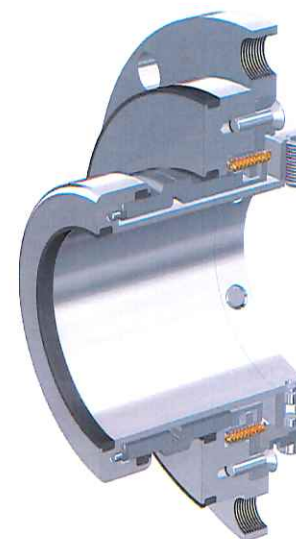


Installation and Operating Instructions



Hygienic Mechanical Seal

Single:




ESU/ESH

Double:

EDU/EDH

Contents

1.	Product Description	3
2.	Safety	3
3.	Storage	3
4.	Material and Operation limits for Single and Double cartridge seals.....	4
4.1.	Material	4
4.2.	Operation Limits	4
5.	Installation Guide	5
5.1.	Preparations	5
5.2.	Installation	6
5.2.1.	Assembly	6
5.2.2.	Disassembly	7
6.	Operation	7
6.1.	System Requirements	7
6.2.	Recommendations for cooling of seal	8
	Dual seal cooling (EDU/EDH) basics.....	8
7.	Maintenance and Repair	9
8.	Recycling	9
8.1.	Seal.....	9
8.2.	Packaging.....	9


Symbols	
 NOTE	Important information.
 CAUTION	Be careful. Risk for personal injury or damage to equipment.
 WARNING	Serious risk for personal injury or death or total failure of equipment.

1. Product Description

Type ESU/ESH – is a single balanced cartridge seal. This seal has an excellent axial movement capability ($\pm 2\text{mm}$) combined with a large angular tolerance. Additionally, it has a robust spring package consisting of tension springs located away from the product.

Type EDU/EDH – is a double balanced cartridge seal. The seal faces are lubricated and cooled by the cooling water. This seal has an excellent axial movement capability ($\pm 2\text{mm}$) combined with a large angular tolerance. Additionally, it has a robust spring package consisting of compression springs which are located away from both the product and cooling water to reduce risk of clogging.

These seals are specifically designed for the food industry. They guarantee perfectly hygienic sealing following EHDEG and 3-A specifications.


 NOTE	<p>Mechanical seals are precision machine components which require extreme cleanliness and care during handling and assembly.</p> <ul style="list-style-type: none"> • Avoid impacts and direct hits on the seal. • Avoid direct hammering on the seal itself. • Do not drop it on the floor or workbench, this will lead to immediate seal damage.
--	--

2. Safety

All personnel who are involved in handling, assembly, disassembly, startup, operation and maintenance of this product must have read and understood this manual. Mechanical seals shall be set in operation, maintained and refurbished only by personnel with adequate training. It is not allowed to change, manipulate or modify the product in a way that can influence its safe operation. All work on the seal must be carried out when the seal is not in operation or pressurized. Always follow site-specific safety regulations.

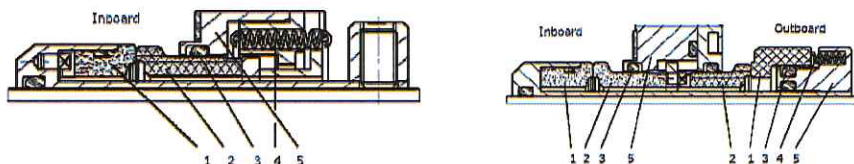
3. Storage

Store product in its original packaging on a flat and stable surface. The storage area should be free of dust, well ventilated, and at a temperature of 15-25 °C. Protect the seal from direct heat exposure (from the sun or other heat source) and ultraviolet light.

 NOTE	<p>It cannot be excluded that seals which have been in storage for some time need to be checked for O-ring condition and seal face flatness. In cases where storage time exceeds 6 months it is recommended that the seal be pressure tested with air or water before it is set in operation.</p>
--	--

4. Material and Operation limits for Single and Double cartridge seals


4.1. Material



Type	Size	Inboard side					Outboard side					
ED	070	Z	Z	6	0	7	/	C	8	6	8	7
Position		1	2	3	4	5	/	2	1	3	4	5

Position	Description
1: Rotor	Z=Sintered Silicon Carbide, W=Graphite filled Sintered Silicon Carbide, C=Carbon, 8=Tungsten Carbide, D=Diamond coated SiC
2: Stator	Z=Sintered Silicon Carbide, W=Graphite filled Sintered Silicon Carbide, C=Carbon, 8=Tungsten Carbide, D=Diamond coated SiC
3: Elastomers	4=FFPM, 5=High performance FPM, 6=EPDM F=FEP encapsulated Q or FPM
4: Springs	0= none, 7=EN 1.4436, 8=Hastelloy C
5: Steel parts	7=EN 1.4404 8=Titanium, 9= EN 1.4462

Example: ES-070-ZZ687 = SiC/SiC/EPDM/Hastelloy C/EN 1.4436
 ED-070-ZZ607/C8677 = SiC/SiC/EPDM/EN 1.4436 // Carbon/Tungsten Carbide/EPDM/EN 1.4301

	Always check the combination of materials for the specific application.
--	--

4.2. Operation Limits

	Standard seals	Dry-running single seals
Maximum product pressure	25 bar / 362,5 psi	6 bar / 87 psi
Maximum product temperature	230 °C / 446 °F ^{1) 2)}	230 °C / 446 °F ^{1) 2)}
Maximum peripheral speed	15 m/s	1,5 m/s
Maximum cooling media pressure	5 bar / 72 psi	Not applicable


- 1) This is highly dependent on the choice of O-rings material.
- 2) Additionally note that single seals in water must have minimum 25 °C margin to vapor pressure.

7. Maintenance and Repair

This seal does not require any maintenance. It is recommended that its condition is checked regularly by checking optically for leakage on the atmospheric side and by controlling pressure and flow of the sealing water, as well as checking the outgoing sealing water for possible product leakage within the seal.

During comprehensive maintenance work on the equipment, requiring that the seal is removed or loosened, it is recommended that a new or refurbished seal is installed.

The seal can be refurbished on-site by using a spare parts kit or sent to the local service center for refurbishment back to "as new" condition.

	Burnt or heat damaged O-rings containing Fluor, e.g. Fluoroelastomers (FPM/FPM, e.g. Viton™) or Perfluoroelastomers (FFPM/FFKM, e.g. Kalrez™) are dangerous and must be handled with protective equipment and adequate tools.
---	--

8. Recycling

8.1. Seal

This product is made of parts in materials which can be sorted for recycling. The materials of the seal components are described in 4.1. They should be sorted and recycled according to local regulations. O-rings and gaskets which contain Fluor should be sorted as hazardous waste according to local regulations.

8.2. Packaging

The different parts of the packaging can be sorted for recycling. The outer box can be recycled according to local regulations. The inner padding foam can be recycled or incinerated according to local regulation

6.2. Recommendations for cooling of seal

It is absolutely essential for proper functioning of the mechanical seal that there is a lubricating and cooling film between the seal faces. Depending on the application, there are several methods to ensure that the seal is supplied with an appropriate media in order to build this film. Basic instructions are given below. For special applications, please contact Sales for advice.

Dual seal cooling (EDU/EDH) basics

Make sure that cooling media is connected to the seal and that the media flows through the seal before start up. This is necessary to ensure that the seal faces on the outboard side are cooled and lubricated. Use hoses dimensioned for this pressure.

Dual seal (EDU/EDH) with low pressure cooling ($P_{cooling} < P_{product}$)

This is the standard for general hygienic applications requiring a dual seal, e.g. crystallising, sticky or quick-drying liquids which can build layers. This should also be used for applications which require cooling (product temperatures over 80-90°C). For usual applications a cooling media pressure of 2-4 bar is recommended.

Dual seal (EDU/EDH) with high pressure cooling ($P_{cooling} > P_{product}$)

Used when sealing abrasive liquids containing small abrasive particles in the 1-5 µm size range. These can come in between the faces and damage them. Cooling media pressure must be 1-1.5 bar over the product pressure (max. 10 bar).

Cooling media flow

Media pressure and flow through the seal can be adjusted by using a flow meter and 2 regulator valves. Flow must be adapted to heat generation on the seal, which is dependent on pressure, rotational speed and media temperature. Adjust this flow so that outlet temperature does not exceed 40-45 °C.

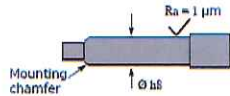
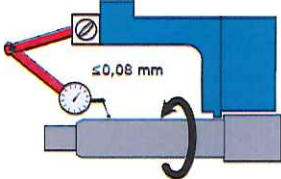
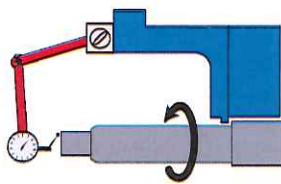


Sealing water flow should never go below 1 liter/minute.

For additional optimisation of cooling water consumption please contact Sales for advice.

5. Installation Guide

5.1. Preparations

1. Equipment <ul style="list-style-type: none"> ☑ Check that the equipment is clean and in good condition. ☑ Check that the bearing unit is in good condition and that there is no noticeable axial gap. ☑ Check that there is no noise from the bearings during rotation of the shaft. 	2. Housing and Stuffing Box <ul style="list-style-type: none"> ☑ Check that the stuffing box is clean. ☑ Check that all surfaces in contact with O-rings and gaskets are clean and free from sharp edges, scratches or burrs. ☑ Check that the mounting dimensions match those indicated in the product dimension sheet or drawing provided with the seal. 						
3. Shaft condition <ul style="list-style-type: none"> ☑ Check that the shaft surface is clean and free from sharp edges, scratches or burrs. ☑ Check surface condition and diameter tolerance. ☑ Check that there is a mounting chamfer. 	4. Radial run out  <table border="1"> <tr> <td>≤500 rpm</td><td>0,5 mm</td></tr> <tr> <td>500-1000 rpm</td><td>0,15 mm</td></tr> <tr> <td>1000-3000 rpm</td><td>0,08 mm</td></tr> </table>	≤500 rpm	0,5 mm	500-1000 rpm	0,15 mm	1000-3000 rpm	0,08 mm
≤500 rpm	0,5 mm						
500-1000 rpm	0,15 mm						
1000-3000 rpm	0,08 mm						
5. Axial run out  <table border="1"> <tr> <td>≤1000 rpm</td><td>0,15 mm</td></tr> <tr> <td>1000-1500 rpm</td><td>0,08 mm</td></tr> <tr> <td>1500-3000 rpm</td><td>0,025 mm</td></tr> </table>	≤1000 rpm	0,15 mm	1000-1500 rpm	0,08 mm	1500-3000 rpm	0,025 mm	6. General <ul style="list-style-type: none"> ☑ Mechanical seals are precision components. High cleanliness and considerable care are required when handling them. ☑ Avoid impacts and direct hits on the seal ☑ Avoid direct hammering on the seal itself ☑ All necessary services such as quenching and flushing should be in place before starting up. ☑ Never run a seal dry unless it was specifically designed for that purpose. Dry-running will immediately damage the seal and lead to failure.
≤1000 rpm	0,15 mm						
1000-1500 rpm	0,08 mm						
1500-3000 rpm	0,025 mm						

5.2. Installation

5.2.1. Assembly

1. Check that built-in dimensions are in agreement with those on the product sheet (or drawing if special seal).
2. Lubricate shaft and flange with product and elastomer compatible grease.



For elastomers in EPDM, do not use mineral oil based grease. Use the grease supplied.

3. Check that the liporings on the shaft sleeve and flange are intact and in place.
4. Lubricate the liporings on the shaft sleeve and on the flange.
5. Slide the complete cartridge over the shaft until it reaches the flange on the equipment. Push it until it bottoms out and tighten the bolts crosswise.
6. Check that the mounting spacers are in place. Tighten the set screws on the shaft to the torque indicated on the table below. Secure them with Loctite 243 or equivalent.

!	Seal size	Set screw size (item 11)	Screw Torque
	025 – 070	M6	8,8 Nm
	075 –150	M8	21,4 Nm

7. Remove spacers and screws. Store these, they will be needed again when the seal is disassembled or when maintenance work is carried out on the bearing or coupling.
8. Rotate the shaft and check that it rotates freely and without noise.

Additional assembly steps for EDU/EDH

9. Connect the piping for cooling water. Use hoses dimensioned for the pressure used.

5.2.2. Disassembly

1. Mount mounting spacers.
2. Loosen stop screws.
3. Remove the seal by removing the screws between the seals flange and the mounting flange.

6. Operation

6.1. System Requirements



Never run the seal dry unless it was designed for that purpose. It will be destroyed within seconds.



Double must always be supplied with clean sealing media during operation.

1. Open sealing water and let it flow through seal for a couple of minutes in order to vent the circuit before the equipment is started.
2. Adapt flow rate to water temperature and pressure/speed. See recommendations below.

Customer dwg.		Project no. EP9622-07		
Drawing no. 18027-90		Scale 3:4	Size A3	Rev. 0

Delivery Control Certificate

Date:2017-06-27 Page: 1 (1)

Assembly technician:

Signature: spl

Date: 2017-06-27 12:4

Seal Identification:

Seal Part no: 912040

Description: EDH-050-ZZH07/C8H87 FDA

ID no: 42090

Test technician:

Signature: spl

Date: 2017-06-27

Approval: Approved

Test assembly:

- ☒ Test-mounted on shaft
- ☐ Test-mounted on flange
- ☒ Axial movement checked
- ☒ ID no. applied
- ☒ Mounting spacers on seal
- ☐ Mounting spacers not required

☒ **Seal Pressure tested, buffer:**

Pressure: 1,7 bar

Time: 5 min

☐ **Seal press. tested, product:**

bar

min

☐ **Dynamic Test run:**

Pressure: bar

Speed: rpm

Time: hour

Test Media: Pressurized Air

Comments