| Impeller | C95800 | C95800 | ASTM A351 CF8M | ASTM A890 Grade 1B |
| Mechanical seal | SiC/SiC/FKM | SiC/SiC/FKM | SiC/SiC/FKM | SiC/SiC/FKM |
| Carbon Mechanical seal | Chrome steel/ carbon/NBR | Chrome steel/ carbon/NBR | Chrome steel/ carbon/NBR | Chrome steel/ carbon/NBR |
| Seal cover | AISI A48-40B | AISI A48-40B | ASTM A351 CF8M | ASTM A890 Grade 1B |
| Motor shaft | AISI 316Ti | AISI 316Ti | AISI 316Ti or 318LN | AISI 316Ti or 318LN |
| Mechanical seal protector | C95800 | - | - | - |

## 13.9 Torque values

| Thread | Tightening torque (lbf/ft) |
|---|---|
| No. 8 - 32 UNC | 1.3 |
| $^{3}/_{8}$" - 16 UNC | 22 |
| $^{7}/_{16}$" - 14 UNC | 37 |
| $^{5}/_{8}$" - 11 UNC | 89 |
| $^{3}/_{4}$" - 10 UNC | 165 |
| $^{7}/_{8}$" - 9 UNC | 336 |
| 1" - 8 UNC | 406 |
| 1 $^{1}/_{2}$" - 12 UNF | 1254 |
| G $^{3}/_{8}$" | 30 |
| G $^{1}/_{2}$" | 52 |

1) With thick-film coating

# 14 Index

**R**



**S**

**T**



**U**



**V**