

Recirculation Pump for Swimming Pool
Filter Systems

Filtra N

Installation/Operating Manual



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Installation/Operating Manual Filtra N

Original operating manual

KSB Aktiengesellschaft

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Contents

	Glossary	5
1	General	6
1.1	Principles	6
1.2	Symbols	6
2	Safety	7
2.1	Key to safety symbols/markings	7
2.2	General	7
2.3	Intended use	7
2.4	Personnel qualification and training	8
2.5	Consequences and risks caused by non-compliance with these operating instructions	8
2.6	Safety awareness	8
2.7	Safety information for the operator/user	8
2.8	Safety information for maintenance, inspection and installation work	9
2.9	Unauthorised modes of operation	9
3	Transport/Temporary Storage/Disposal	10
3.1	Checking the condition upon delivery	10
3.2	Transport	10
3.3	Storage/Preservation	10
3.4	Return to supplier	10
3.5	Disposal	11
4	Description of the Pump (Set)	12
4.1	General description	12
4.2	Designation	12
4.3	Name plate	12
4.4	Design details	12
4.5	Configuration and function	13
4.6	Noise characteristics	14
4.7	Scope of supply	14
5	Installation at Site	15
5.1	Safety regulations	15
5.2	Checks to be carried out prior to installation	15
5.3	Installing the pump set	16
5.4	Connecting the piping	16
5.5	Connection to power supply	17
5.6	Priming and venting the pump	18
5.7	Checking the direction of rotation	18
6	Commissioning/Start-up/Shutdown	19

6.1	Commissioning/start-up	19
6.2	Operating limits	19
6.3	Shutdown/storage/preservation	20
6.4	Returning to service	20
7	Servicing/Maintenance	21
7.1	Safety regulations	21
7.2	Servicing/maintenance/inspection	21
7.3	Spare parts stock	26
7.4	Drainage/disposal	26
8	Trouble-shooting	27
9	Related Documents	28
9.1	Exploded view and list of components	28
9.2	Wiring diagram	29
10	EC Declaration of Conformity	30
11	Certificate of Decontamination	31
	Index	32

Glossary

Cavitation damage

Material of the pump internals is destroyed by imploding vapour bubbles.

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

Noise characteristics

The noise emission to be expected, indicated as sound pressure level L_{pA} in dB(A)

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 supplied as an integral part of the type series and variants indicated on the front cover. The manual describes the proper and safe use of this equipment in all phases of operation.


The name plate indicates the type series/size and main operating data. The serial/series number uniquely identify the system and serve as identification in all further business processes.

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

Noise characteristics(⇒ Section 4.6 Page 14)

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







2 Safety

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



2.1 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.

2.2 General

This manual contains general installation, operating and maintenance instructions that must be observed to ensure safe pump operation and prevent personal injury and damage to property.

The safety information in all sections of this manual must be complied with.

This manual must be read and completely understood by the specialist personnel/operators responsible prior to installation and commissioning.

The contents of this manual must be available to the specialist personnel at the site at all times.

Information attached directly to the pump must always be complied with and be 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 in this manual.

2.3 Intended use

The pump (set) must only be operated within the operating limits described 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 to handle the fluids described in the data sheet or product literature of the pump model.
- Never operate the pump without the fluid handled.
- Observe the minimum flow rates indicated in the data sheet or product literature (to prevent overheating, bearing damage, etc).

- Observe the maximum flow rates indicated in the data sheet or product literature (to prevent overheating, mechanical seal damage, cavitation damage, bearing damage, etc).
- 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.

Prevention of foreseeable misuse

- Never open discharge-side shut-off elements further than permitted.
 - The maximum flow rate specified in the data sheet or product literature would be exceeded.
 - Risk of cavitation damage
- Never exceed the permissible operating limits specified in the data sheet or product literature regarding pressure, temperature, etc.
- Observe all safety information and instructions in this manual.

2.4 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.

2.5 Consequences and risks caused by non-compliance with these operating instructions

- 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

2.6 Safety awareness

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

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

2.7 Safety information for the operator/user

- Fit contact guards supplied by the operator for hot, cold or moving parts, and check that the guards function properly.
- Do not remove any 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 shutting down 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).

2.8 Safety information for maintenance, inspection and installation work

- Modifications or alterations of the pump are only permitted with the manufacturer's prior consent.
- Use only original spare parts or parts authorised by the manufacturer. The use of other parts can invalidate any liability of the manufacturer for resulting damage.
- The operator ensures that all maintenance, inspection and installation work is 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.
- The pump casing 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 is completed, re-install and/or re-activate any safety-relevant and protective devices. Before returning the product to service, observe all instructions on commissioning.(⇒ Section 6.1 Page 19)

2.9 Unauthorised modes of operation

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


The warranty relating to the operating reliability and safety of the supplied pump (set) is only valid if the equipment is used in accordance with its intended use.(⇒ Section 2.3 Page 7)

3 Transport/Temporary 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 (as applicable) and the insurer about the damage in writing immediately.

3.2 Transport

	<div style="background-color: yellow; padding: 5px;">CAUTION</div> <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.
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3.3 Storage/Preservation

	<div style="background-color: yellow; padding: 5px;">CAUTION</div> <p>Damage during storage by 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.
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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 7.4 Page 26)
2. Always flush and clean the pump, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
3. If the fluids handled by the pump set leave residues which might lead to corrosion damage when coming into contact with atmospheric humidity, or which might ignite when coming into contact with oxygen, the pump set must also be neutralised, and anhydrous inert gas must be blown through the pump for drying purposes.
4. Always complete and enclose a certificate of decontamination when returning the pump (set).
Always indicate any safety and decontamination measures taken.(⇒ Section 11 Page 31)

	<div style="background-color: #0070C0; color: white; padding: 5px;">NOTE</div> <p>If required, a blank certificate of decontamination can be downloaded from the KSB web site at: www.ksb.com/certificate_of_decontamination</p>
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3.5 Disposal

	⚠ WARNING
	Fluids, consumables and supplies which are hot or pose a health hazard Hazard to persons and the environment! <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.

1. Dismantle the pump (set).
Collect greases and other lubricants during dismantling.
2. Separate and sort the pump 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.

4 Description of the Pump (Set)

4.1 General description

	<p>CAUTION</p> <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.
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- 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 Designation

Example: Filtra N 6 E

Table 3: Key to the designation

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

4.3 Name plate

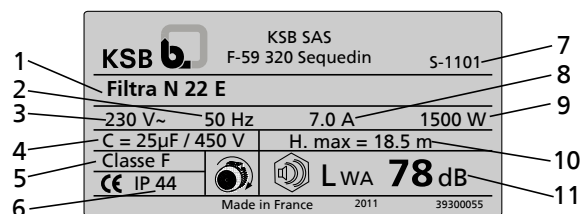


Fig. 1: Name plate (example)

1	Type series, size	2	Rated frequency
3	Rated voltage	4	Capacitor capacity
5	Thermal class	6	Enclosure
7	Serial number S = series, 11 = year of construction 2011, 01 = week 01	8	Rated current
9	Rated power	10	Maximum head
11	Sound power [dB]		

4.4 Design details

Design

- Single-stage, self-priming centrifugal pump
- 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

- 230 V single-phase a.c. motor, protected by a temperature switch with automatic reset.
- Three-phase motor 230/400 V
- Surface-cooled
- Enclosure IP 44
- Thermal class F

Shaft seal

- Mechanical seal

Bearings

- Motor runs in grease-lubricated rolling element bearings

4.5 Configuration and function

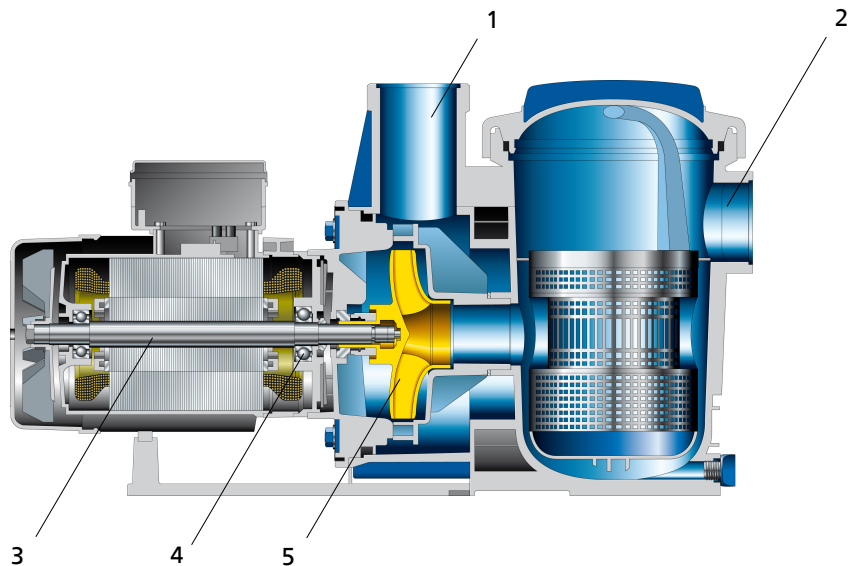


Fig. 2: Sectional drawing

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.

4.6 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

4.7 Scope of supply





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

- Pump set

Accessories 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"> ▷ Make sure the electrical installation meets the VDE 0100 installation rules (i.e. sockets with earthing terminals). ▷ Make sure the electric mains is equipped with a residual current device of maximum 30 mA. ▷ Always have the electrical connections installed by a trained and qualified 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 installing the pump make sure that the following requirements are met:

- Check the data on the name plate of the pump to make sure it can be operated on the available mains.
- The fluid to be handled matches the description of suitable fluids.
- The above safety instructions have been complied with.

5.3 Installing the pump set

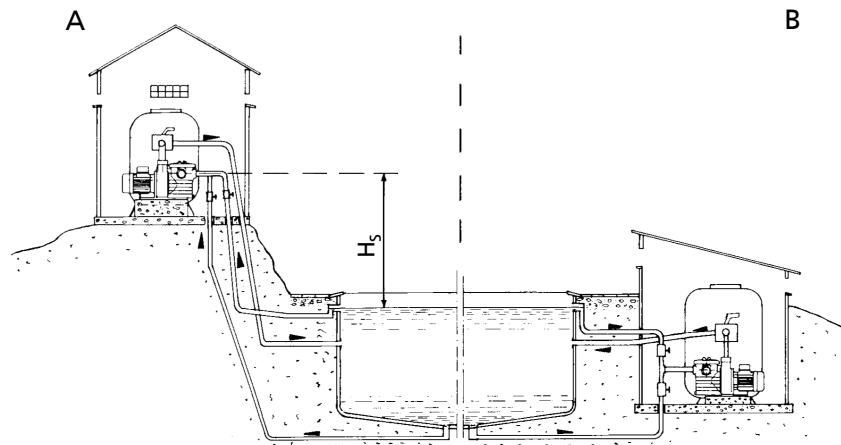


Fig. 3: Filtra N installation

A	Suction lift operation	B	Suction head operation
H _s	Suction lift		



NOTE

For operating the pump set in suction lift operation, make sure the suction lift does not exceed 3 metres.



CAUTION

Motor overheating due to poor venting
Damage to the pump (set)!

- ▷ Make sure there is a gap of at least 30 mm between the pump (set) and the nearest wall.

Install the pump set horizontally in a sufficiently vented, flood-proof room.

Install the pump set on a thin rubber mat and fasten it to the floor.

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

5.4 Connecting the piping



DANGER

Impermissible loads acting on the pump nozzles
Danger to life from leakage of hot fluids!

- ▷ Do not use the pump as an anchorage point for the piping.
- ▷ Anchor the pipelines in close proximity to the pump and connect them without transmitting any stresses or strains.
- ▷ Observe the permissible forces and moments at the pump nozzles.
- ▷ Take appropriate measures to compensate any thermal expansion of the piping.

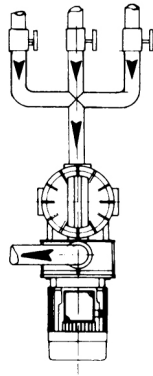






Fig. 4: Connecting the piping

- ✓ 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: #f4a460; padding: 5px;">⚠ DANGER</div> <p>Work on the pump set 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 (DIN VDE 0100).
	<div style="background-color: #f4a460; padding: 5px;">⚠ WARNING</div> <p>Incorrect connection to the mains Damage to the mains network, short circuit!</p> <ul style="list-style-type: none"> ▸ Observe the technical specifications of the local energy supply companies.
	<div style="background-color: #0070c0; color: white; padding: 5px;">NOTE</div> <p>We recommend to fit a thermal motor protection switch if pumps with three-phase motors are used.</p>


5.6 Priming and venting the pump

	CAUTION
	<p>Increased wear due to dry running Damage to the pump set!</p> <ul style="list-style-type: none"> ▷ 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
	<p>Temperature increase caused by rotating parts Risk of injuries! Damage to the pump set!</p> <ul style="list-style-type: none"> ▷ Never check the direction of rotation by starting up the unfilled pump set.

	CAUTION
	<p>Drive and pump running in the wrong direction of rotation Damage to the pump!</p> <ul style="list-style-type: none"> ▷ Refer to the arrow indicating the direction of rotation on the pump. ▷ 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 runs 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

	<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.
	<p>CAUTION</p> <p>Increased wear due to dry running Damage to the pump set!</p> <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




	<p>⚠ WARNING</p> <p>Non-compliance with operating limits for pressure and temperature Hot fluid may escape!</p> <ul style="list-style-type: none"> ▸ Comply with the operating range indicated in the technical product literature. ▸ Avoid prolonged operation against a closed shut-off element.
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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

	<p>⚠ DANGER</p> <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 (DIN VDE 0100).
	<p>⚠ DANGER</p> <p>Power supply not disconnected Danger to life!</p> <ul style="list-style-type: none"> ▷ Pull the mains plug or disconnect all electrical connections and secure against unintentional start-up.

The pump (set) remains installed

✓ Sufficient fluid is supplied for the operation check run of the pump.

1. Start up the pump (set) regularly between once a month and once every three months for approximately five minutes during prolonged shutdown periods. This will prevent the formation of deposits within the pump and the pump intake area.

The pump (set) is removed and stored

✓ The pump has been properly drained (⇒ Section 7.4 Page 26) and the safety instructions for dismantling the pump have been 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 and discharge nozzles. It is advisable to then close the pump nozzles (e.g. with plastic caps or similar).
3. Oil or grease all exposed machined parts and surfaces of the pump (with silicone-free oil or grease, food-approved, if required) to protect them against corrosion.
Observe the additional instructions.(⇒ Section 7.2.2.1 Page 22)



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 pump to service observe the sections on commissioning/start-up (⇒ Section 6.1 Page 19) and the operating limits.(⇒ Section 6.2 Page 19)

In addition, carry out all servicing/maintenance operations before returning the pump (set) to service.(⇒ Section 7 Page 21)


	<p>⚠ WARNING</p> <p>Failure to re-install or re-activate protective devices Risk of personal injury from moving parts or escaping fluid!</p> <ul style="list-style-type: none"> ▷ As soon as the work is complete, re-install and/or re-activate any safety-relevant and protective devices.
	<p>NOTE</p> <p>If the pump has been out of service for more than one year, replace all elastomer seals.</p>

7 Servicing/Maintenance

7.1 Safety regulations

	<p>⚠ DANGER</p> <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.
	<p>⚠ DANGER</p> <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.
	<p>⚠ WARNING</p> <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 tipping or falling over.

7.2 Servicing/maintenance/inspection

	<p>⚠ WARNING</p> <p>Hot surface Risk of injury!</p> <ul style="list-style-type: none"> ▸ Allow the pump set to cool down to ambient temperature.
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7.2.1 Inspection work

7.2.1.1 Cleaning the filter basket

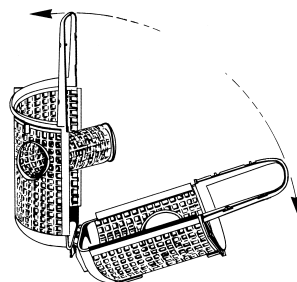



Fig. 5: Filter basket


Make sure the filter basket is cleaned regularly.


	<div style="background-color: #FFD700; padding: 5px;">CAUTION</div> <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.
---	--


1. Unscrew the transparent 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 it is positioned correctly. (Observe the marking.)
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 it, if required.
12. Fit the lid seal on the lid and screw the lid down until it will not go any further.

7.2.2 Dismantling the pump set

7.2.2.1 General information/Safety regulations


	<div style="background-color: #FFA500; padding: 5px;">⚠ WARNING</div> <p>Unqualified personnel performing work on the pump (set) Risk of injury!</p> <ul style="list-style-type: none"> ▷ Always have repair and maintenance work performed by specially trained, qualified personnel.
---	---

	<div style="background-color: #FFA500; padding: 5px;">⚠ WARNING</div> <p>Hot surface Risk of injury!</p> <ul style="list-style-type: none"> ▷ Allow the pump set to cool down to ambient temperature.
---	--

	<div style="background-color: #FFA500; padding: 5px;">⚠ WARNING</div> <p>Improper lifting/moving of heavy assemblies or components Personal injury and damage to property!</p> <ul style="list-style-type: none"> ▷ 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 28)

	<div style="background-color: #0070C0; color: white; padding: 5px;">NOTE</div> <p>All maintenance, service and installation work can be carried out by KSB Service or authorised workshops. Find your contact in the attached "Addresses" booklet or on the Internet at "www.ksb.com/contact".</p>
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7.2.2.2 Dismantling the motor



⚠ WARNING

Motor tipping over

Risk of crushing hands and feet!

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

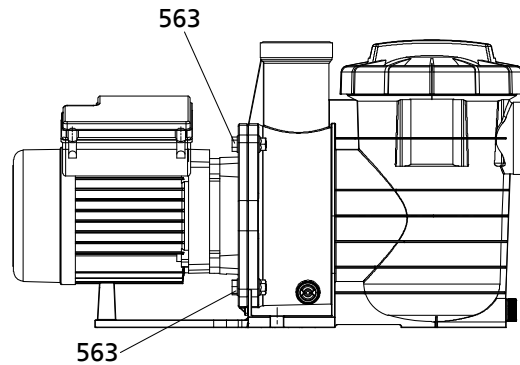


Fig. 6: Dismantling the motor

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

7.2.2.3 Dismantling the impeller

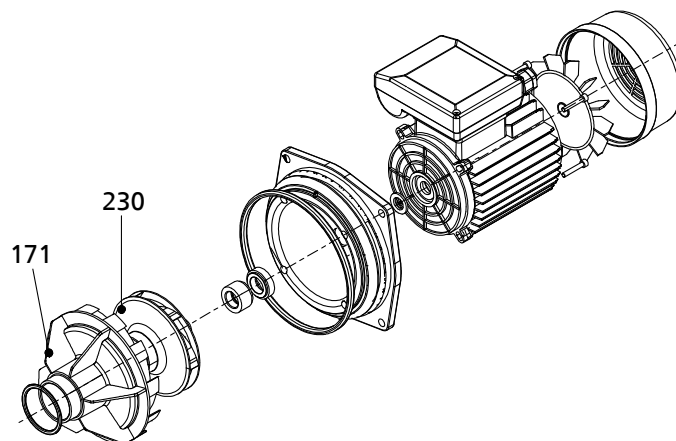


Fig. 7: Dismantling the impeller

✓ The motor has been removed. (⇒ Section 7.2.2.2 Page 23)

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

7.2.2.4 Dismantling the mechanical seal

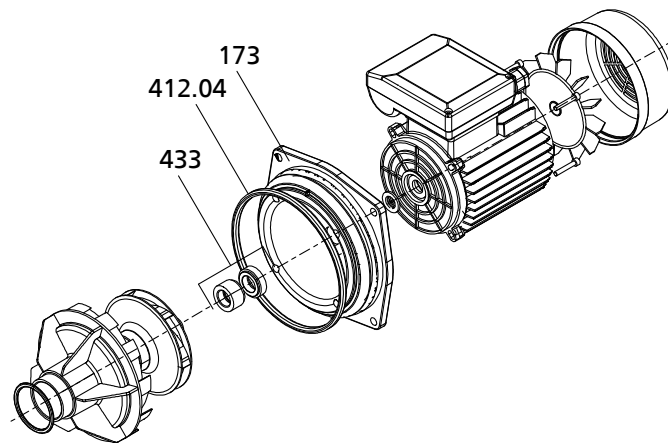


Fig. 8: Dismantling the mechanical seal

✓ The impeller has been removed. (⇒ Section 7.2.2.3 Page 23)

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

7.2.3 Reassembling the pump set

7.2.3.1 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.

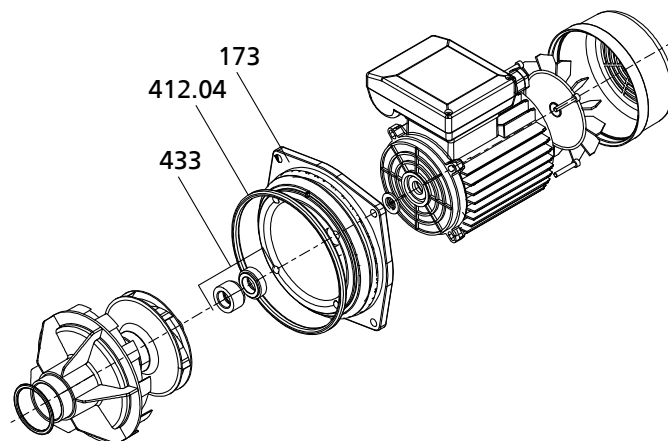


Fig. 9: Re-installing the mechanical seal

- ✓ 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.

7.2.3.2 Fitting the impeller

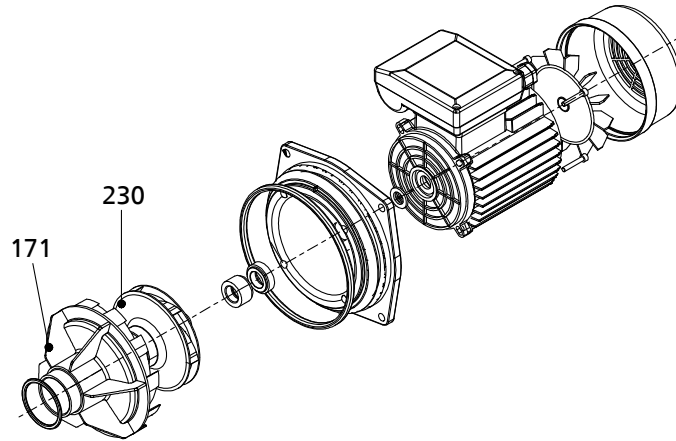


Fig. 10: Fitting the impeller

- ✓ The mechanical seal has been properly installed.(⇒ Section 7.2.3.1 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.

7.2.3.3 Mounting the motor



⚠ WARNING

Motor tipping over

Risk of crushing hands and feet!

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

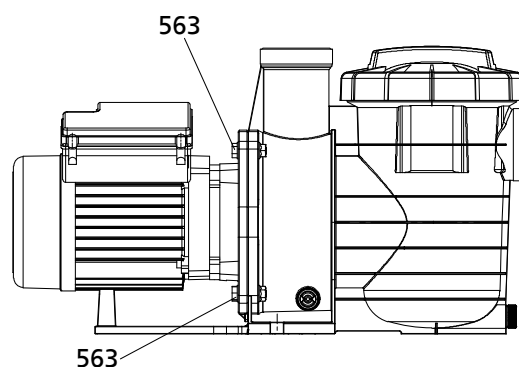


Fig. 11: Mounting the motor

- ✓ The impeller has been fitted as described.(⇒ Section 7.2.3.2 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.

7.3 Spare parts stock

7.3.1 Ordering spare parts

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

- Pump type
- Pump size

Refer to the name plate for all data.

Also supply the following data:

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

Refer to the general assembly drawing for part numbers and descriptions.

7.3.2 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 %

7.4 Drainage/disposal

Undo screws 912 to drain the pump.(⇒ Section 9.1 Page 28)

8 Trouble-shooting

Table 7: Trouble-shooting

Fault/Malfunction	Causes	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.
	Impermissible voltage drop	Increase the voltage or increase the core cross-sections.

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 allow it to cool down.

9 Related Documents

9.1 Exploded view and list of components

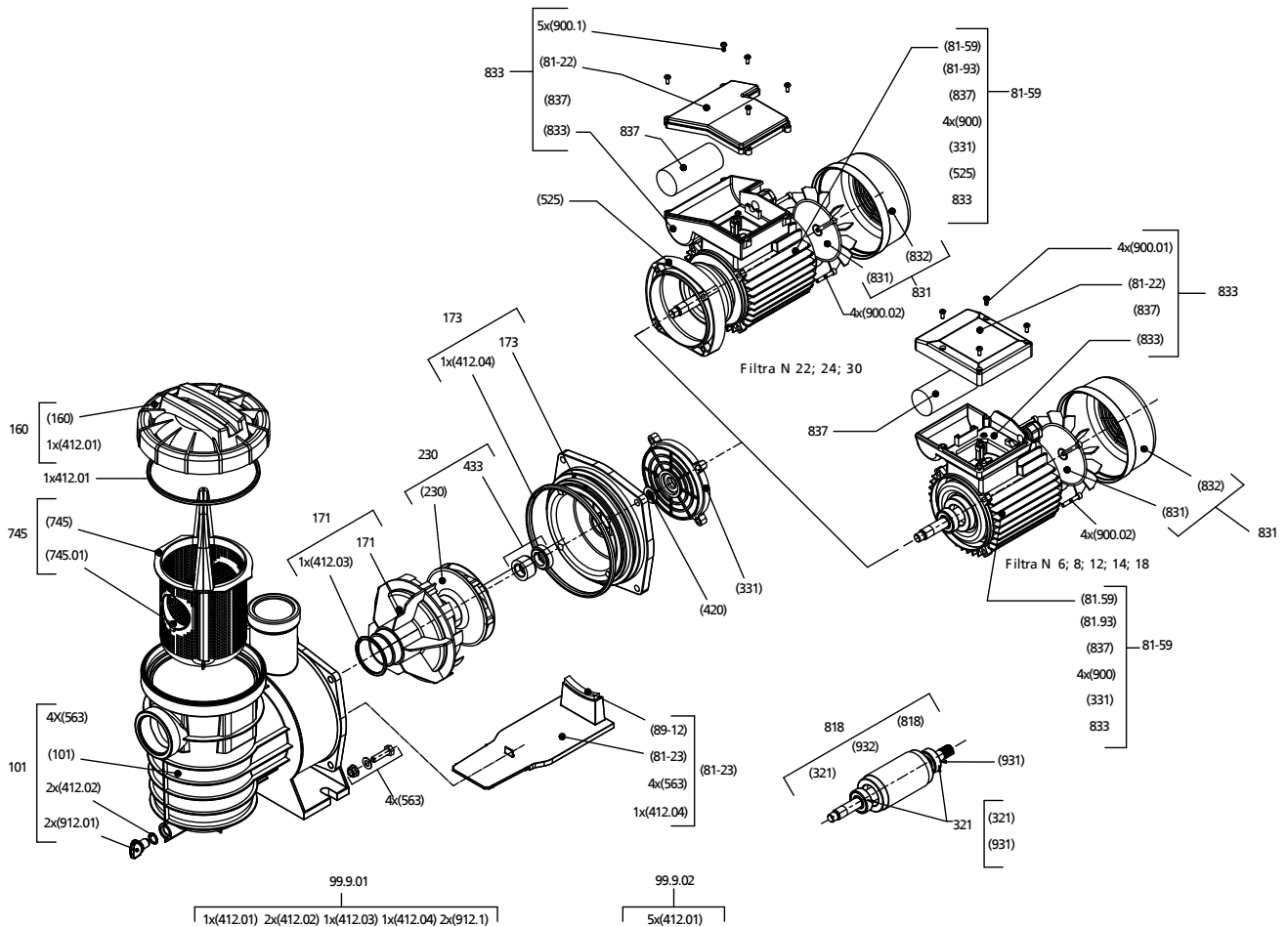


Fig. 12: Exploded view

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 wall	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

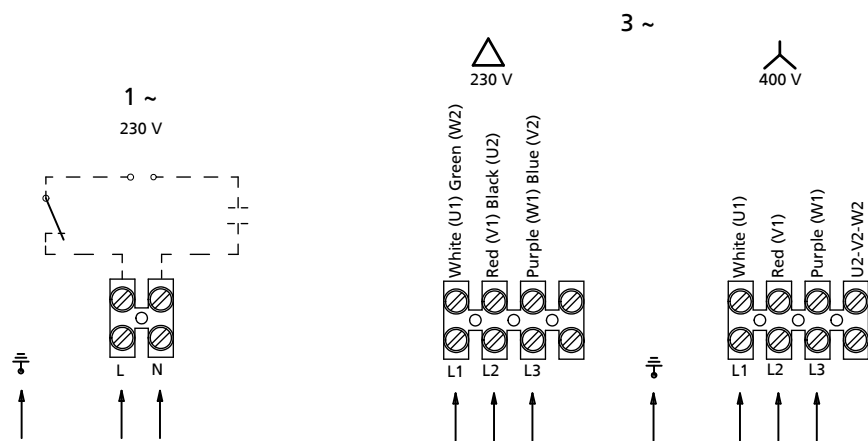


Fig. 13: Wiring diagram

10 EC Declaration of Conformity

Manufacturer:

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

The manufacturer herewith declares that the product:

Filtra N

Series code: S 1001 - S 1452

- is in conformity with the provisions of the following Directives as amended from time to time:
 - Pump (set): Machinery Directive 2006/42/EC

The manufacturer also declares that

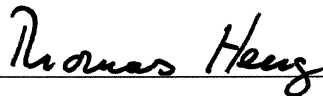
- the following harmonised international standards have been applied:
 - ISO 12100
 - EN 809/A1,
 - EN 60034-1, EN 60034-5/A1,
 - EN 60335-1/A1, EN 60335-2-41

Person authorised to compile the technical file:

Martial Smis
Head of Design/Engineering
KSB S.A.S.
128, rue Carnot,
59320 Sequedin/Lille (France)

The EC Declaration of Conformity was issued in/on:

Frankenthal, 1 March 2011



Thomas Heng
Head of Product Development
Submersible Pumps
KSB Aktiengesellschaft
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

11 Certificate of Decontamination

Type
 Order number/
 Order item number²⁾

Delivery date

Field of application:

Fluid pumped²⁾:

Please tick where applicable²⁾:



☐ Radioactive



☐ Explosive



☐ Corrosive



☐ Toxic



☐ Harmful



☐ Bio-hazardous



☐ Highly flammable



☐ Safe

Reason for return²⁾:

Comments:

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

We hereby declare that this product is free from hazardous chemicals, biological or radioactive substances.

On seal-less pumps, the rotor has been removed from the pump for cleaning.

- ☐ 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

²⁾ Required fields

Index

B

Bearings 13

C

Certificate of decontamination 31
Commissioning/Start-up 19

D

Design 12
Direction of rotation 18
Dismantling 22
Disposal 11

I

Intended use 7

M

Misuse 8

N

Noise characteristics 14

O

Operating limits 7

P

Preservation 20
Product description 12

R

Reassembly 22
Return to supplier 10
Returning to service 20

S

Safety 7
Safety awareness 8
Scope of supply 14
Shaft seal 13
Shutdown 20
Spare parts stock 26
Storage 20

T

Trouble-shooting 27



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