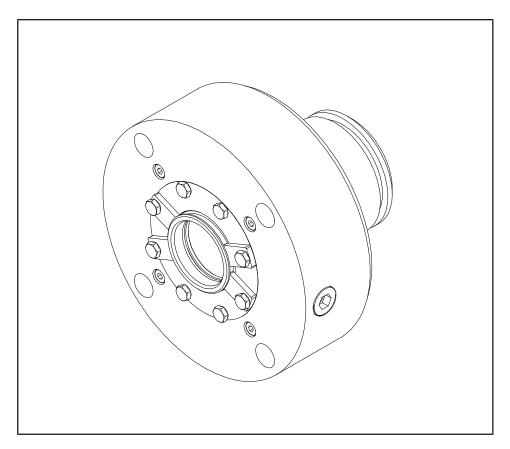
### **KSB** Mechanical Seal

## **4RPS**

for the RPH-RO Type Series

# **Supplementary Operating Manual**





# Legal information/Copyright Supplementary Operating Manual 4RPS Original operating manual All rights reserved. The contents provided herein must neither be distributed, copied, reproduced, edited or processed for any other purpose, nor otherwise transmitted, published or made available to a third party without the manufacturer's express written consent. Subject to technical modification without prior notice.

© KSB SE & Co. KGaA, Frankenthal 02/02/2018



#### Contents

1	Sup	Supplementary Operating Manual		
		General		
	1.2	Operating data	4	
	1.3	Removing the mechanical seal	4	
		1.3.1 Removing a cartridge mechanical seal of the 4RPS seal series	4	
	1.4	Installing the mechanical seal	5	
		1.4.1 Installing a cartridge mechanical seal of the 4RPS seal series	5	
	1.5	General assembly drawings with list of components	6	
		1.5.1 4RPS cartridge mechanical seal		
		1.5.2 General assembly drawing with list of components	7	



#### 1 Supplementary Operating Manual

#### 1.1 General

This supplementary operating manual accompanies the installation/operating manual. All information contained in the installation/operating manual must be observed.

Table 1: Relevant operating manuals

	Reference number of the installation/operating manual	
RPH-RO	1316.86	

#### 1.2 Operating data

Table 2: Operating properties

Characteristic	Value		
Cartridge seal	C047M1-4RPS	C073M1-4RPS	
Pump	RPH-RO	RPH-RO	
Bearing bracket	B03L	B05L	
Material	Q1Q1VMG4	Q1Q1VMG4	
Fluid handled	Seawater	Seawater	
Maximum temperature T [°C]		≤ 80	≤ 80
Maximum dynamic pressure	p [bar]	70	70
Maximum static pressure p [bar]		100	100
Maximum speed n [rpm]		3500	1750
Axial displacement	± 1,5	± 1,5	

#### 1.3 Removing the mechanical seal

#### 1.3.1 Removing a cartridge mechanical seal of the 4RPS seal series

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 is available.
- ✓ The back pull-out unit of the pump has been placed in a clean and level assembly area.
- 1. Undo and remove hexagon head bolts 901.53. Engage assembly fixtures 96-3 in the groove of shaft sleeve 523. Lock them in this position with hexagon head bolts 901.53 on seal cover 471.
- 2. Depending on the design, unscrew and remove the impeller screw or impeller nut, as applicable.
- 3. Pull the impeller carefully off the pump shaft.
- 4. Evenly loosen nuts 920.02 and take them off studs 902.02.
- 5. Unbolt the casing cover from the bearing bracket. Carefully lift it off.
- 6. Carefully and evenly pull the cartridge mechanical seal off the shaft.

Further dismantling of the mechanical seal is carried out at KSB.

4 of 12 4RPS



#### 1.4 Installing the mechanical seal

#### 1.4.1 Installing a cartridge mechanical seal of the 4RPS seal series

#### **CAUTION**



#### Use of grease or other permanent lubricants

Torque transmission impeded/overheating of and damage to the pump!

- Do not use grease or other permanent lubricants.
  Use soft soap to reduce friction.
- Do not coat seal faces with grease or oil.
- ✓ The operating manual for the pump is available.
- ✓ Install the mechanical seal as shown in the installation drawing.
- ✓ The back pull-out unit of the pump has been placed in a clean and level assembly area.
- ✓ The original 4RPS cartridge mechanical seal is fully assembled and undamaged.
- 1. O-rings 412.54 and 412.56 are fitted in the mechanical seal. A lubricant compatible with the elastomer material has been applied to the O-rings.
- 2. O-ring 412.55 fully abuts seal cover 471.
- 3. Slide the cartridge mechanical seal carefully onto the pump shaft.
- 4. Carefully mount the casing cover on the bearing bracket. To do so, align and insert studs 902.02 through the holes in the seal cover.
- 5. Carefully mount the impeller. Depending on the design, fasten with the impeller screw or impeller nut, as applicable.
- 6. Screw nuts 920.02 evenly onto studs 902.02, tightening the screwed connections crosswise in several increments to fasten the seal at the pump cover.
- 7. Remove hexagon head bolts 901.53. Swivel assembly fixtures 96-3 to disengage them. To store the assembly fixtures, fasten them in the disengaged position using the hexagon head bolts.

**4RPS** 5 of 12



#### 1.5 General assembly drawings with list of components

#### 1.5.1 4RPS cartridge mechanical seal

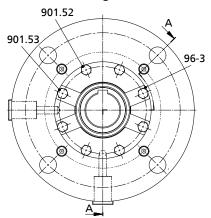


Fig. 1: Axis for the cross-section

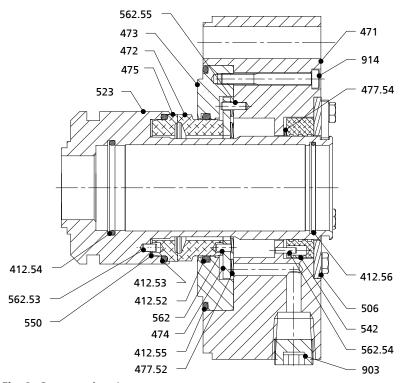


Fig. 2: Cross-section A

Table 3: List of components

Part No.	Description	Part No.	Description
96-3	Assembly fixture	506	Retaining ring
412.52/.53/.54/.55/.56	O-ring	523	Shaft sleeve
471	Seal cover	542	Throttling bush
472	Primary ring	550	Disc
473	Primary ring carrier	562.53/.54/.55	Parallel pin
474	Thrust ring	901.52/.53	Hexagon head bolt
475	Mating ring	903	Screw plug
477.52/.54	Spring for mechanical seal	914.52	Hexagon socket head cap screw

6 of 12 **4RPS** 



#### 1.5.2 General assembly drawing with list of components

#### 1.5.2.1 Bearing brackets B03 to B05

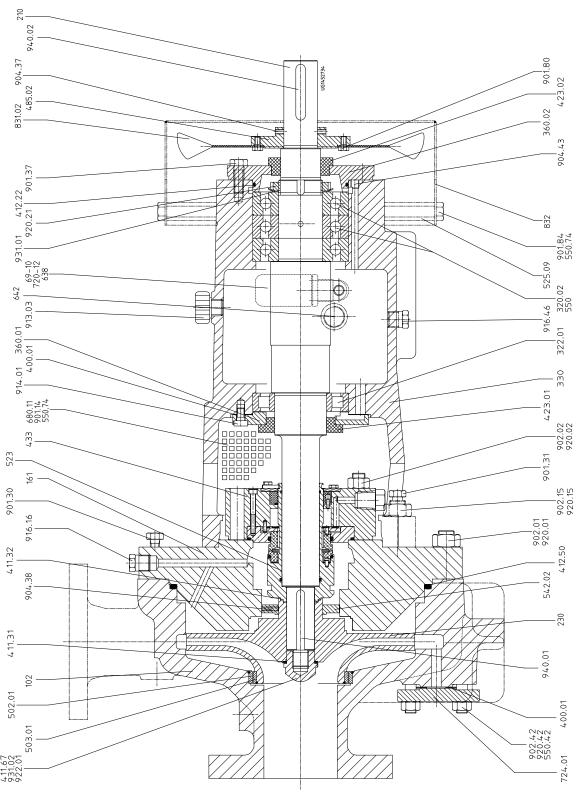


Fig. 3: Bearing brackets B03 to B05

**4RPS** 7 of 12



#### 1.5.2.2 Bearing brackets B06 and B07

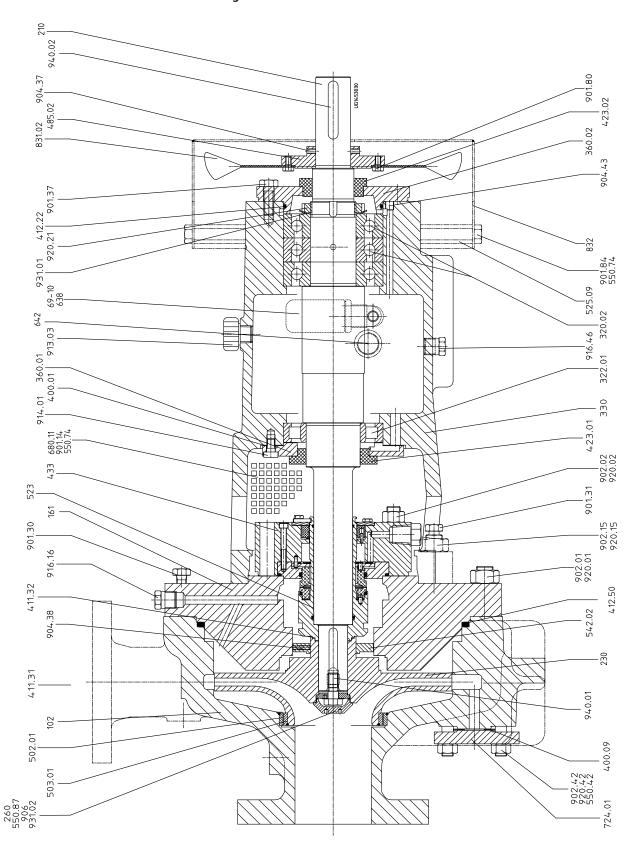


Fig. 4: Bearing brackets B06 and B07



Table 4: List of components

Part No.	Comprising	Description		
102	102	Volute casing		
	412.50	O-ring		
	502.01	Casing wear ring		
	902.01	Stud		
	916.01	Plug		
	920.01	Hexagon nut		
161	161	Casing cover		
	412.50	O-ring		
	901.30	Hexagon head bolt		
	902.15	Stud		
	916.16	Plug		
	920.15	Hexagon nut		
210	210	Shaft		
	920.21	Slotted round nut		
	931.01	Lock washer		
	940.01/.02	Key		
230	230	Impeller		
	411.31/.32/.67	Joint ring		
	503.01	Impeller wear ring		
	931.02	Lock washer		
260 <sup>1)</sup>	260	Impeller hub cap		
	550.87	Disc		
	906	Impeller screw		
320.02	320.02	Angular contact ball bearing		
	550	Adjusting washer		
322.01	322.01 <sup>2)</sup>	Cylindrical roller bearing		
330	330	Bearing bracket		
	69.10	Protective cage		
	360.01/.02	Bearing cover		
	400.01	Gasket		
	412.22	O-ring		
	638	Constant level oiler		
	642	Oil level sight glass		
	710.21	Pipe		
	901.31/.37	Hexagon head bolt		
	913.03	Vent plug		
	916.46	Plug		
	914.01	Hexagon socket head cap screw		
360.01/.02	360.01/.02	Bearing cover		
	400.01	Gasket		
	412.22	O-ring		
	914.01	Hexagon socket head cap screw		
400.09	400.09	Gasket		
423.01/.02 <sup>3)</sup>	423.01/.02	Labyrinth ring		
433	433	Mechanical seal		

For bearing brackets B06 and B07 only For bearing brackets B03 to B05 only On pumps with fan only 1) 2) 3)

**4RPS** 9 of 12



Part No.	Comprising	Description	
502.01	502.01	Casing wear ring	
503.01	503.01	Impeller wear ring	
507.01/.024)	507.01/.02 <sup>4)</sup>	Thrower	
	904.41/.424)	Grub screw	
542.02	542.02	Throttling bush	
	904.38	Grub screw	
550.42 550.42 Disc		Disc	
638	638	Constant level oiler	
680.11	680.11	Guard	
	901.14	Hexagon head bolt	
	550.74	Disc	
724.01 724.01		Blind flange	
831.025)	831.02	Fan impeller	
	832	Fan hood	
	485.02	Fan hub	
	904.37	Grub screw	
902.42 902.42 Stud		Stud	
920.42	920.42	Hexagon nut	
922.01 <sup>2)</sup>	922.01	Impeller nut	
	931.02	Lock washer	
99-9	99-9	Set of sealing elements, complete	

On pumps without fan only Optional

<sup>4)</sup> 5)

