

GENERAL INSTRUCTIONS FOR INSTALLATION OF MECHANICAL SEALS

Please carefully read the instructions. If the installation is consistent with it, you will ensure the smooth operation and long life of the mechanical seals. For more responsible machines separate specialized instructions are recommended.

1. Precautions

Mechanical seals and related items should be transported and stored in closed, strong boxes or crates. Rooms in which they are stored must be dry and dust-free. Avoid placing them near a high temperature or radiation.

The end customer should be sure that the technicians who will install or operate the seals and sealing equipment are well versed with the design and operational requirements for such equipment.

2 . Equipment check

2.1. Observe the following safety precautions before operating :

- 2.1.1 Wear protective clothing
- 2.1.2 Turn off the power and close all valves
- 2.1.3 Isolate the equipment and release the pressure in the system
- 2.1.4 If you work with hazardous chemicals or materials work in accordance with the relevant instructions

2.2 . Disassemble the equipment according to the manufacturer recommendations.

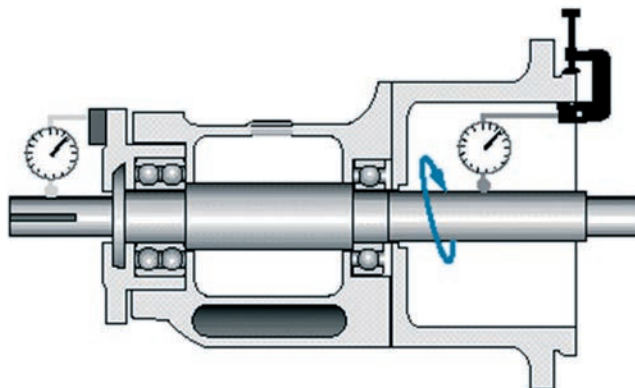
2.3 . Remove the sealing element (mechanical seal or packing). Carefully clean the seal chamber and the shaft.

2.4. Make sure the size of the shaft meets the requirements according to the drawings . Check the surface of the shaft and seal chamber for dents and scratches .

2.5. Check the drawings for any further works or improvements that should be done and make them.

Eccentricity (pic.1) should not exceed 0,05 mm, measured with an indicator on any point of the shaft (for ball or roller bearings). For sliding bearings comply with the manufacturer's instructions.

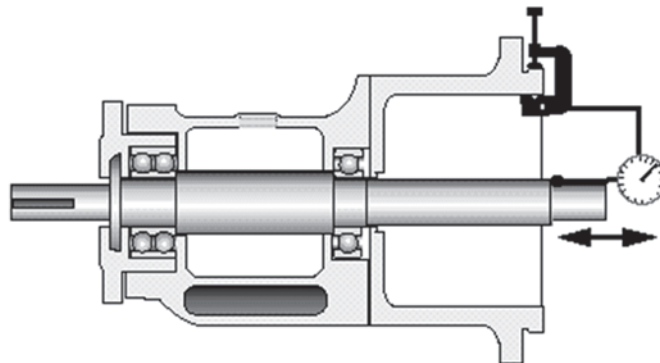
If the equipment can not be completely disassembled, the measurements must be taken closely to the position of the mechanical seal. The above values are required for shaft speeds between 1000 and 3600 RPM.



pic. 1

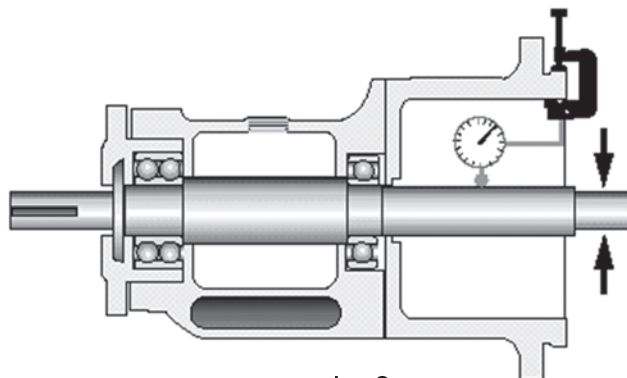
General instruction for installation of mechanical seals

Axial displacement (pic. 2) of the shaft must not exceed 0.1 mm, measured with indicator (for ball and roller bearings). For other types of bearings comply with the manufacturer's instructions.



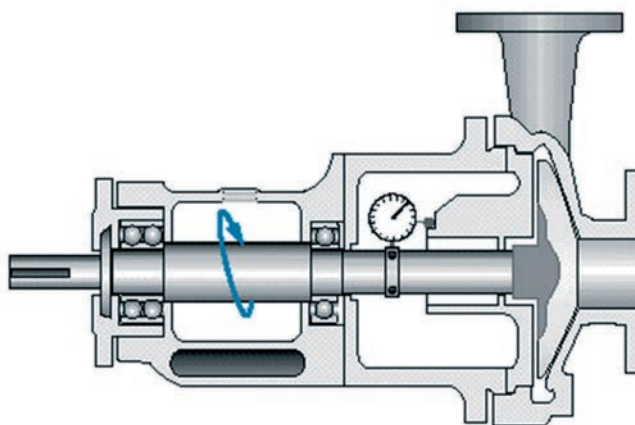
pic. 2

Tolerances for radial displacement (pic. 3) are typically between 0.05 and 0.10 mm, measured with indicator (for ball and roller bearings). For other types of bearings, the values must be between 0.10 and 0.15 mm.



pic. 3

Measured values (pic. 4) for concentricity of the shaft against the seal chamber must be within 0.025 and 0.125 mm. for each 25 mm. of the shaft diameter.

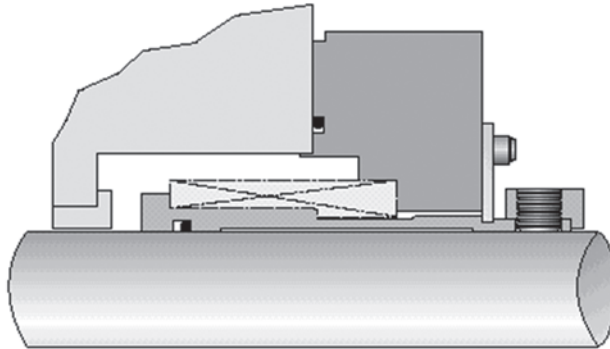


pic. 4

3. Installation of mechanical seals

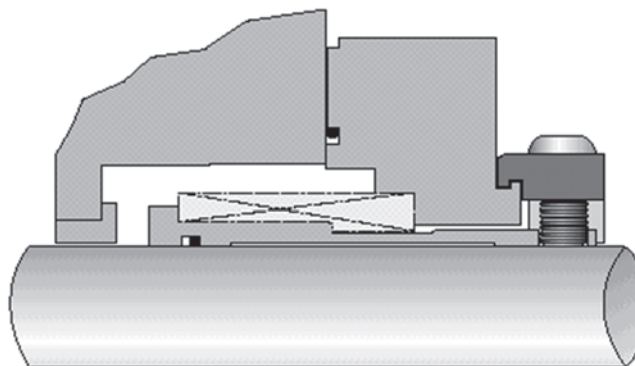
Proper installation is important for trouble-free operation of the mechanical seal. For easy installation, the rubber parts should be lightly lubricated. Lubricant must be compatible with the materials used in the seal. Typically used is silicone lubricant.

3.1 Installation of mechanical seals with assembly fixtures



- 3.1.1 Before installation, check the assembled seal accordingly the drawing provided
- 3.1.2 Install on the shaft as shown in the drawing of the piping system
- 3.1.3 Align the holes of the seal flange according to the piping system
- 3.1.4 Evenly tighten the bolts/nuts on the flange to avoid blocking the seal or uneven pressure on the sealing surfaces
- 3.1.5 Complete the assembly of the rest equipment, including axial (thrust) bearing
- 3.1.6 Assembly fixtures must be properly fitted and fastened
- 3.1.7 After making sure that the bolts on the cap /flange/ are tightened well to the pump casing and the sleeve - to the shaft, release the assembly fixtures from the sleeve
- 3.1.8 Check the alignment of the equipment according to manufacturer's drawings
- 3.1.9 Check the alignment again after a short-time of work

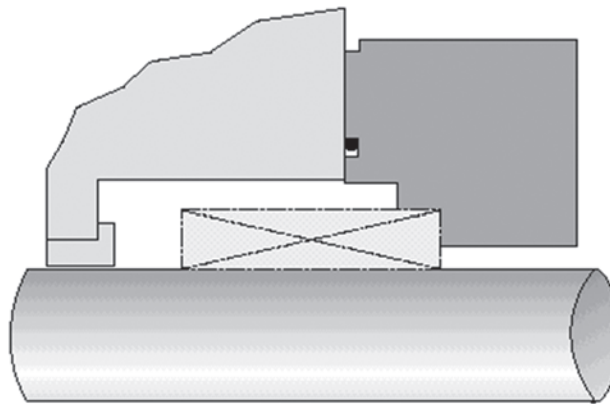
3.2 Installation of mechanical seals with assembly disk



- 3.2.1 Before installation, check the assembled seal accordingly the drawing provided

- 3.2.2 Install on the shaft as shown in the drawing of the piping system
- 3.2.3 Align the holes of the seal flange according to the piping system
- 3.2.4 Insert the cap screws but do not tighten them
- 3.2.5 Assemble the other parts, including thrust bearing
- 3.2.6 Make sure that assembly disk is properly positioned;
- 3.2.7 Evenly tighten the bolts/nuts on the cap to avoid blocking the seal or uneven pressure on sealing surfaces
- 3.2.8 Remove assembly disk and keep it for next repair
- 3.2.9 Check the alignment of the equipment according to manufacturer's drawings
- 3.2.10 Check the alignment again after a short-time of work

3.2 Assembly of mechanical seal parts



- 3.3.1 Check the drawing and components of the seal for discrepancies before installation. Check sealing surfaces for scratches, dirt or other damage. Wipe those with a soft cloth, using a cleaning solution. Lubricating the sealing surfaces is not recommended, unless otherwise stated in the manufacturer's instructions
- 3.3.2 Install the seal chamber and the shaft (including thrust bearing), making sure that the depth of the chamber is as shown in drawings
- 3.3.3 Assemble the individual components one by one to the equipment, as the free movement of rotating parts must be present
- 3.3.4 Align the holes of the cap/flange according to the piping system
- 3.3.5 Evenly tighten the bolts/nuts on the cap to avoid blocking the seal or uneven pressure on sealing surfaces
- 3.3.6 Complete the rest of the installation
- 3.3.7 Check the alignment of the equipment according to manufacturer's drawings
- 3.3.8 Check the alignment again after a short-time of work

4. Connecting the pipelines

Cooling pipes must be connected as shown in the drawing of the seal. These instructions must be followed exactly to ensure proper work of the seal.

The minimum inside diameter of the pipes and pipe connections of the cooling system must be not less than 12,7 mm.

Stick to a minimum pipe length and curves. Valves should be installed as far away from the mechanical seal as possible.

The tank for cooling fluid must be mounted 40-60 cm above the top curve of the piping system.

5. Recommendations

Pressure and temperature in the seal chamber must not exceed the limits specified by the manufacturer .

Seals with external cooling, start circulation before switching on the equipment.

Do not start the equipment "dry" unless the seal is not designed to work in a gas environment.

Plug the device into operation under normal operating procedures unless any special conditions are required by the manufacturer or service company. If the equipment is not working properly (the temperature of the seal increases, vibrations are present, cavitation processes, etc.), unplug and discover why. Consult the manufacturer or service company if necessary.

6. Repairs

Mechanical seals are designed to withstand a wide range of operating conditions. However, repair is necessary if the service life of the seal is at it's end, or when it runs for a long time over capacity. Compliance with design and size is very important for their application.

Using spare parts supplied by the manufacturer is obligatory.

Surface roughness acc. to DIN 24960



Secondary seal material	Ra, μm	
	b	w
Elastomer	2,5	1,0
Non-elastomer or elastomer combined with non-elastomer	1,6	0,2

7. Alignment of coupling with elastic rubber elements

In the presence of coupling with an elastic element(s) it's required before switching on the equipment, to check the coupling alignment. Permissible values are given in the table below.

Shaft speed (RPM)	Parameter			
	Axial displacement (mm)		Angular displacement (mm/100mm)	
	good	acceptable	good	acceptable
up to 1000	0,07	0,13	0,06	0,10
up to 2000	0,05	0,10	0,05	0,08
up to 3000	0,03	0,07	0,04	0,07
up to 4000	0,02	0,04	0,03	0,06
up to 5000	0,01	0,03	0,02	0,05
up to 6000	< 0,01	< 0,03	0,01	0,04

8. Vibrations check

High value of the vibrations also cause rapid wear of the seal. It is advisable to make periodic measurements according to ISO 10816. In the table below are shown some limits for vibrations evaluation.

MACHINES CLASSES

Class I - Machines. Small machines to 15 kW

Class II - Machines. 15-75 kW on light foundations

15-300 kW on heavy foundations

Class III - Machines Above 300 kW on heavy and rigid foundations

Class IV - Machines Above 300 kW on flexible foundations (soft mount)

Zone A: The vibration of newly commissioned machines would normally fall within this zone.

Zone B: Machines with vibration within this zone are normally considered acceptable for unrestricted long-term operation.

RMS Velocity (mm/s)	Class I	Class II	Class III	Class IV
0,28	A	A	A	A
0,45				
0,71				
1,12	B	B	B	B
1,8				
2,8	C	C	C	C
4,5				
7,1	D	D	D	D
11,2				
18				
28				
45				

Zone C: Machines with vibration within this zone are normally considered unsatisfactory for long-term continuous operation. Generally, the machine may be operated for a limited period. In this condition until a suitable opportunity arises for remedial action.

Zone D: Vibration values within this zone are normally considered to be of sufficient severity to cause damage to the machine.