

Recirculation Pump for Swimming Pool
Filter Systems

Filtra N

Installation/Operating Manual



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Installation/Operating Manual Filtra N

Original operating manual

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Glossary

Certificate of decontamination

A certificate of decontamination is enclosed by the customer when returning the product to the manufacturer to certify that the product has been properly drained to eliminate any environmental and health hazards arising from components in contact with the fluid handled.

Hydraulic system

The part of the pump in which the kinetic energy is converted into pressure energy

Pump

Machine without drive, additional components or accessories

Pump set

Complete pump set consisting of pump, drive, additional components and accessories

Self-priming ability

Ability of a filled pump to evacuate a suction line, i.e. to self-prime from an unfilled suction line.

1 General

1.1 Principles

This operating manual is valid for the type series and variants indicated on the front cover.


The operating manual describes the proper and safe use of this equipment in all phases of operation.

The name plate indicates the type series, the main operating data and the serial number. The serial number uniquely describes the product and is used as identification in all further business processes.

In the event of damage, immediately contact your nearest KSB service facility to maintain the right to claim under warranty.







1.2 Symbols

Table 1: Symbols used in this manual

Symbol	Description
✓	Conditions which need to be fulfilled before proceeding with the step-by-step instructions
▷	Safety instructions
⇒	Result of an action
⇨	Cross-references
1. 2.	Step-by-step instructions
	Note Recommendations and important information on how to handle the product

1.3 Key to safety symbols/markings

Table 2: Definition of safety symbols/markings

Symbol	Description
 DANGER	DANGER This signal word indicates a high-risk hazard which, if not avoided, will result in death or serious injury.
 WARNING	WARNING This signal word indicates a medium-risk hazard which, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION This signal word indicates a hazard which, if not avoided, could result in damage to the machine and its functions.
	General hazard In conjunction with one of the signal words this symbol indicates a hazard which will or could result in death or serious injury.
	Electrical hazard In conjunction with one of the signal words this symbol indicates a hazard involving electrical voltage and identifies information about protection against electrical voltage.
	Machine damage In conjunction with the signal word CAUTION this symbol indicates a hazard for the machine and its functions.



2 Safety

All the information contained in this section refers to hazardous situations.

In addition to the present general safety information the action-related safety information given in the other sections must be observed.

2.1 General

- This operating manual contains general installation, operating and maintenance instructions that must be observed to ensure safe operation of the system and prevent personal injury and damage to property.
- Comply with all the safety instructions given in the individual sections of this operating manual.
- The operating manual must be read and understood by the responsible specialist personnel/operators prior to installation and commissioning.
- The contents of this operating manual must be available to the specialist personnel at the site at all times.
- Information and markings attached directly to the product must always be complied with and kept in a perfectly legible condition at all times. This applies to, for example:
 - Arrow indicating the direction of rotation
 - Markings for connections
 - Name plate
- The operator is responsible for ensuring compliance with all local regulations not taken into account.

2.2 Intended use

- The pump (set) must only be operated in the fields of application and within the use limits specified in the other applicable documents.
- Only operate pumps/pump sets which are in perfect technical condition.
- Do not operate the pump (set) in partially assembled condition.
- Only use the pump (set) to handle the fluids described in the data sheet or product literature of the pump variant.
- Never operate the pump (set) without the fluid to be handled.
- Observe the minimum flow rate and maximum flow rate indicated in the data sheet or product literature (to prevent overheating, mechanical seal damage, cavitation damage, bearing damage, etc).
- Always operate the pump (set) in the direction of rotation it is intended for.
- Do not throttle the flow rate on the suction side of the pump (to prevent cavitation damage).
- Consult the manufacturer about any use or mode of operation not described in the data sheet or product literature.

2.3 Personnel qualification and training

All personnel involved must be fully qualified to transport, install, operate, maintain and inspect the machinery this manual refers to.

The responsibilities, competence and supervision of all personnel involved in transport, installation, operation, maintenance and inspection must be clearly defined by the operator.

Deficits in knowledge must be rectified by means of training and instruction provided by sufficiently trained specialist personnel. If required, the operator can commission the manufacturer/supplier to train the personnel.

Training on the pump (set) must always be supervised by technical specialist personnel.

2.4 Consequences and risks caused by non-compliance with this manual

- Non-compliance with these operating instructions will lead to forfeiture of warranty cover and of any and all rights to claims for damages.
- Non-compliance can, for example, have the following consequences:
 - Hazards to persons due to electrical, thermal, mechanical and chemical effects and explosions
 - Failure of important product functions
 - Failure of prescribed maintenance and servicing practices
 - Hazard to the environment due to leakage of hazardous substances

2.5 Safety awareness

In addition to the safety information contained in this operating manual and the intended use, the following safety regulations shall be complied with:

- Accident prevention, health regulations and safety regulations
- Explosion protection regulations
- Safety regulations for handling hazardous substances
- Applicable standards, directives and laws

2.6 Safety information for the operator/user

- Fit protective equipment (e.g. contact guards) supplied by the operator for hot, cold or moving parts, and check that the equipment functions properly.
- Do not remove any protective equipment (e.g. contact guards) during operation.
- Provide the personnel with protective equipment and make sure it is used.
- Contain leakages (e.g. at the shaft seal) of hazardous fluids handled (e.g. explosive, toxic, hot) so as to avoid any danger to persons and the environment. Adhere to all relevant laws.
- Eliminate all electrical hazards. (In this respect refer to the applicable national safety regulations and/or regulations issued by the local energy supply companies.)
- If stopping the pump does not increase potential risk, fit an emergency-stop control device in the immediate vicinity of the pump (set) during pump set installation.
- Make sure the system cannot be accessed by unauthorised persons (e.g. children).

2.7 Safety information for maintenance, inspection and installation

- Modifications or alterations of the pump (set) are only permitted with the manufacturer's prior consent.
- Use only original spare parts or parts/components authorised by the manufacturer. The use of other parts/components can invalidate any liability of the manufacturer for resulting damage.
- The operator ensures that maintenance, inspection and installation are performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.
- Only carry out work on the pump (set) during standstill of the pump.
- Only perform work on the pump set when it has been disconnected from the power supply (de-energised).
- The pump (set) must have cooled down to ambient temperature.
- Pump pressure must have been released and the pump must have been drained.

- When taking the pump set out of service always adhere to the procedure described in the manual.
- Decontaminate pumps which handle fluids posing a health hazard.
- As soon as the work has been completed, re-install and re-activate any safety-relevant devices and protective devices. Before returning the product to service, observe all instructions on commissioning. (⇒ Section 6.1, Page 21)

2.8 Unauthorised modes of operation

Never operate the pump (set) outside the limits stated in the data sheet and in this operating manual.


The warranty relating to the operating reliability and safety of the pump (set) supplied is only valid if the equipment is used in accordance with its intended use. (⇒ Section 2.2, Page 7)

3 Transport/Storage/Disposal


3.1 Checking the condition upon delivery

1. On transfer of goods, check each packaging unit for damage.
2. In the event of in-transit damage, assess the exact damage, document it and notify KSB or the supplying dealer and the insurer about the damage in writing immediately.

3.2 Transport

	CAUTION
	<p>Improper pump transport Damage to the pump!</p> <ul style="list-style-type: none"> ▷ Never suspend the pump/pump set from the power cable. ▷ Prevent the pump (set) from getting knocked or dropped.

3.3 Storage/preservation

	CAUTION
	<p>Damage during storage due to frost, humidity, dirt, UV radiation or vermin Corrosion/contamination of the pump!</p> <ul style="list-style-type: none"> ▷ Store the pump (set) in a dry, dark, frost-proof room not exposed to sunlight where the atmospheric humidity is as constant as possible.



Store the pump (set) in a dry, dark, frost-proof room not exposed to sunlight. Under these conditions it does not need additional preservation.

3.4 Return to supplier

1. Drain the pump as per operating instructions. (⇒ Section 7.3, Page 24)
2. Flush and clean the pump, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
3. If the pump has handled fluids whose residues could lead to corrosion damage in the presence of atmospheric humidity or could ignite upon contact with oxygen, the pump must also be neutralised, and anhydrous inert gas must be blown through the pump to ensure drying.
4. Always complete and enclose a certificate of decontamination when returning the pump.
Indicate any safety measures and decontamination measures taken.
(⇒ Section 12, Page 36)

	NOTE
	<p>If required, a blank certificate of decontamination can be downloaded from the following web site: www.ksb.com/certificate_of_decontamination</p>

3.5 Disposal

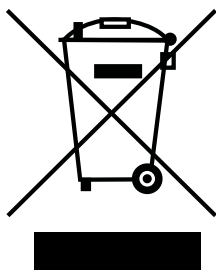
	 WARNING
	<p>Fluids, consumables and supplies posing a health hazard Hazard to persons and the environment!</p> <ul style="list-style-type: none"> ▷ Collect and dispose of any preservatives, flushing liquids and fluid residues. ▷ Wear safety clothing and a protective mask, if required. ▷ Observe all legal regulations on the disposal of fluids posing a health hazard.

1. Dismantle the product.
Collect greases and other lubricants during dismantling.
2. Separate and sort the materials, e.g. by:
 - Metals
 - Plastics
 - Electronic waste
 - Greases and other lubricants
3. Dispose of materials in accordance with local regulations or in another controlled manner.

Electrical or electronic equipment marked with the adjacent symbol must not be disposed of in household waste at the end of its service life.


Contact your local waste disposal partner for returns.

If the used electrical or electronic equipment contains personal data, the operator is responsible for deleting it before the equipment is returned.



4 Description of the Pump (Set)

4.1 General description

	CAUTION
	<p>Unsuitable fluids Damage to the pump!</p> <ul style="list-style-type: none"> ▷ Never use the pump to handle corrosive, combustible or explosive fluids. ▷ Never use the pump to handle waste water or abrasive fluids. ▷ Do not use the pump for foodstuff applications.

- Recirculating pump for swimming pool filtering systems
- Single-stage
- Self-priming
- With integrated filter basket for recirculation and pre-filtering

Pump for handling clear, chlorinated or treated water as well as seawater and brackish water.

4.2 Product information

4.2.1 Product information as per Regulation No. 1907/2006 (REACH)

For information as per European chemicals regulation (EC) No. 1907/2006 (REACH) see <https://www.ksb.com/en-global/company/corporate-responsibility/reach>.

4.2.2 Product information as per Regulation (EU) 2019/1781

Product information as per Regulation (EU) 2019/1781 laying down the ecodesign requirements regarding the ecologically compatible design of glandless circulators integrated in products, see <https://www.ksb.com/de-de/filtraN>



4.3 Designation

Example: Filtra N 6 E

Table 3: Designation key

Code	Description	
Filtra N	Type series	
6	Size / rated flow	
	6	6 m³/h
	8	8 m³/h
	12	12 m³/h
	14	14 m³/h
	18	18 m³/h
	22	22 m³/h
	24	24 m³/h
	30	30 m³/h
E	Drive	
	D	Three-phase motor
	E	Single-phase AC motor

4.4 Name plate

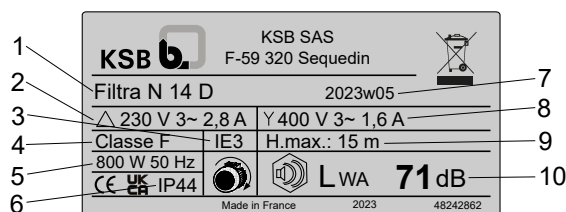


Fig. 1: Name plate (example)

1	Type series, size	6	Enclosure
2	Rated voltage, rated current	7	Production year and production week
3	Energy efficiency class	8	Rated voltage, rated current
4	Thermal class	9	Maximum head
5	Power input (P1), rated frequency	10	Noise characteristic

4.5 Design details

Design

- Centrifugal pump
- Single-stage
- Self-priming
- Horizontal installation
- Integrated pre-filter consisting of a filter basket with intermediate pipe; the filter can be hinged open in the middle to facilitate cleaning.

Drive

- Surface-cooled
- Enclosure IP44
- Thermal class F

Single-phase AC motor:

- 230 V
- Temperature switch with automatic reset and start-up

Three-phase motor:

- 230/400 V

Shaft seal

- Mechanical seal

Bearings

- Motor runs in grease-lubricated rolling element bearings

4.6 Configuration and function

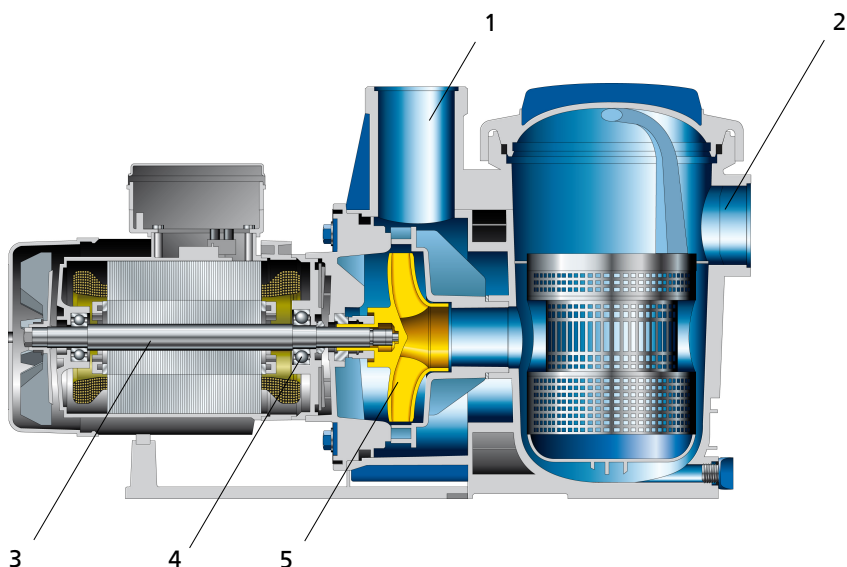


Fig. 2: Sectional drawing

1	Discharge nozzle	2	Suction nozzle
3	Shaft	4	Shaft seal
5	Impeller		

Design The pump is designed with a horizontal fluid inlet and a vertical outlet. The hydraulic system runs in common bearings and is connected to the motor via a shaft.

Function The fluid enters the pump via a suction nozzle (2) and is accelerated outwards by the rotating impeller (7). In the flow passage of the pump casing the kinetic energy of the fluid is converted into pressure energy. The fluid is pumped to the discharge nozzle (1), where it leaves the pump. At the rear side of the impeller, the shaft (3) enters the casing via the casing wall. The shaft passage through the cover is sealed towards the atmosphere with a shaft seal (4). The shaft runs in a rolling element bearing.

Sealing The pump is sealed by a mechanical seal with rotating torque-transmitting elements.

4.7 Noise characteristics

Table 4: Surface sound pressure level L_{wA}

Size	Noise characteristic [dB]
6 E	69
8 E	70
12 E	75
14 E	72
18 E	74
22 E	78
24 E	80
6 D- 8 D	69
12 D	75
14 D	71
18 D	77
22 D	78
24 D	79
30 D	80

4.8 Scope of supply

Depending on the model, the following items are included in the scope of supply:





- Pump set

Accessories

Further required accessories can be purchased from our distributors.

5 Installation at Site

5.1 Safety regulations


	<p>⚠ DANGER</p> <p>Unsuitable electrical installation Danger to life!</p> <ul style="list-style-type: none"> ▷ The electrical installation has to meet the VDE 0100 installation rules (sockets with earthing terminals) ▷ Make sure the electric mains is equipped with a residual current device with a maximum residual current rating of 30 mA. ▷ Always have the electrical connections installed by a trained electrician.
	<p>⚠ DANGER</p> <p>Use in an outdoor area Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Install the pump to IEC 364-7-702 / NFC 15.100 Section 702 at least 3 metres away from the edge of the pool in a location which is protected against flooding, or in an adjacent room which can be entered via a lockable door or trapdoor. ▷ Provide connections between pump and swimming pool which are insulated, e.g. with PVC, or run in metal pipes which are linked with the common earthing conductor of the swimming pool. ▷ Ensure correct installation of the seal element in the terminal box.
	<p>⚠ DANGER</p> <p>Damaged cables and plugs Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Check the cables and power cables for damage before connecting them. ▷ Never connect damaged power cables or damaged plugs.
	<p>⚠ DANGER</p> <p>Damaged terminal box Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Never operate a pump with a damaged terminal box.

5.2 Checks to be carried out prior to installation

Before beginning with the installation check the following:

- All structural work required has been checked and prepared in accordance with the dimensions in the outline drawing.
- The data on the name plate of the pump set has been checked. The pump set must be suitable for operation on the available power supply network.
- The fluid to be handled matches the description of suitable fluids.

5.3 Installing the pump set

	<p>CAUTION</p> <p>Motor overheating due to poor venting Damage to the pump (set)!</p> <p>► Make sure there is a gap of at least 30 mm between the pump (set) and the nearest wall.</p>
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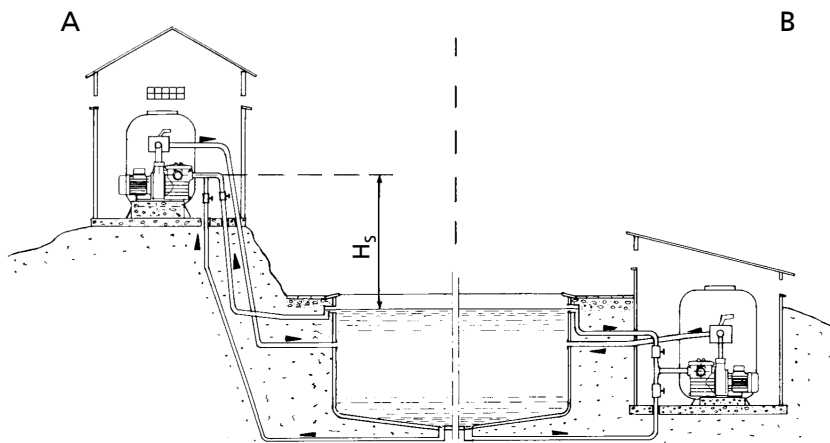



Fig. 3: Installing the pump set

A	Priming	B	Suction head operation
H_s	Suction lift		

	<p>NOTE</p> <p>For operating the pump set in suction lift operation, make sure the suction lift does not exceed 3 metres.</p>
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Install the pump set horizontally in a sufficiently vented, flood-proof room.

Place the pump set on a thin, flexible and non-flammable mat and fasten it to the floor.

Make sure the pump set can be easily accessed for maintenance and repair work.

Required working area The following working area is recommended:

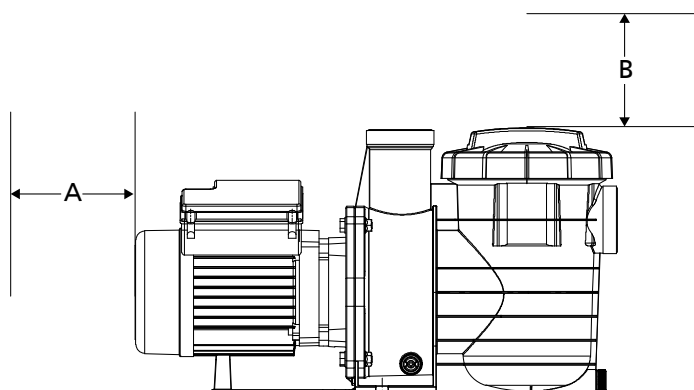




Fig. 4: Required working area

A	80 mm (optimum: 100 mm) for removing and fitting the motor
B	300 mm for replacing the filter

5.4 Connecting the piping

	<div style="background-color: #e67e22; color: white; padding: 5px;"> DANGER</div> <p>Impermissible loads acting on the pump nozzles Danger to life from leakage of hot fluids!</p> <ul style="list-style-type: none"> ▷ Do not use the pump as an anchorage point for the piping. ▷ Anchor the pipes in close proximity to the pump and connect them properly without transmitting any stresses or strains. ▷ Observe the permissible forces and moments at the pump nozzles. ▷ Take appropriate measures to compensate for thermal expansion of the piping.
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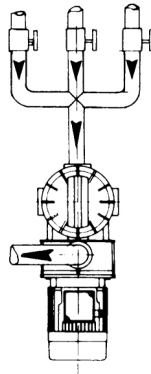





Fig. 5: Connecting the piping


- ✓ A suitable connection type has been chosen.
 - ✓ The diameter of the suction line matches the diameter of the suction nozzle.
 - ✓ The suction line is absolutely tight and laid as short and straight as possible.
1. Thoroughly clean, flush and blow through all vessels, pipelines and connections (especially of new installations).
 2. Seal all pipe connections by means of suitable material (e.g. Teflon tape). Make sure the first threaded ring remains free to ensure that the connections can be screwed on correctly.
 3. Moderately tighten the piping, observing a maximum tightening torque of 50 Nm.

5.5 Connection to power supply


	<div style="background-color: #e67e22; color: white; padding: 5px;"> DANGER</div> <p>Electrical connection work by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Always have the electrical connections installed by a trained and qualified electrician. ▷ Observe regulations IEC 60364 .
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	⚠ WARNING
	Incorrect connection to the mains Damage to the power supply network, short circuit! ▷ Observe the technical specifications of the local energy supply companies.

1. Check the available mains voltage against the data on the name plate.
2. Select an appropriate start-up method.
3. Connect the pump set in accordance with the wiring diagram.
(⇒ Section 9.2, Page 33)


	NOTE
	We recommend to fit a thermal motor protection switch if pumps with three-phase motors are used.


5.6 Priming and venting the pump

	CAUTION
	Increased wear due to dry running Damage to the pump set! ▷ Never operate the pump set without liquid fill.

1. Unscrew the transparent filter lid.
 2. Fill the pump set with the fluid to be handled.
 3. Fit the joint ring on the transparent filter lid.
 4. Screw the filter lid down until it touches the casing.
 5. Fully open all connections.
 6. Start up the pump.
- ⇒ After a few minutes, the pump should be primed and start to deliver fluid. If this is not the case, re-fill the pump.

5.7 Checking the direction of rotation

	⚠ WARNING
	Temperature increase caused by rotating parts Risk of injuries! Damage to the pump set! ▷ Never check the direction of rotation by starting up the unfilled pump set.

	CAUTION
	Direction of rotation of drive and pump Damage to the pump (mechanical seal, motor bearings)! ▷ Refer to the arrow indicating the direction of rotation on the pump set. ▷ Check the direction of rotation. If required, check the electrical connection and correct the direction of rotation.

The correct direction of rotation of the motor and pump is clockwise (seen from the motor end).

1. Start the motor and stop it again immediately to determine the motor's direction of rotation.
2. Check the direction of rotation.
The motor's direction of rotation must match the arrow indicating the direction of rotation on the pump.
3. If the motor is running in the wrong direction of rotation, check the electrical connection of the motor and the control system, if applicable.

6 Commissioning/Start-up/Shutdown



6.1 Commissioning/Start-up

6.1.1 Prerequisites for commissioning/start-up

Before start-up make sure that the following requirements are met:

- The pump set has been installed correctly.
- The pump set has been properly connected to the power supply.
- The operating data and the direction of rotation have been checked.
- All protective equipment has been connected and is operational.
- The fan impeller can be rotated by hand.
- The pump set has been filled.

6.1.2 Start-up

	CAUTION Filter basket missing High wear on the pump (set)! <ul style="list-style-type: none"> ▷ Never operate the pump (set) without a filter basket. ▷ Make sure the filter basket is fitted properly.
	CAUTION Increased wear due to dry running Damage to the pump set! <ul style="list-style-type: none"> ▷ Never operate the pump set without liquid fill.

✓ The pump set has been filled properly.

1. Start up the pump set.

6.2 Operating limits




	! WARNING Non-compliance with operating limits for pressure and temperature Risk of injuries by escaping fluid! <ul style="list-style-type: none"> ▷ Comply with the operating range indicated in the documentation. ▷ Avoid prolonged operation against a closed shut-off element. ▷ Never operate the pump at temperatures exceeding those specified in the data sheet or on the name plate unless the written consent of the manufacturer has been obtained.
---	---

Table 5: Operating limits

Parameter	Value
Maximum operating pressure	2.5 bar
Fluid temperature	0 to +35 °C
Ambient temperature	0 to +60 °C
Voltage/frequency, alternating current	230 V / 50 Hz
Voltage/frequency, three-phase current	230 V / 400 V / 50 Hz
Max. suction lift	3 m
Enclosure	IP 44

6.3 Shutdown/storage/preservation

	<div style="background-color: #f4a460; padding: 5px;">⚠ DANGER</div> <p>Electrical connection work by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Always have the electrical connections installed by a trained and qualified electrician. ▷ Observe regulations IEC 60364 .
	<div style="background-color: #f4a460; padding: 5px;">⚠ DANGER</div> <p>Equipment not de-energised Danger to life!</p> <ul style="list-style-type: none"> ▷ Pull the mains plug / disconnect all electrical connections and secure the equipment against unintentional start-up.

The pump (set) remains installed

- ✓ Sufficient fluid is supplied for the functional check run of the pump.
- 1. For prolonged shutdown periods, start up the pump (set) regularly between once a month and once every three months for approximately five minutes.
 - ⇒ This will prevent the formation of deposits within the pump and the pump intake area.

The pump (set) is removed from the pipe and stored.

- ✓ The pump has been properly drained. (⇒ Section 7.3, Page 24)
 - ✓ The safety instructions for dismantling the pump have been observed.
 - ✓ The permissible ambient temperature for storing the pump is observed.
 - 1. Spray-coat the inside wall of the pump casing and, in particular, the impeller clearance areas with a preservative.
 - 2. Spray the preservative through the suction nozzle and discharge nozzle. It is advisable to then close the pump nozzles (e.g. with plastic caps).
 - 3. Oil or grease all exposed machined parts and surfaces of the pump (with silicone-free oil and grease, food-approved, if required) to protect them against corrosion.
- Observe the additional instructions on preservation.


If the pump set is to be stored temporarily, only preserve the wetted components made of low-alloy materials. Commercially available preservatives (food-approved, if required) can be used for this purpose. Observe the manufacturer's instructions for application/removal.

Observe any additional instructions and information provided. (⇒ Section 3, Page 10)

6.4 Returning to service

For returning the equipment to service observe the sections on commissioning/start-up and the operating limits. (⇒ Section 6.1, Page 21) (⇒ Section 6.2, Page 21)

In addition, carry out all servicing/maintenance operations before returning the pump (set) to service. (⇒ Section 7, Page 24)







	<div style="background-color: #f4a460; padding: 5px;">⚠ WARNING</div> <p>Failure to re-install or re-activate protective devices Risk of injury from moving parts or escaping fluid!</p> <ul style="list-style-type: none"> ▷ As soon as the work is completed, properly re-install and re-activate any safety-relevant devices and protective devices.
---	---

**NOTE**



If the equipment has been out of service for more than one year, replace all elastomer seals.

7 Servicing/Maintenance

7.1 Safety regulations

	<div data-bbox="507 315 683 360">  DANGER </div> <div data-bbox="507 376 1356 488"> <p>Power supply not disconnected Danger to life!</p> <ul style="list-style-type: none"> ▷ Pull the mains plug and secure the pump against unintentional start-up. </div>
	<div data-bbox="507 517 683 562">  DANGER </div> <div data-bbox="507 577 1388 723"> <p>Work on the pump set by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Have pump components modified and dismantled by authorised personnel only. </div>
	<div data-bbox="507 759 703 804">  WARNING </div> <div data-bbox="507 819 1388 958"> <p>Insufficient stability Risk of crushing hands and feet!</p> <ul style="list-style-type: none"> ▷ During assembly/dismantling, secure the pump (set)/pump parts to prevent tilting or tipping over. </div>

7.2 Maintenance/inspection

	<div data-bbox="507 1072 703 1117">  WARNING </div> <div data-bbox="507 1133 1209 1245"> <p>Hot surface Risk of injury!</p> <ul style="list-style-type: none"> ▷ Allow the pump set to cool down to ambient temperature. </div>
---	--

7.3 Drainage/disposal

Undo screws 912 to drain the pump. (⇒ Section 9.1, Page 32)

7.4 Reassembling the pump set

7.4.1 Re-installing the mechanical seal

The following rules must be observed when installing the mechanical seal:

- Work cleanly and accurately.
- Only remove the protective wrapping of the contact faces immediately before installation takes place.
- Prevent any damage to the sealing surfaces or O-rings.

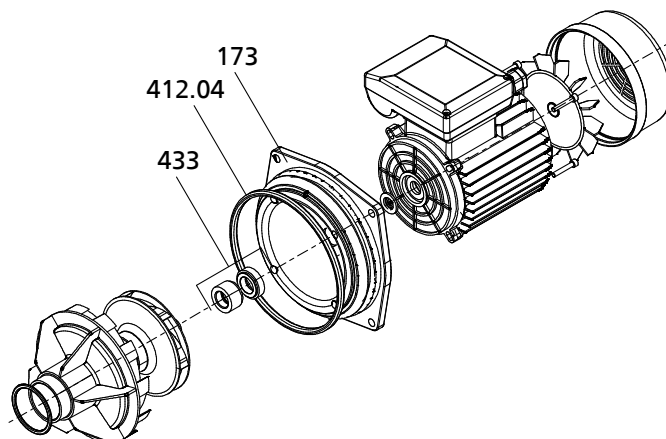


Fig. 6: Re-installing the mechanical seal

- ✓ All disassembled parts have been cleaned and checked for wear.
 - ✓ Any damaged or worn parts have been replaced by original spare parts.
 - ✓ The sealing surfaces have been cleaned.
1. Wet the rubber surfaces of mechanical seal 433 with soapy water to facilitate the assembly.
 2. Fit mechanical seal 433.
 3. Fit diffuser wall 173.
 4. Fit O-ring 412.04 in diffuser wall 173 and make sure it is pressed in properly.

7.4.2 Fitting the impeller

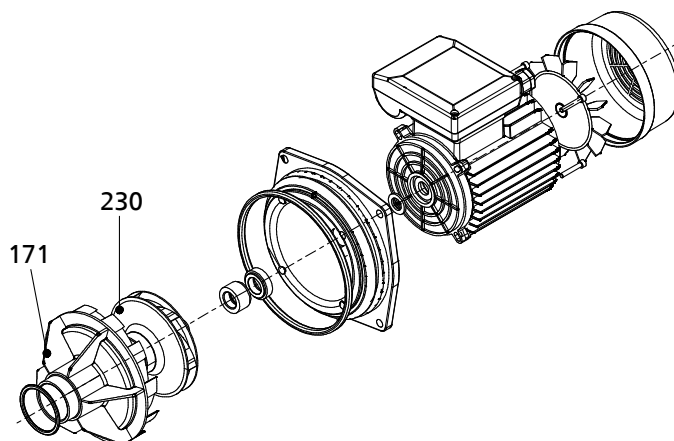



Fig. 7: Fitting the impeller

- ✓ The mechanical seal has been properly installed. (⇒ Section 7.4.1, Page 24)
1. Fit impeller 230 and make sure that the torque-transmitting elements of the mechanical seal are engaged in the recesses of the impeller.
 2. Fit diffuser 171.

7.4.3 Mounting the motor

	⚠ WARNING
	Motor tipping over Risk of crushing hands and feet! ▷ Suspend or support the motor to prevent it from tipping over.

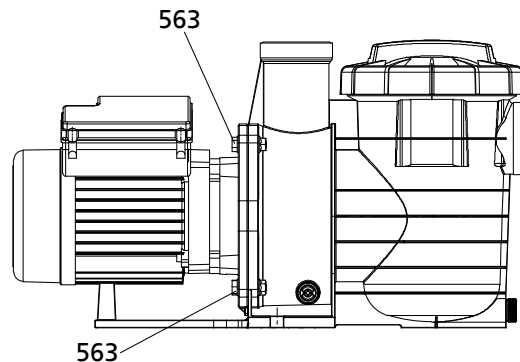





Fig. 8: Mounting the motor

- ✓ The impeller has been fitted as described. (⇒ Section 7.4.2, Page 25)
- 1. Position the motor together with the pump's hydraulic system.
- 2. Fit pins 563.
- 3. Connect the motor to the power supply.

7.5 Dismantling the pump set

7.5.1 General information/Safety regulations

	⚠ WARNING
	Unqualified personnel performing work on the pump (set) Risk of injury! ▷ Always have repair work and maintenance work performed by specially trained, qualified personnel.
	⚠ WARNING
	Hot surface Risk of injury! ▷ Allow the pump set to cool down to ambient temperature.
	⚠ WARNING
	Improper lifting/moving of heavy assemblies or components Personal injury and damage to property! ▷ Use suitable transport devices, lifting equipment and lifting tackle to move heavy assemblies or components.

Observe the general safety instructions and information.

For dismantling and reassembly observe the exploded views and the general assembly drawing. (⇒ Section 9.1, Page 32)



NOTE

All maintenance work, service work and installation work can be carried out by KSB Service or authorised workshops. Find your contact in the attached Addresses booklet or visit <https://www.ksb.com/en-global/contact>.

7.5.2 Dismantling the motor



WARNING

Motor tipping over

Risk of crushing hands and feet!

- ▷ Suspend or support the motor to prevent it from tipping over.

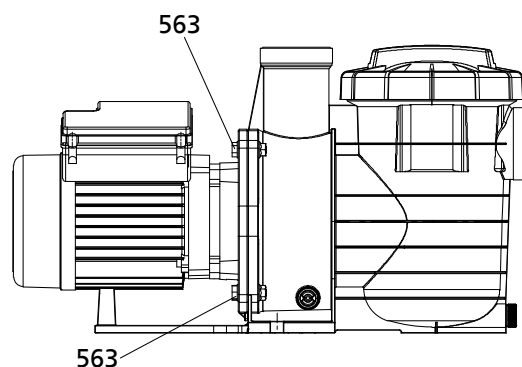


Fig. 9: Dismantling the motor

1. Disconnect the motor from the power supply.
2. Remove pins 563.
3. Lift off the motor together with the pump's hydraulic system.

7.5.3 Dismantling the impeller

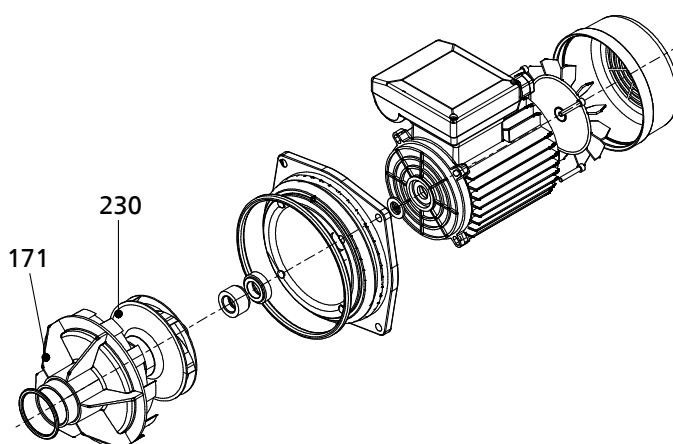


Fig. 10: Dismantling the impeller

✓ The motor has been removed. (⇒ Section 7.5.2, Page 27)

1. Remove diffuser 171.
2. Remove impeller 230.

7.5.4 Dismantling the mechanical seal

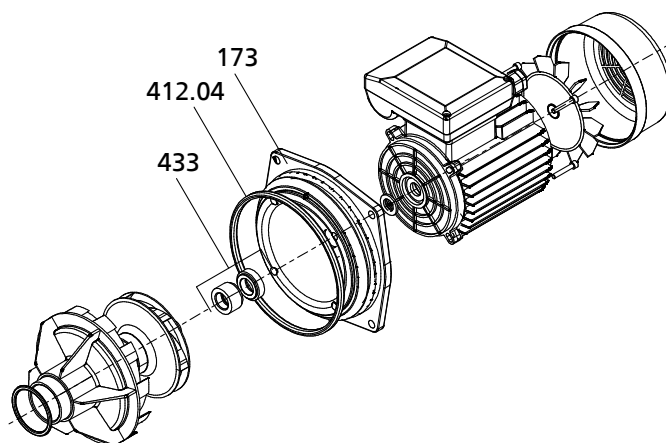


Fig. 11: Dismantling the mechanical seal

✓ The impeller has been removed. (⇒ Section 7.5.3, Page 27)

1. Remove mechanical seal 433.
2. Remove O-ring 412.04 from diffuser wall 173.

7.6 Spare parts stock

7.6.1 Ordering spare parts

Always quote the following data when ordering replacement or spare parts:

- Type series
- Size

Refer to the name plate for all data.

Also specify the following data:

- Quantity of spare parts
- Part No. and description
- Shipping address
- Mode of dispatch (freight, mail, express freight, air freight)



7.6.2 Recommended spare parts stock for 2 years' operation to DIN 24296

Table 6: Quantity of spare parts for recommended spare parts stock

Part No.	Description	Number of pumps (including stand-by pumps)						
		2	3	4	5	6	8	10 and more
321	Rolling element bearing	1	1	1	2	2	2	20 %
433	Mechanical seal	1	1	1	2	2	2	20 %

7.7 Inspection work

7.7.1 Cleaning the filter basket

	<p>WARNING</p> <p>Fluids, consumables and supplies which are hot or pose a health hazard Hazard to persons and the environment!</p> <ul style="list-style-type: none"> ▷ Collect and properly dispose of flushing fluid and any residues of the fluid handled. ▷ Wear safety clothing and a protective mask, if required. ▷ Observe all legal regulations on the disposal of fluids posing a health hazard.
	<p>CAUTION</p> <p>Filter basket missing High wear on the pump (set)!</p> <ul style="list-style-type: none"> ▷ Never operate the pump (set) without a filter basket. ▷ Make sure the filter basket is fitted properly.

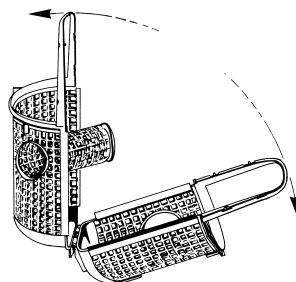




Fig. 12: Filter basket

Make sure the filter basket is cleaned regularly.

1. Unscrew the lid.
2. Remove the filter basket.
3. Hinge the filter basket open in the middle.
4. Remove the intermediate pipe if necessary.
5. Clean all parts.
6. Re-install the intermediate pipe in one half of the filter basket.
7. Close the filter basket.
8. Insert the filter basket into the pump casing. Make sure its installation position (marking) is correct.
9. Press the filter basket firmly into the casing.
10. Re-fill the pump casing with water if required.
11. Check the lid seal and replace if required.
12. Fit the lid seal on the lid and screw the lid down until it will not go any further.

8 Trouble-shooting

	 WARNING
	Improper work to remedy faults Risk of injury! <p>► For any work performed to remedy faults, observe the relevant information given in this operating manual and/or in the product literature provided by the accessories manufacturer.</p>

If problems occur that are not described in the following table, consultation with the KSB service is required.

Table 7: Trouble-shooting

Problem	Possible cause	Remedy ¹⁾
Motor does not start.	Motor protection switch defective or not calibrated properly	Check.
	Correct mains voltage but insufficient voltage at the motor terminals	Replace the power cable of the pump set; make sure core cross-sections are large enough.
	Incorrect motor connection	Observe the wiring diagram.
Pump does not prime.	Suction lift is too high.	Reduce the suction lift.
	Pump casing and suction line not filled completely	Fill completely.
	Air ingress at the transparent lid	Check that the joint ring is fitted properly and provides tight sealing.
	Air ingress at the suction line	Check that the suction line is sealed properly and has been laid with a continuously falling slope (to prevent air pocket formation).
	Wrong direction of rotation (3-phase motor)	Check electrical connections.
	Discharge-side and suction-side shut-off elements fully or partly closed	Fully open the shut-off elements.
Specified performance data are not achieved.	Wrong direction of rotation (3-phase motor)	Check electrical connections.
	Total head smaller than expected	Use pump set with larger head/flow rate or reduce head losses.
	Filter fully or partly clogged	Clean the filter basket
	Excessive pressure losses in the piping	Reduce head losses (use pipelines with larger diameters, reduce the number of pipe elbows).
	Air ingress on the suction side	Check the suction line for tightness.
Mechanical seal leakage	Defective mechanical seal	Check all parts of the mechanical seal; replace them if required.
Motor protection device has tripped	Pump blocked	Check whether the pump can be rotated by hand.
	Pump not running	Check that the room is sufficiently vented.
	Motor is running on two phases only (three-phase motor)	Check electrical connections.
	Wrong direction of rotation (3-phase motor)	Check electrical connections.

¹⁾ Pump pressure must be released before attempting to remedy faults on parts which are subjected to pressure. Disconnect the pump from the power supply and let it to cool down.

Problem	Possible cause	Remedy ¹⁾
Motor protection device has tripped	Impermissible voltage drop	Increase the voltage or increase the conductor cross-section.

9 Related Documents

9.1 Exploded view and list of components

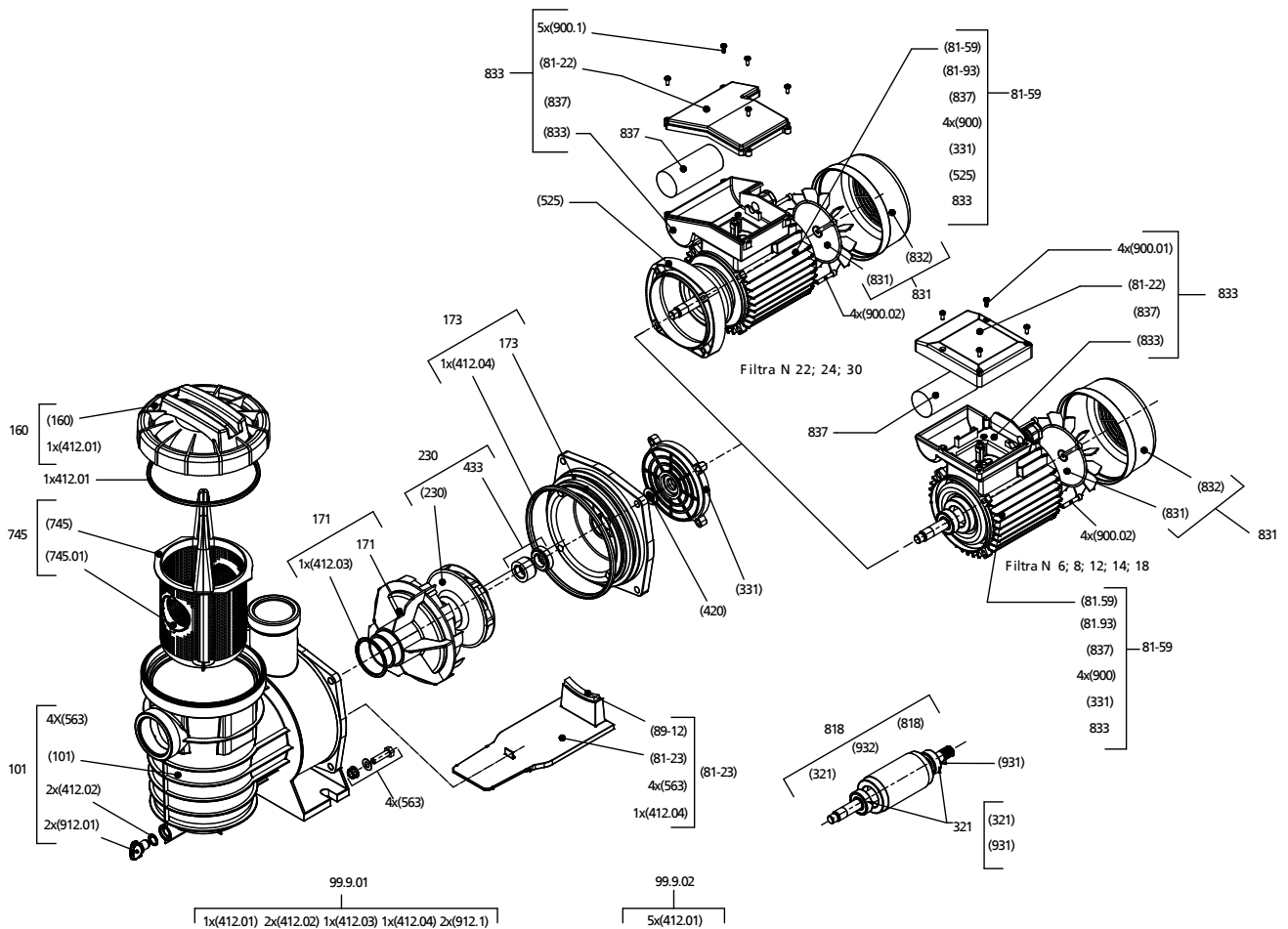


Table 8: List of components

Part No.	Description	Part No.	Description
101	Pump casing	81-23	Support foot
160	Cover	81-59	Stator
171	Diffuser	81-93	Protective switch
173	Diffuser plate	818	Rotor
230	Impeller	831	Fan impeller
321	Radial ball bearing	833	Terminal box
412.01	Bonnet gasket	837	Capacitor
433	Mechanical seal	99-9	Sealing elements and screws
745	Filter basket		

9.2 Wiring diagram

Sizes 6 E, 8 E, 12 E, 14 E and
18 E

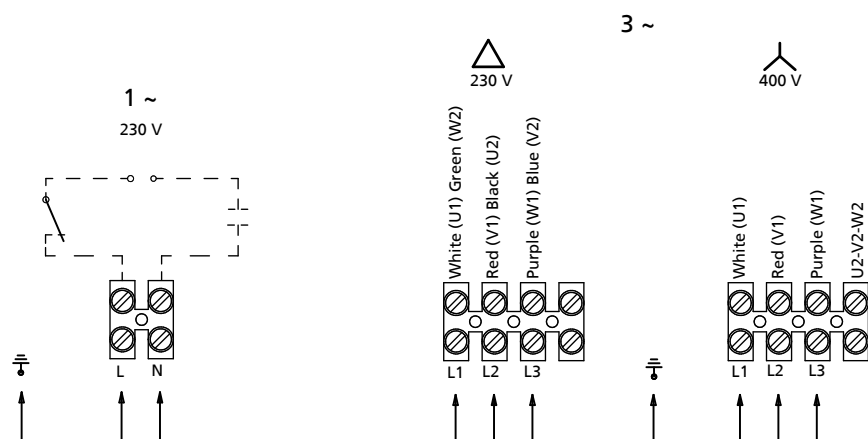


Fig. 14: Wiring diagram (sizes 6 E, 8 E, 12 E, 14 E and 18 E)

Sizes 22 E and 24 E

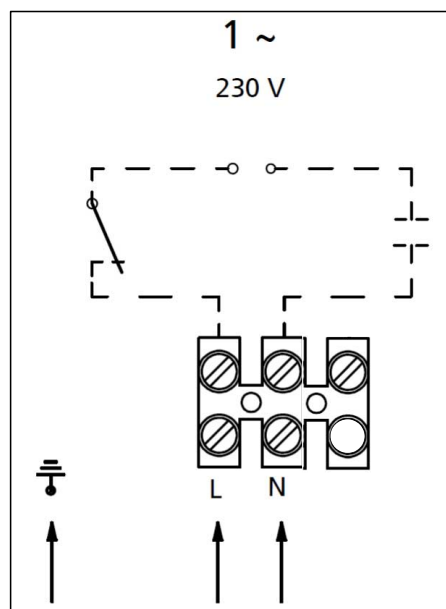


Fig. 15: Wiring diagram of sizes 22 E and 24 E

10 EU Declaration of Conformity

Manufacturer:

KSB S.A.S.
128, rue Carnot,
59320 Sequedin (France)

The manufacturer herewith declares that the product:

Filtra N (E, 1~)

Serial number range: 2023w01 to 2024w52

- is in conformity with the provisions of the following directives / regulations as amended from time to time:
 - 2006/42/EC: Machinery Directive
 - Electrical components²⁾: 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

The manufacturer also declares that

- the following harmonised international standards have been applied:
 - ISO 12100
 - EN 809
 - EN 60034-1, EN 60034-5/A1
 - EN 60335-1/A1, EN 60335-2-41

Person authorised to compile the technical file:

Dr. Frank Obermair
Model-based Product Development
KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

The EU Declaration of Conformity was issued in/on:

Frankenthal, 1 January 2023



Jochen Schaab
Head of Product Development Pump Systems & Drives
KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

² Where applicable

11 EU Declaration of Conformity

Manufacturer:

KSB S.A.S.
128, rue Carnot,
59320 Sequedin (France)

The manufacturer herewith declares that the product:

Filtra N (D, 3~)

Serial number range: 2023w01 to 2024w52

- is in conformity with the provisions of the following directives / regulations as amended from time to time:
 - 2006/42/EC: Machinery Directive
 - Electrical components³⁾: 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

The manufacturer also declares that


- the following harmonised international standards have been applied:
 - ISO 12100
 - EN 809
 - EN 60034-1, EN 60034-5/A1

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Frankenthal, 1 January 2023



Jochen Schaab
Head of Product Development Pump Systems & Drives
KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

³ Where applicable

12 Certificate of Decontamination

Type:
Order number /
Order item number⁴⁾:
Delivery date:
Application:
Fluid handled⁴⁾:

Please tick where applicable⁴⁾:



Corrosive



Oxidising



Flammable



Explosive



Hazardous to health



Seriously hazardous to health



Toxic



Radioactive



Bio-hazardous



Safe

Reason for return⁴⁾:
Comments:
.....

The product / accessories have been carefully drained, cleaned and decontaminated inside and outside prior to dispatch / placing at your disposal.

We herewith declare that this product is free from hazardous chemicals and biological and radioactive substances.

For mag-drive pumps, the inner rotor unit (impeller, casing cover, bearing ring carrier, plain bearing, inner rotor) has been removed from the pump and cleaned. In cases of containment shroud leakage, the outer rotor, bearing bracket lantern, leakage barrier and bearing bracket or intermediate piece have also been cleaned.

For canned motor pumps, the rotor and plain bearing have been removed from the pump for cleaning. In cases of leakage at the stator can, the stator space has been examined for fluid leakage; if fluid handled has penetrated the stator space, it has been removed.

- ☐ No special safety precautions are required for further handling.
☐ The following safety precautions are required for flushing fluids, fluid residues and disposal:

.....
.....

We confirm that the above data and information are correct and complete and that dispatch is effected in accordance with the relevant legal provisions.

.....
Place, date and signature

.....
Address

.....
Company stamp

⁴ Required field

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