Double Mechanical Seals

Tandem Arrangement
with Quench Liquid

Supplementary Operating Manual

KSB

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Supplementary Operating Manual Double Mechanical Seals

Original operating manual

Contents

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

Type series	Reference numbers of the operating/installation manuals
Etaprime	2746.8

1.2 Technical data

Design details

The shaft is sealed by two balanced single bi-directional mechanical seals to EN 12756 in tandem arrangement with quench liquid.

Seal size/ material variant

Table 2: Material variant

Shaft unit	Mechanical seal			
	Outboard (433.02)		Inboard (433.01)	
	Seal size	Material variant	Seal size	Material variant
17	016S-MG1-G60	Q1Q1EGG	035S-MG1-SX-GX[1)]	Q1Q1EGG
25	KU028S-MG12-G6-E1	Q1Q1EGG-G	KU028S-MG12-G6-E1	Q1Q1EGG-G
35	KU038S-MG12-G6-E1	Q1Q1EGG-G	KU038S-MG12-G6-E1	Q1Q1EGG-G

Material code

Table 3: Material code

Item	Description	Code	Materials
1	Primary ring	Q1	SiC, silicon carbide, sintered without pressure
2	Mating ring	Q1	SiC, silicon carbide, sintered without pressure
3	Secondary seal	E	Ethylene propylene rubber (EPDM 80)
4	Spring	G	CrNiMo steel
5	Other components	G	CrNiMo steel

1.3 Removing the shaft seal

1.3.1 Removing the shaft seal - shaft unit 17

1. Dismantle the pump as described in operating manual 2746.8.
2. Take off hexagon nut 920.95, impeller 230 and disc 550.02/550.04.
3. Take key 940.01 out of the shaft keyway.
4. Remove special part 720.02/720.03.
5. Pull primary ring holder 473 with inboard mechanical seal 433.01 (rotating assembly) off shaft 210.
6. Pull the rotating assembly of outboard mechanical seal 433.02 off shaft 210.
7. Remove the stationary mating ring of mechanical seal 433.01/433.02 from drive lantern 341.
8. Pull inboard mechanical seal 433.01 (rotating assembly) off primary ring holder 473.

1) Dimension not compliant with EN 12756

1.3.2 Removing the shaft seal - shaft units 25/35

1. Dismantle the pump as described in operating manual 2746.8.
2. Take off hexagon nut 920.95, disc 550.01 (shaft unit 25 only), safety device 930.95, impeller 230 and discs 550.02/550.04.
3. Take key 940.01 out of the shaft keyway.
4. Remove special part 720.02/720.03.
5. Unscrew hexagon nut 920.02 from stud 902.02 and slide seal cover 471 towards the motor end.
6. **Model with bolted casing cover:** Unscrew hexagon nuts 920.24.
7. Press casing cover 161 out of drive lantern 341 and pull it off shaft 210.
8. Pull shaft sleeve 523 with the rotating assemblies of inboard and outboard mechanical seal 433.01/433.02 and intermediate ring 509 off shaft 210.
9. Remove seal cover 471 with the mating ring of outboard mechanical seal 433.02 from shaft 210.
10. Remove inboard mechanical seal 433.01 and intermediate ring 509 from shaft sleeve 523.
11. Use the sheet-metal ring supplied to pull outboard mechanical seal 433.02 off the shaft sleeve.
12. Remove the stationary mating ring of mechanical seal 433.01 and O-rings 412.01 from intermediate ring 509.
13. Remove the stationary mating ring of mechanical seal 433.02 from seal cover 471.
14. Take gasket 400.01 off the shaft.

1.4 Fitting the shaft seal

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.
- Clean the shaft, the shaft sleeve and the mating ring locations in drive lantern 341, seal cover 471 as well as intermediate ring 509, and gently remove any deposits.

NOTE

To reduce friction forces when assembling the seal, wet the shaft sleeve and the mating ring location with water.

1.4.1 Fitting the shaft seal - shaft unit 17

1. Press the mating ring of outboard mechanical seal 433.02 and the mating ring of inboard mechanical seal 433.01 into drive lantern 341.
   Press in by hand or fingers only, making sure that pressure is applied evenly.
2. Slide outboard mechanical seal 433.02 (rotating assembly) onto shaft 210.
3. Slide inboard mechanical seal 433.01 (rotating assembly) onto primary ring holder 473 until it will not go any further.
4. Slide primary ring holder 473 with assembled mechanical seal 433.01 onto shaft 210.
5. Place key 940.01 into the keyway of shaft 210.
6. Slide disc 550.02/550.04 and impeller 230 onto shaft 210 and tighten with hexagon nut 920.95.
7. Fit special parts 720.02/720.03 in drive lantern 341 using Loctite 573 and hemp.

1.4.2 Fitting the shaft seal - shaft units 25/35

1. Press the mating ring of the outboard mechanical seal 433.02 into seal cover 471.
   Press in by hand or fingers only, making sure that pressure is applied evenly.
2. Slide seal cover 471 with the mating ring of mechanical seal 433.02 onto shaft 210.
3. Press the mating ring of the inboard mechanical seal 433.01 into intermediate ring 509.
   Press in by hand or fingers only, making sure that pressure is applied evenly.
4. Insert O-rings 412.01 into seal cover 509.
5. Use the sheet-metal ring supplied to slide the rotating assembly of outboard mechanical seal 433.02 onto the non-fitted shaft sleeve 523 up to the shaft shoulder.
6. Slide intermediate ring 509 with the mating ring of inboard mechanical seal 433.01 and the rotating assembly of inboard mechanical seal 433.01 onto shaft sleeve 523.
7. Slide gasket 400.01 onto shaft 210.
8. Slide fully assembled shaft sleeve 523 onto shaft 210.
9. Slide casing cover 161 onto intermediate ring 509 and press into drive lantern 341.
10. **Model with bolted casing cover:** Fit hexagon nuts 920.24.
11. Slide seal cover 471 onto intermediate ring 509 and fasten with hexagon nut 920.02.
12. Place key 940.01 into the keyway of shaft 210.
13. Slide discs 550.02/550.04, impeller 230, safety device 930.95 and disc 550.01 (shaft unit 25 only) onto shaft 210 and tighten with hexagon nut 920.95.
14. Fit special parts 720.02/720.03 in seal cover 471 using Loctite Type 573 and hemp.

1.5 Quench liquid

1.5.1 Applications

A quench liquid is used in the following cases:

- Where a single mechanical seal without supportive measures would not work at all or unsatisfactorily.
- Where a double mechanical seal design with pressurised barrier fluid is not required.

1.5.2 Quench pot arrangement

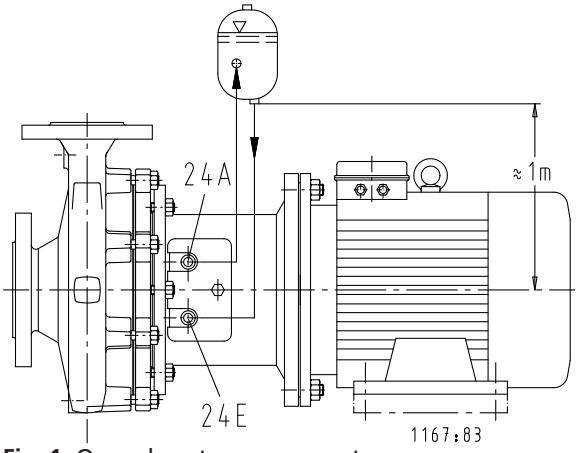

Fig. 1: Quench pot arrangement

Table 4: Connections

Connection[2)]	Description	Size[3)]
24A	Quench liquid outlet	R3/8
24E	Quench liquid inlet	R3/8

Quench feed from vessel mounted above the pump: liquid circulation ensured by thermosyphon effect or forced circulation.

1.5.3 Quench liquid requirements

The quench liquid should preferably form a solution with the pumped product and be environmentally compatible.

Typical quench liquids

- Water with a conductivity of 100 - 800 µS/cm
- Water-glycol mixture
- Glycerine

The quench liquid should be supplied to the mechanical seals without pressure (atmospheric pressure), if possible. Positive pressures of up to 0.5 bar are acceptable.

The one-way quench supply should be adjusted to a constant flow ≥ 0.4 l/min.

Periodically check the quench liquid for contamination (replace quench liquid and clean quench system if necessary).

2) Plugged during transport
3) To EN 10226-1

1.6 General assembly drawing with list of components

1.6.1 Shaft unit 17

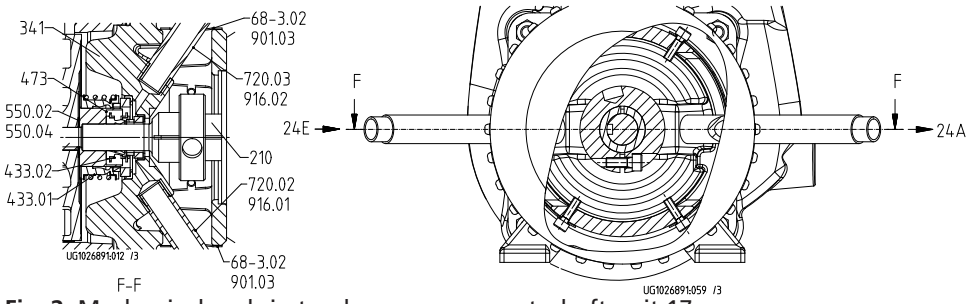

Fig. 2: Mechanical seals in tandem arrangement, shaft unit 17

Table 5: List of components

Part No.	Description
210	Shaft
341	Drive lantern
433.01/.02	Mechanical seal
473	Primary ring holder
550.02/.04	Disc
68-3.01/.02	Cover plate
720.02/.03	Special part
901.03	Hexagon head bolt
916.01/.02	Plug

Table 6: Connections

Connection[4]	Description	Size[5]
24A	Quench liquid outlet	R3/8
24E	Quench liquid inlet	R3/8

1.6.2 Shaft unit 25/35

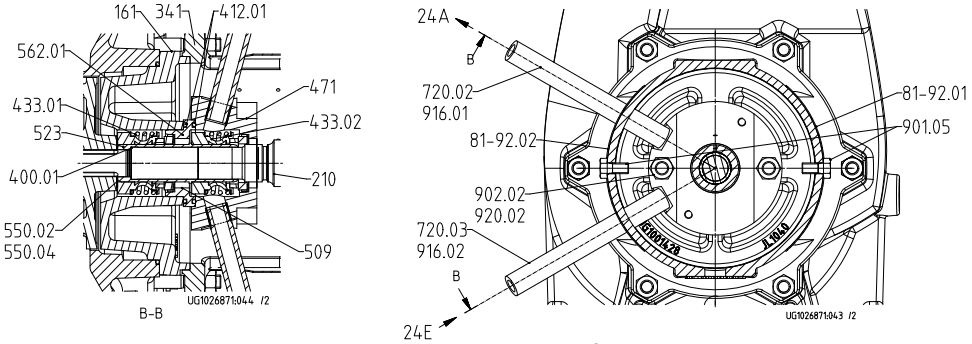

Fig. 3: Mechanical seals in tandem arrangement, shaft unit 25/35

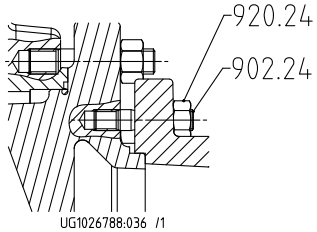

Fig. 4: Model with bolted casing cover

4) Plugged during transport
5) To EN 10226-1

Table 7: List of components

Part No.	Description
161	Casing cover
210	Shaft
341	Drive lantern
412.01	O-ring
433.01/.02	Mechanical seal
471	Seal cover
509	Intermediate ring
523	Shaft sleeve
550.02/.04	Disc
562.01	Parallel pin
720.02/.03	Special part
81-92.01/.02	Cover plate
901.05	Hexagon head bolt
902.02/.24	Stud
916.01/.02	Plug
920.02/.24	Nut

Table 8: Connections

Connection[6)]	Description	Size[7)]
24A	Quench liquid outlet	R3/8
24E	Quench liquid inlet	R3/8

6) Plugged during transport
7) To EN 10226-1

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KSB SE & Co. KGaA
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0
www.ksb.com