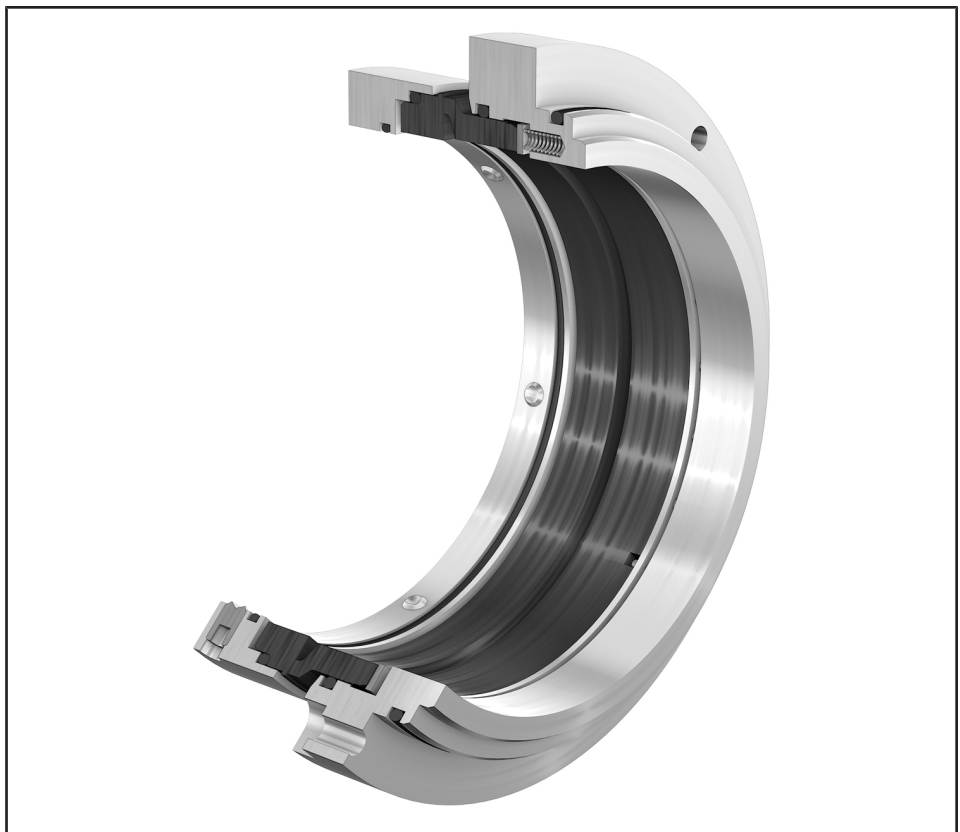


KSB Mechanical Seal

4STC

For the Amarex KRT, Sewatec and Amacan Type Series

Installation/Operating Manual



Legal information/Copyright

Installation/Operating Manual 4STC

Original operating manual

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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 order number and order item number of the pump clearly identify the mechanical seal via the corresponding material number in the pump's parts list and serve as identification for all further business processes.

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

For any queries contact LPC_Mechanical.Seals@ksb.com

1.2 Target group

This operating manual is aimed at the target group of trained and qualified specialist technical personnel.

1.3 Other applicable documents


Table 1: Overview of other applicable documents

Document	Contents
Data sheet	Description of the technical data of the pump (set) in which the mechanical seal is installed.
General assembly drawing ¹⁾	Description of the mechanical seal as part of the sectional drawing of the pump
Sub-supplier product literature ¹⁾	Operating manuals and other product literature describing accessories and integrated machinery components

For accessories and/or integrated machinery components, observe the relevant manufacturer's product literature.

1.4 Symbols










Table 2: 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 If agreed to be included in the scope of supply

1.5 Key to safety symbols/markings

Table 3: 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.
	Explosion protection This symbol identifies information about avoiding explosions in potentially explosive atmospheres in accordance with EU Directive 2014/34/EU (ATEX).
	Explosion protection This symbol identifies information about avoiding explosions in potentially explosive atmospheres in accordance with the <i>Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016</i> .
	Explosion protection This symbol identifies information about avoiding explosions in potentially explosive atmospheres in accordance with Technical Regulation TP TC 012/2011.
	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
 - Fitting direction
- The operator is responsible for ensuring compliance with all local regulations not taken into account.

2.2 Intended use

- This product must only be operated within the limit values stated in the technical product literature for the ambient temperature, fluid handled, speed, density, pressure, temperature and in compliance with any other instructions provided in the operating manual or other applicable documents.

2.3 Personnel qualification and training

- All personnel involved must be fully qualified to install, operate, maintain and inspect the product 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 product must always be supervised by specialist technical 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 user/operator

- 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 of hazardous fluids (e.g. explosive, toxic, hot) so as to avoid any danger to persons and the environment. Observe all legal requirements.
- The design of mechanical seals always produces a small amount of leakage.
- Higher leakage may occur especially in the running-in phase. The leakage must be drained off in a controlled way

2.7 Safety information for maintenance, inspection and installation

- Modifications or alterations of the mechanical seal require 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 mechanical seal when the shaft is not rotating.

For mechanical seals installed in pump sets:

- 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.
- Observe the relevant sections of the corresponding pump operating manual.

2.8 Unauthorised modes of operation

Never operate the mechanical seal outside the limits stated in the data sheet and in this operating manual.

The warranty relating to the operating reliability and safety of the mechanical seal supplied is only valid if the mechanical seal is used in accordance with its intended use.


Any damage caused by dry running shall be excluded from the warranty.

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


	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Improper transport Damage to the mechanical seal!</p> <ul style="list-style-type: none"> ▷ Only transport the mechanical seal in suitable packaging. ▷ Observe the weights, symbols and instructions indicated on the packaging. ▷ Use suitable, approved lifting accessories.
---	---

KSB's standard packaging is suitable for dry transport ,e.g. by truck, rail, air. Special packaging can be provided if specified in the contractual agreement.

	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Removing transport locks too early Damage to previously locked components during transport!</p> <ul style="list-style-type: none"> ▷ If transport locks are fitted, do not remove them too early.
--	--

3.3 Storage/preservation

	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Improper storage Damage due to humidity, vermin, corrosion and contamination!</p> <ul style="list-style-type: none"> ▷ Avoid outdoor storage. ▷ Observe, check and record the storage conditions. ▷ Regularly check the packaging for any damage. ▷ Regularly check the humidity indicator of shrink-wrapped objects. The relative humidity should be < 50 %. ▷ If the relative humidity indicated for shrink-wrapped objects > 50 %, have the equipment repacked by the manufacturer.
	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Improper storage Impairment of O-rings' sealing function!</p> <ul style="list-style-type: none"> ▷ Do not store O-rings together with chemicals, solvents, fuels, acids, etc. ▷ Protect O-rings from light, in particular from direct sun exposure and strong artificial light high in ultraviolet rays. ▷ Check the O-rings for damage before they are fitted.

	<div style="background-color: #FFD700; padding: 5px;">CAUTION</div> <p>Wet, contaminated or damaged openings and connections</p> <p>Damage to the mechanical seal!</p> <p>Risk of embrittlement! Damage to elastomers!</p> <ul style="list-style-type: none"> ▷ Only open screw plugs and connections at the mechanical seal at the time of installation. ▷ Avoid opening screw plugs, connections and similar before that time.
---	--

We recommend taking the following measures for storing the mechanical seal:

For storing the mechanical seal observe standards ISO 2230 and DIN 7716.

Store the mechanical seal in its original packaging, placed on a level surface in a dry, protected room with constant conditions that meet the following requirements:

- Relative humidity < 65 %
- Temperature between 15 °C and 25 °C
- Moderately vented atmosphere
- Dust-free and vermin-free



If properly stored indoors, the equipment is protected for a maximum of 36 months. New mechanical seals are supplied by our factory duly prepared for storage.

3.4 Return to supplier

1. Remove the used mechanical seal from the system.
2. Always flush and clean the mechanical seal, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
3. If the mechanical seal has handled fluids whose residues could lead to corrosion damage in the presence of atmospheric humidity or could ignite upon contact with oxygen, the mechanical seal must also be neutralised and dried with anhydrous inert gas.
4. Always complete and enclose a certificate of decontamination when returning the mechanical seal. Always indicate any safety measures and decontamination measures taken.

	<div style="background-color: #0070C0; color: white; padding: 5px;">NOTE</div> <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

	<div style="background-color: #f4a460; padding: 5px;"> WARNING</div> <p>Fluids handled, consumables and supplies which are hot and/or pose a health hazard</p> <p>Hazard to persons and the environment!</p> <ul style="list-style-type: none"> ▸ Collect and properly dispose of flushing fluid and any 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 mechanical seal.
Collect greases and other lubricants during dismantling.
2. Separate and sort the mechanical seal materials, e.g. by:
 - Metals
 - Plastics
 - Greases and other lubricants
3. Dispose of materials in accordance with local regulations or in another controlled manner.

4 Description

4.1 General description

- KSB mechanical seal

Mechanical seal for installation in pump sets and other rotating machinery in accordance with the manufacturer's instructions.

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

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see <https://www.ksb.com/ksb-en/About-KSB/Corporate-responsibility/reach/>.

4.3 Designation

Example: SB120-124M1-4STC-A

Table 4: Designation key

Code	Description	
S	Design	
	K	Short overall length
	N	Normal overall length
	S	Special overall length
B	Type	
	U	Unbalanced
	B	Balanced
120	Smallest inside diameter of the seal	
124	Smallest inside diameter of the primary ring	
M	Direction of rotation	
	M	Bi-directional with multi-spring arrangement
	S	Bi-directional with single spring
	L	Direction of rotation anti-clockwise
	R	Direction of rotation clockwise
1	Anti-twist lock of mating ring	
	0	Without lock
	1	With lock
4STC	Type series, type	
A	Primary ring carrier, axially secured against reversing pressure	
	A	Axially secured
	Blank	Not axially secured

4.4 Materials

- Depending on the application
- See product literature of the pump
- Selection of suitable material variant on request

4.5 Design details

Design

- Mechanical seal in modular design
- Single seal or in combination with another seal in tandem arrangement to API Plan 52
- Stationary type
- Bi-directional

- Axial movability +/- 2.5 mm
- Torque transmission via cup point grub screws
- Multi-spring arrangement

4.6 Configuration and function

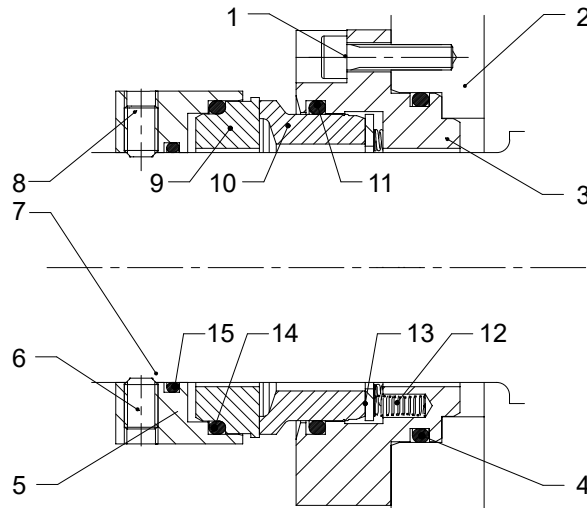



Fig. 1: Cross-section of 4STC with axially secured primary ring carrier

Design Mechanical seal for installation in pump sets and other rotating machinery in accordance with the manufacturer's instructions.



KSB's mechanical seal 4STC is a component mechanical seal that has been specially developed for use in pumps of the Amarex KRT, Sewatec and Amacan type series. KSB's 4STC mechanical seal is available as a variant with axially secured primary ring carrier, a variant without axially secured primary ring carrier, and a variant with clamped mating ring carrier.

Function Primary ring 10 is the axially movable sealing ring which is pressed against mating ring 9 by springs 12. O-rings 11 and 14 are fitted for secondary sealing. On type series 4STC thrust ring 13 engages with primary ring 10 and primary ring carrier 3, thus preventing rotation of primary ring 10 without hindering its axial movability. Sealing between primary ring carrier 3 and discharge cover 2 is provided by O-ring 4. On the variant with axially secured primary ring carrier, the primary ring carrier is fitted to the discharge cover with bolts 1. On the variant without axially secured primary ring carrier, the primary ring carrier is guided into the discharge cover. Here, O-ring 4 transmits the torque. Mating ring 9 is fitted in mating ring carrier 8. Pin 5 transmits the torque between these two components. The space between the two components is sealed by O-ring 14. Mating ring carrier 8 is fitted on shaft 7 and fastened with grub screw 6. Grub screw 6 provides axial fastening and also transmits the torque. O-ring 15 provides sealing between the mating ring carrier and the shaft.

5 Installation/Dismantling

	<p>NOTE</p> <p>Priority shall be given to the installation instructions and/or installation sequence in the documents of the pump set into which this mechanical seal is to be installed. This also applies to the dismantling instructions and/or dismantling sequence.</p>
---	---

5.1 Permissible aids

	<p>CAUTION</p> <p>Impermissible cleaning agents</p> <p>Damage to the seal faces at the mechanical seal!</p> <ul style="list-style-type: none"> ▷ For removing minor contamination use only paper tissues and ethyl alcohol. ▷ Do not use dirty cleaning cloths or cleaning cloths that leave behind lint.
	<p>CAUTION</p> <p>Impermissible assembly aids</p> <p>Sealing elements made of ethylene propylene diene rubber perishing or swelling up!</p> <ul style="list-style-type: none"> ▷ Never let sealing elements come into contact with mineral oil base lubricants. ▷ Use permissible lubricants only. ▷ Verify that the assembly aids are silicon-free.

- Lubricants²⁾
 - Permanent lubricants, such as non-mineral grease (Klübertemp GR 555) are used for elastomers that do not serve to transmit the torque. Examples are mating rings with an anti-twist lock or primary rings that move axially relative to the pump components.
 - Non-permanent lubricants such as a soap solution, for example, are used for elastomers that serve as a sealing element and, in addition, transmit the torque. An example would be a mating ring without anti-twist lock.
- Recommended cleaning agent for seal faces and grub screws: ethyl alcohol
- Thread-locking agent: Loctite, No. 243
- Open-ended wrench, ring spanner, socket wrench (cleaned, no impact tools)
- Torque wrench (cleaned)


5.2 Prerequisites

- Chamfered ends to EN 12756
- Installation dimensions to DIN EN 12756, except 5A-OM, 5B-RC (pump-specific installation dimensions);
- Surface roughness of pump components to DIN EN 12756
- Shaft run-out to ISO 5199:
 - Shaft diameter ≤ 50 mm: 0.05 mm max.
 - Shaft diameter 50 to 100 mm: 0.08 mm max.
 - Shaft diameter > 100 mm: 0.10 mm max.
- Face run-out of the shaft in relation to the vertical connection surface of the casing:


²⁾ Lubricants must be compatible with all fluids used. They must not be aggressive to the secondary sealing elements.

- Shaft speed ≤ 750 rpm: 0.2 mm max.
- Shaft speed > 750 rpm to 1000 rpm: 0.15 mm max.
- Shaft speed > 1000 rpm to 1500 rpm: 0.08 mm max.
- Shaft speed > 1500 rpm to 3000 rpm: 0.025 mm max.
- Permissible centre offset between the pump casing and the shaft:
 - Max. 0.2 mm for seals without pumping ring
 - Max. 0.1 mm for seals with pumping ring
- The seal faces are clean and have not been touched with fingers.
- The mechanical seal is in proper condition and complete.
- The elastomers are free from any contamination, cracks, softening, hardening, stickiness and discolouration.
- The mechanical seal has been placed down on a clean and level surface.


5.3 Installing the mechanical seal

	CAUTION
	<p>Use of grease or other permanent lubricants</p> <p>Torque transmission impeded / overheating of and damage to the pump!</p> <ul style="list-style-type: none"> ▷ Never use grease or other permanent lubricants for fitting the torque-transmitting elements of a mechanical seal. ▷ Use soft soap to reduce any friction caused during assembly. ▷ Never coat the mechanical seal faces with grease or oil.

- ✓ The relevant documentation for installing the mechanical seal is being observed.
- ✓ The back pull-out unit has been removed from the pump casing and safely positioned and secured in a horizontal position.
- ✓ The original KSB's mechanical seal 4STC is fully assembled and undamaged.
- ✓ Assembly aids are available.

	NOTE
	<p>If any installation instructions or an installation sequence are specified in the product literature of the pump/machinery into which the mechanical seal is to be installed, they must be observed.</p>

1. Properly remove any corrosion or wear.
2. Clean the seal faces with a suitable paper tissue and, if required, ethyl alcohol.
3. Wet O-ring 412.55 and suction cover 162 with a non-permanent lubricant (e.g. a water/soap mixture).
4. Press the assembly consisting of primary ring carrier 473, primary ring 472, thrust ring 474, springs and O-rings 412 into the seat at suction cover 162. If necessary, use a spacer sleeve and elastic intermediate element to protect the seal faces.

	NOTE
	<p>The seal faces must not be damaged (score mark, etc). The assembly must not be pressed into the seat by pressing on the primary ring (risk of fracture). The force for mounting it must be applied via the primary ring carrier.</p>

5. Fasten primary ring carrier 473 to suction cover 162 with hexagon head bolts 901. Tighten the bolts crosswise in several increments. Observe the tightening torques. This step does not apply to the variant without axially secured primary ring carrier.
6. Check the seal face for any damage. Clean it again if required.

7. Check that primary ring 472 is correctly seated.
8. Wet O-ring 412.54 and the corresponding surface on shaft 210 with a suitable, non-permanent lubricant.
9. Slide the rotating assembly of the seal, comprising mating ring carrier 476, mating ring 475 and O-rings 412 onto shaft 210 as far as it will go.
10. Preload the rotating assembly with an assembly aid to match the installation dimension. This step does not apply to the variant with clamped mating ring carrier. In this case, the installation dimension and torque transmission is ensured by mounting impeller 230.
11. Tighten grub screws 904, observing the installation dimension and tightening torques.



NOTE

Do not re-use cup point grub screws!
Used grub screws must be replaced by new cup point grub screws.

⇒ Cup point grub screws must not be re-used. Repeated tightening can impair the reliability of force transmission.

12. Carry out further installation instructions given in the pump's operating manual.

5.4 Removing the mechanical seal

The rules of sound engineering practice and the pump manufacturer's general provisions apply. Tidiness and cleanliness are essential for proper execution of the installation work.

- ✓ The operating manual for the pump set is on hand.
- ✓ The pump has been prepared in accordance with the operating manual for removing the mechanical seal.



NOTE

If any dismantling instructions and/or a dismantling sequence are specified in the product literature of the pump/machinery into which the mechanical seal is to be installed, they must be observed.

1. Undo grub screws 904. Pull mating ring carrier 476 and mating ring 475 off shaft 210. For the variant with clamped mating ring carrier, pull the mating ring carrier together with the mating ring directly off the shaft.
2. On mechanical seals with axially secured primary ring carrier 473 undo hexagon head bolts 901.
3. Use the jacking threads to remove the primary ring carrier.
4. On mechanical seals without axially secured primary ring carrier, use assembly aids to remove the primary ring carrier. Another option of removing the primary ring carrier is to remove the discharge cover and apply pressure to the rear side of the primary ring carrier.
5. Carry out further dismantling instructions given in the pump's operating manual.





5.5 Tightening torques

Table 5: Tightening torques



Thread	[Nm]
M5	4
M6	8
M8	15
M10	20
M12	25

6 Operation

6.1 Safety instructions for operation

	CAUTION Air intake via the seal faces Dry running of the seal and consequential seal failure! <ul style="list-style-type: none">▷ For single seals the pressure in the seal chamber of the pump must always be higher than the ambient pressure.
	CAUTION Unsuitable fluid to be sealed off Damage to the machinery! <ul style="list-style-type: none">▷ Take appropriate measures to ensure that the fluid to be sealed off at the mechanical seal is in liquid condition no matter what the operating status of the pump. This applies in particular when starting up and stopping the pump.▷ If the fluid to be sealed off forms deposits while the pump set cools down or during standstill of the pump set, the seal chamber must be flushed through with a clean liquid. The quantity and type of flushing liquid has to be defined by the operator for the specific material combination of the mechanical seal.
	CAUTION Excessive rise in temperature Damage to the mechanical seal! Dry running or damage to the elastomers, incrustations at the seal faces, etc. <ul style="list-style-type: none">▷ Shut down the pump as described in the operating manual.
	NOTE If the operating limits indicated are observed and the instructions given in this manual are complied with, the mechanical seal can be expected to give trouble-free operation. If the values during operation are not within the specified limits, the mechanical seal must be removed from the system and sent to KSB for inspection.

6.2 Emissions

	WARNING Incorrect handling of the fluid to be sealed off Risk of injury! <ul style="list-style-type: none">▷ If the fluid to be sealed off and/or the buffer fluid have to meet the requirements of the German Hazardous Substances Regulations, the regulations on handling hazardous substances (safety data sheets to Directive 91/155/EEC) and the accident prevention regulations must be heeded.
	NOTE If a reduction in leakage cannot be observed or if other failures occur, the mechanical seal must be shut down, removed from the system and sent to KSB for inspection.

**NOTE**

Any leakage must be drained off in a controlled way and safely disposed of. Components which may come into contact with the seal leakage must either be corrosion-resistant or must be adequately protected.

- For physical and technical reasons a mechanical seal cannot be leak-free.
- Leakage can be either in liquid or gaseous form. Its aggressiveness corresponds to that of the fluid to be sealed off.
- The quantity of leakage is influenced by several factors:
 - Seal selection
 - Manufacturing tolerances
 - Operating statuses
 - Smooth running of the pump
- In the running-in phase of the mechanical seal higher leakage can occur.

6.3 Operating limits**NOTE**

Always observe the operating limits in the product literature and the other applicable documents.

**NOTE**

The following values are limits that depend on the seal face materials and elastomer materials. As the characteristics influence each other, operation at minimum/maximum limits is not possible for all characteristics at the same time.

Table 6: Operating limits (nominal diameter, sliding velocity, maximum pressure to be sealed off and temperature limits depending on the material combination and fluid.)


Type series	$v^{3)}$	Max. pressure to be sealed off			$T^{4)}$
		Carbon/SiC	SiC/SiC	SiC/WC	Max.
	[m/s]	[bar]	[bar]	[bar]	[°C]
4STC	20	14	14	14	+200

³ Sliding velocity

⁴ Fluid temperature




7 Maintenance

7.1 Maintenance/inspection

	NOTE
	<p>The operator is responsible for conducting checks.</p>

- The mechanical seal is low in maintenance. Replace wear parts as necessary.
- Proper operation includes regular checks of temperature and leakage (drainage) of the mechanical seal.
- When a system maintenance inspection or pump maintenance inspection is conducted, the mechanical seal should also be inspected. The seal faces should be reworked and all elastomer joint rings and springs should be replaced by new ones. KSB is available for inspecting the mechanical seal.

8 Trouble-shooting

	<p>⚠ WARNING</p> <p>Improper work to remedy faults Risk of injury!</p> <ul style="list-style-type: none"> ▸ 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>NOTE</p> <p>Prior to conducting any work on the mechanical seal during the warranty period contact the manufacturer. KSB Service will be pleased to help you. Non-compliance with this instruction will lead to forfeiture of any and all rights to claims for damages.</p>
	<p>NOTE</p> <p>For any failures you cannot remedy or whose cause cannot be identified, contact the responsible KSB service centre.</p>

What to do in the event of a fault/malfunction

- Determine and document the nature of the fault/malfunction.
- Monitor the development of leakage quantity. If necessary, shut down the pump as described in the operating manual.
A steady flow of leakage indicates mechanical seal damage.

Maintenance work, service work and installation work by KSB Service

- KSB Service GmbH | Service Center Pegnitz
E-mail: service-center.pegnitz@ksb.com
- KSB Service LLC | Service Center Abu Dhabi
E-mail: ksb@ksb.ae

Contact for general queries:

- E-mail: LPC_Mechanical.Seals@ksb.com

Further contact addresses:

- <https://www.ksb.com/en-global/contact>

9 Related Documents

9.1 General drawings with list of components

9.1.1 Variant with axially secured primary ring carrier

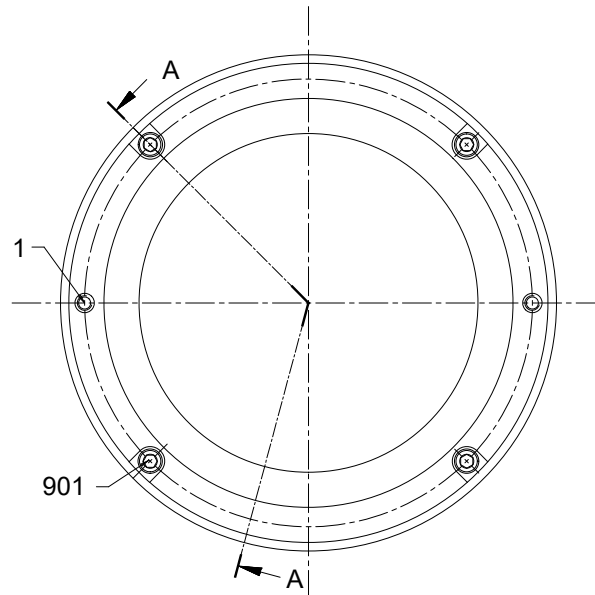


Fig. 2: Cross-section axis

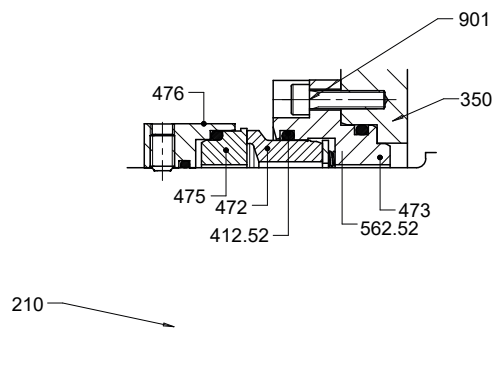


Fig. 3: Sectional drawing

Table 7: List of components

Part No.	Description	Part No.	Description
1	Jacking thread	475	Mating ring
210	Shaft	476	Mating ring carrier
350	Bearing housing	477	Spring for mechanical seal
412.52/.53/.54/.55	O-ring	562	Parallel pin
472	Primary ring	901	Hexagon head bolt

Part No.	Description	Part No.	Description
473	Primary ring carrier	904	Grub screw
474	Thrust ring		

9.1.2 Variant without axially secured primary ring carrier

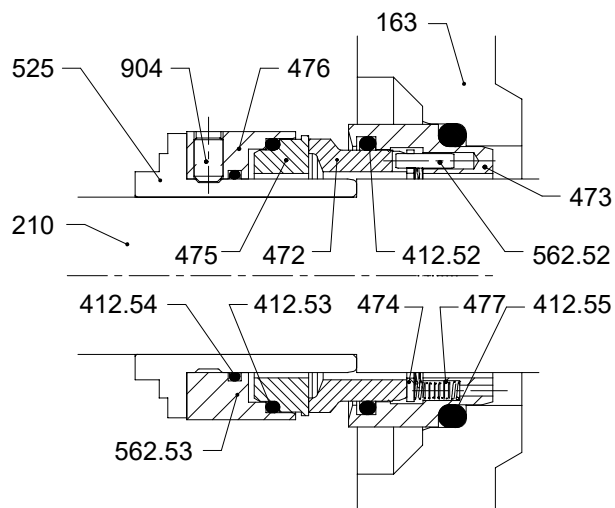


Fig. 4: Sectional drawing

Table 8: List of components

Part No.	Description	Part No.	Description
162	Suction cover	475	Mating ring
210	Shaft	476	Mating ring carrier
412.52/.53/.54/.55	O-ring	477	Spring for mechanical seal
472	Primary ring	525	Spacer sleeve
473	Primary ring carrier	562.52/.53	Parallel pin
474	Thrust ring	904	Grub screw

9.1.3 Variant with clamped mating ring carrier

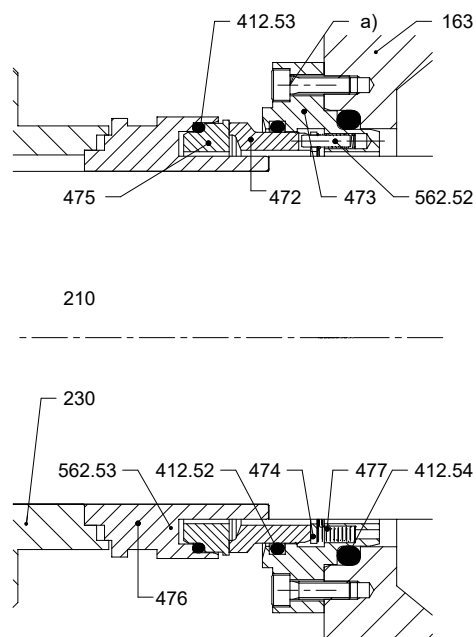


Fig. 5: Sectional drawing

Table 9: List of components

Part No.	Description	Part No.	Description
162	Suction cover	474	Thrust ring
210	Shaft	475	Mating ring
230	Impeller	476	Mating ring carrier
412.52/.53/.54	O-ring	477	Spring for mechanical seal
472	Primary ring	562.52/.53	Parallel pin
473	Primary ring carrier		

10 Certificate of Decontamination

Type:
Order number /
Order item number⁵⁾:
Delivery date:
Application:
Fluid handled⁵⁾:

Please tick where applicable⁵⁾:



Corrosive



Oxidising



Flammable



Explosive



Hazardous to health



Seriously hazardous to health



Toxic



Radioactive



Bio-hazardous



Safe

Reason for return⁵⁾:
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

⁵ Required field

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