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AIGI ENVIRONMENTAL INCORPORATED

A Subsidiary of AIGI Industrial Group

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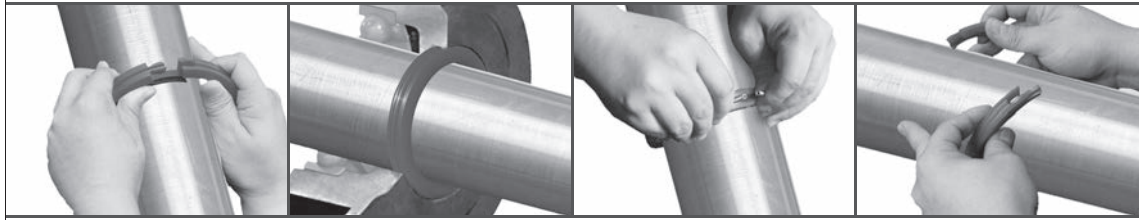
Rotary Seal *Installation Instruction*



Installation Notes

It is recommended that some sample tests should be arranged in actual working conditions before successful batch use. As an “accessory”, the condition of the original equipment and the effect of proper installation on the use of this product should be highlighted.

1. Make sure that the system pressure and equipment operation do not have unreasonable system factors before use;
2. Before use, make sure that the surface fit and tolerance of the equipment meet the installation requirements (this is especially important for old equipment);
3. After installing this product, try to check whether there are any abnormalities after assembly by manual or other methods, and make sure that there are no abnormalities before starting the machine;
4. Finally, if abnormalities occur during installation or after start-up, you should immediately stop the machine and find the cause.

CONTENTS

Definition and Working Principles

Oil seals and rotary seals are mechanical components used to seal bearing and gear box oil and grease. They isolate the parts which need lubrication from the other parts of the system in order to prevent leakage of lubricant and the entry of external impurities such as dust, mud and water. Any part that has liquid lubricating oil or grease in the machine and interfaces the outside needs a rotary or oil seal.

With the development of modern industry, the demand for oil seals and rotary that can meet the demanding working conditions such as high temperature, high pressure and high speed is becoming more and more urgent, and continuity of production also requires seals to have a longer service life. Therefore, new types of oil seals have been developed, such as new composite lip seals, labyrinth type oil seals, spiral type oil seals, mechanical type oil seals, etc. These new types of oil seals have been developed from many new materials and are upgraded in form and structure design to meet the needs of high temperature, high pressure and high speed, and to improve sealing effect, reduce wear and extend service life. The emergence of stable split oil seals effectively avoids tedious equipment disassembly and installation, makes the replacement of oil seals easier and faster, and maximizes the continuity of production. The latest oil seal technology not only can prevent oil leakage, but also can play a role in preventing external pollutants from entering the bearing box and protecting the bearing, so they have also been referred to as a bearing protector.

■ Pre-installation inspection

1. Verify that the working conditions of the equipment are within the technical parameters of AIGI 520S/520SN/521S/521SN.
2. Verify that the tolerance of the shaft diameter at the seal installation position is within the range of h7, that the surface roughness is not less than grade 5, and that there are no obvious signs of wear.
3. Check that the gland oil seal installation bore is within the range of H6.

■ Installation steps

1. Clean the shaft surface and apply clean lubricant.
2. Clean the oil seal seat (gland), and remove impurities and contaminants.
3. Place the oil seal on the shaft in the correct orientation.
4. Push the oil seal to the installation position.
5. 521S is split type so make sure the split is positioned vertically at the top of the shaft after installation (at the twelve O'clock position)

■ Cautions

1. Fix the shaft end with a large chamfer as far as possible to prevent damage to the lip from the sharp-edged transition.
2. Prohibit forcing the oil seal perpendicular to the shaft without a suitable chamfer when snapping into the shaft end.
3. When installing the seal , do not rotate it along the shaft to avoid damaging the lip.
4. Avoid contacting or knocking with sharp and hard objects at the lip of the oil seal, and avoid compressing the lip with nails or other sharp objects.
5. It is recommended to add oil seal pressure plate on the outside of the end cover to prevent the oil seal from following the rotation.

■ **Pre-installation inspection**

1. Verify that the operating temperature, pressure and linear speed of the equipment meet the technical requirements of the AIGI 523 composite oil seal;
2. Measure the runout of the shaft to ensure it is less than 30.4mm;
3. Check whether the shaft at the installation point of the seal lip is smooth and not worn, and make sure the surface finish of the shaft is up to grade 6. It should feel smooth when you scratch it with your finger.

■ **Installation steps**

1. Clear the sharp chamfer, burr and surface dirt of the shaft and apply clean grease.
2. Install the oil seal into the gland to prevent damage to the outer O-ring;
3. Push the oil seal to the end of the shaft at an angle (Figure 5-1), and put the bottom of the oil seal on the shaft.
4. Lift the oil seal upward, so that the bottom part of the oil seal is compressed to the upper part and can be set on the shaft normally.
5. Adjust the oil seal to be perpendicular to the shaft (Figure 5-2) and push it evenly into the final installation position (Figure 5-3).
6. Judge the degree of integrity of the lip after installation according to whether the grease sliding over the surface of the oil seal is completely brought in by the lip (guide sleeve can be used to match the installation).

■ **Cautions**

1. Make the shaft end with a sufficiently large chamfer to avoid damage to the lip by the sharp surface during installation.
2. Do not push the oil seal perpendicular to the shaft without proper chamfering.
3. Do not rotate the oil seal when it is not completely set into the shaft to avoid damaging the lip.
4. Avoid contacting or knocking with sharp and hard objects at the lip of the oil seal, and forbid compressing the lip with nails or other sharp objects.

AIGI 523 Series

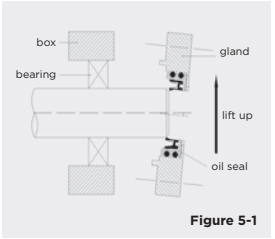


Figure 5-1

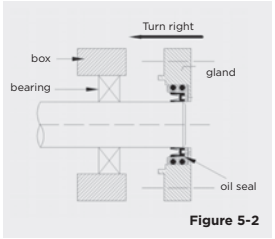


Figure 5-2

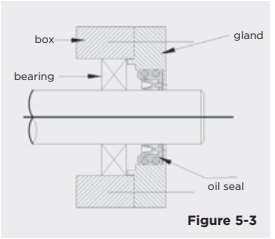


Figure 5-3

■ **Troubleshooting**

1. Causes of leakage and repair methods: ①The original surface of the shaft has been seriously worn: repair or replace the new shaft. ②Eccentricity is too large: adjust the gland, control the eccentricity within the range of 0.001x shaft diameter. ③lip damage: replace with new oil seal.
2. Causes of overheating and the method of elimination: ①Shaft size is too large: verify the size and reorder. ②Oil level is too low: add oil to the specified position.
3. Cause of excessive shaft grinding or wear and the method of elimination: Lubricant contamination is excessive: replace with clean lubricant.
4. Reason and method of elimination of oil seal: The oil seal and gland do not fit tightly: re-measure the seal and checkthe fit, and re-order after confirmation.

PATENTED

■ **Pre-installation inspection**

1. Verify that the working conditions of the equipment are within the technical parameters of AIGI 5505.
2. Measure that the tolerance of the shaft diameter at the seal installation position is within the range of h7, that the surface roughness is not less than Ra3.2, and that there are no obvious signs of wear.
3. Check that the gland oil seal installation bore is within the range of H8.

■ **Installation steps**

1. Clean the shaft surface and apply clean grease.
2. Pull apart the AIGI 5505 and set it on the shaft (Figure 6-1).
3. Insert the end of the oil seal into the mating slot (Figure 6-2) and connect it.
4. Push the oil seal evenly into the oil seal position so that the split id perpendicular to the shaft and make the interface symmetrical in the upward position (Figure 6-3).

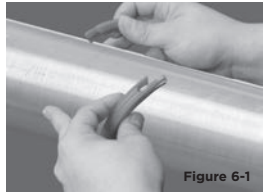


Figure 6-1

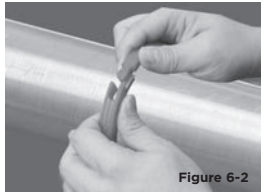


Figure 6-2

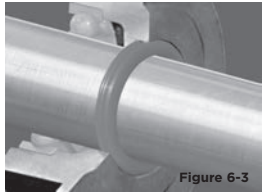


Figure 6-3

PATENTED

■ **Pre-installation inspection**

1. Verify that the working conditions of the equipment are within the technical parameters of AIGI 5505H.
2. Measure that the tolerance of the shaft diameter at the seal installation position is within the range of h7, that the surface roughness is not less than Ra3.2, and that there are no obvious signs of wear.
3. Check that the gland oil seal installation bore is within the range of H6.

■ **Installation steps**

1. Clean the shaft surface and apply clean grease.
2. Pull apart the AIGI 5505H and set it on the shaft (Figure 7-1).
3. Align the slot and end piece and connect them (Figure 7-2).
4. Attach the outer circlip (Figure 7-3).
5. Install the oil seal to the oil seal position with the split in the up position (Twelve O'clock) (Figure 7-4).

■ **Cautions**

Ensure that the compensation block and the inner seal remain in the same position during installation.

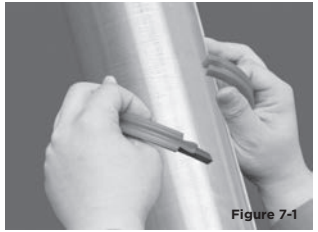


Figure 7-1

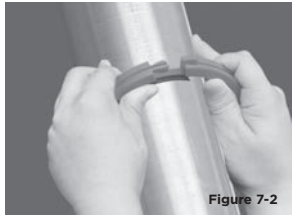


Figure 7-2

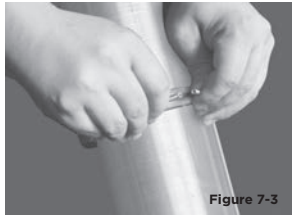


Figure 7-3

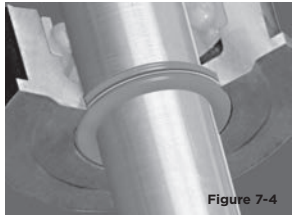


Figure 7-4

■ **Troubleshooting**

1. The causes of leakage and repair methods: ①The original surface of the shaft has been seriously worn: repair or replace the new shaft. ②Shaft runout is too large: adjust the runout or add compensation block to fill the inner ring gap. ③Lip damage: replace with new oil seal. ④Eccentricity is too large: adjust the equipment to control the eccentricity in the range of 0.001x shaft diameter.
2. The causes of overheating and the method of elimination: ①Shaft size is too large: verify the size and reorder appropriate size seal. ②The oil level is too low: add oil to the specified position. ③The line speed is too high: use other appropriate AIGI seal products.
3. Cause of excessive shaft wear and elimination methods: The lubricant has been excessively contaminated: replace with clean lubricant.

■ **Pre-installation inspection**

1. Verify that the working conditions of the equipment are within the technical parameters of AIGI 321.
   - Whether the oil seal type and specification are correct
   - Whether the size of the oil seal meets the installation requirements
   - Whether the technical parameters of the installed oil seal are in line with the working parameters of the equipment

2. Check the shaft or sleeve
   - Remove all burrs, especially where the O-ring passes through, and wrap the threads or keyway on the shaft with smooth shim to prevent cutting the O-ring.
   - The shaft surface roughness should not be greater than Ra1.6, and when sliding a fingernail over the shaft should feel smooth.
   - Make sure the diameter of the shaft or sleeve is within the tolerance range, which is: h7
   - Measure the radial runout of the shaft at the installation position of the oil seal with a runout gauge: put the table base on the stationary surface; make the table head pressed vertically on the shaft, and rotate the shaft, the radial runout (i.e., the swing range of the table needle) shall not exceed ± 0.5mm. If more than 0.5mm, the radial runout should be adjusted.
   - Using a percentage table to measure the installation of the oil seal at the shaft stir quantity. Put the table seat on the stationary surface, the table head pressed vertically on the end of the shaft end surface, and push or pull the shaft along the axial force to measure the shaft stir quantity. The stir quantity shall not exceed ± 0.5 mm, otherwise the radial stir quantity should be adjusted.
   - Use clean grease to protect the O-ring of the bushing.

■ **Installation steps**

1. Place the oil seal on a clean surface, paying attention not to damage the O-ring as well as static gasket of the oil seal.
2. Make sure that all screws pass through the locking ring and bushing, but do not protrude through the inner diameter wall.
3. When installing, reinstalling or removing the oil seal, make sure all locating blocks and hex head screws are all complete.
4. Apply grease on the shaft past the O-ring, and put the oil seal on the shaft. Then push the oil seal to make it slide on the shaft and also make sure:
   - The static sealing surface of the oil seal fits well with the sealing end face of the equipment.
   - Align the oil seal gland bolt hole with the equipment bolt to make the gland centered.
5. Tighten the gland bolts evenly. Tightening the gland bolts must be done before tightening any locking screws.
6. Tighten the locking screws evenly with a hex wrench to set the oil seal on the shaft. If tightening the screws requires rotation of the shaft, loosen or remove a locating block.
7. Remove the locating block and the screw holding it in place and store it.

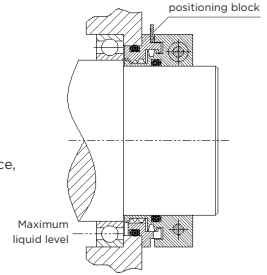
*tips: If you need to remove the 321 oil seal for readjustment or maintenance of equipment, please install the positioning block first, loosen the locking screw and gland bolt, and then remove the oil seal.

■ **Pre-installation inspection**

1. Verify the required oil seal type and specification.
2. Verifying that the operating temperature, pressure, linear speed, etc. of the equipment meet the technical requirements of the oil seal.
3. Measure the axial movement of the shaft and make sure it is less than ±0.3mm.
4. Measure the shaft runout making sure it is less than ±0.4mm.

■ **Installation steps**

1. Remove sharp chamfers, burrs and surface dirt from the shaft and seal chamber cavity and end face, and apply clean grease.
2. Bond/ glue the two split O-rings around the shaft separately.
3. Place the bonded moving ring O-ring (the smaller one) on the side away from the cavity and the bonded static ring O-ring (the larger one) on the side near the cavity.
4. Loosen the screw on the oil seal with an Allen wrench and rotate the moving and static rings, taking care not to separate the moving and static rings and to separate the oil seal.
5. Place the part of the oil seal with oil return hole under the shaft, make sure the oil return hole is at the lowest position, align the O-ring with the smaller inner diameter (so that the O-ring is installed in the groove of the inner diameter of the oil seal), and press it upward from the bottom of the shaft.
6. Pressing the other part of the oil seal onto the shaft from above and push down. Then immediately attaching the oil seal with the removed screw, but not tightening it to the final position.
7. Place the already bonded static ring O-ring (the larger one) in the oil seal outer diameter O-ring groove.
8. Push the oil seal evenly into the sealing cavity, making sure the static ring is tight against the end face of the cavity. Tighten the screw to the final position, and after positioning, just remove the 3 positioning blocks on the oil seal.

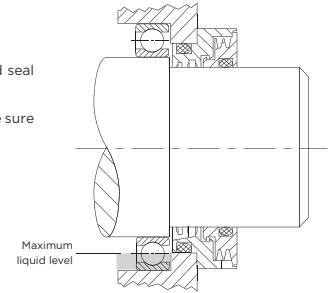


■ **Pre-installation inspection**

1. Verify the required oil seal type and specification.
2. Verify that the operating temperature, pressure, linear speed, etc. of the equipment meet the technical requirements of the oil seal.
3. Measure the axial movement of the shaft making sure it is less than ±0.3mm.
4. Measure the runout of the shaft making sure it is less than ±0.4mm.

■ **Installation steps**

1. Remove sharp chamfers, burrs and surface dirt from the end faces of the shaft and seal chamber cavity, and apply clean grease.
2. Orient the oil seal inner diameter drain end towards the seal chamber body and make sure the drain is at the lowermost end of the shaft and on the shaft.
3. Push the oil seal evenly to the final installation position.



Installation schematic

■ **Pre-installation inspection**

1. Verify the required product type and specification as well as the installation location determined at the time of selection.
2. Verify that the operating conditions of the equipment, such as temperature, pressure and linear speed, are in accordance with the technical requirements of the product.
3. Measure the runout of the shaft making sure it is less than 0.4mm and the eccentricity is less than 0.4mm.
4. Check the seal lip mounting part for excessive wear. The surface roughness is acceptableup to grade 6, and should feel smooth when scratched with finger nail.

■ **Installation steps**

1. Remove burrs and dirt from the shaft surface and apply clean lubricant to the oil seal passages.
2. Place the oil seal with the marked side facing outward.
3. Install the oil seal together with the mounting sleeve into the oil seal holder with uniform force (Figure 13-1).
4. Install the oil seal seat together with the oil seal and mounting sleeve onto the shaft as shown in Figure 13-2.
5. Push the oil seal seat and oil seal until the final installation position as shown in Figure 13-3, then the mounting sleeve will be ejected.
6. Remove the mounting sleeve and finish tightening the oil seal seat with bolts.

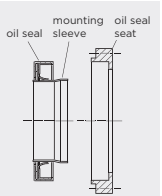


Figure 13-1

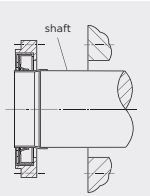


Figure 13-2

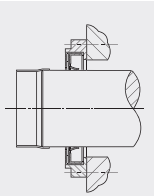


Figure 13-3

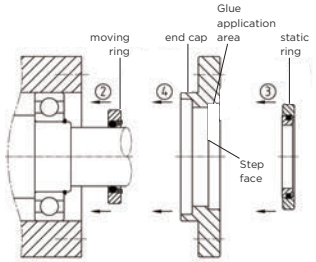
Applicable product series: AIGI 323I (323F can be referenced)

■ Pre-installation inspection

1. Verify whether the temperature, pressure and speed of the equipment comply with 323i technical performance.
2. Measurement of shaft diameter (h7 tolerance) and surface roughness not less than Ra1.6, measurement of internal diameter dimensions at the static ring installed in the end cap.
3. Measure the shaft runout ≤ 0.1; shaft runout ≤ 0.3; perpendicularity of seal chamber end face to the shaft ≤ 0.1.

■ Installation steps

1. Clean the shaft surface and apply clean grease.
2. Place the friction surface of the moving ring on the shaft facing outward, but do not push it into place.
3. Apply sealant evenly on the inner diameter of the end cap where the static ring is installed and press the static ring evenly into the housing. Tap gently with a wooden stick or rubber hammer (be careful not to damage the sealing surface) to make the static ring and the gland step surface stick together, and then wipe the excess sealant.
4. Laminate the friction surface of the moving ring and static ring and push them together evenly to the installation position.
5. Tighten the gland bolts evenly, pan the car, and confirm the installation is correct.



Installation schematic

■ Pre-installation inspection

1. Please unpack the oil seal only before installation.
2. Clean the chamber where the A-type floating oil seal is installed and remove burrs. Make sure the area in contact with the O-ring has no contaminants such as grease, dirt, metal shavings, etc. and is not scratched. Older equipment can be cleaned with a scraper to remove dirt and rust from the chamber surface, and then cleaned with a non-oil based cleaner. Finally wipe it clean with a silk or other lint free cloth (no lint).
3. Check the installation chamber and installation gap size again. Adjust by adding thin shims according to the design requirements and specific circumstances.
4. Check the metal sealing ring and O-ring to ensure their integrity and cleanliness. If the sealing surface is damaged or scratched, it must be repaired.
5. Hold and place the metal seal ring carefully to prevent damage to the sealing surface or deformation of the ring body. Install the two O-rings on the bottom of the outer taper of the two metal sealing rings separately and adjust them with proper stretching to avoid distortion or uneven stretching.

■ Installation steps

1. Install half pairs of A-type floating oil seals (metal seal ring with O-ring installed) in the corresponding chambers separately. To ensure accurate installation, it is required to be installed horizontally downward without tiltin, vertical or upside down. It is forbidden to apply lubricating grease on the floating oil seal during installation. After installation and before the equipment docking, clean grease can be applied on the sealing surface (bright belt).
2. Place the installation tool over the outer circle of the sealing surface of the metal seal ring and lock the clasp. For easy installation, keep the O-ring at the bottom of the outer taper of the metal seal ring so that its outer diameter is kept to a minimum.

3. Align the O-ring horizontally with the entrance of the chamber and smoothly apply gradual pressure to the installation tool until the O-ring slides into the chamber. Avoid poking and scratching of the sealing surface and O-ring during the process.
4. Check the O-ring position to ensure that it is level and not twisted, or arched. If so, adjustments will need to be made to restore it.
5. Check the distance between the sealing surface of the metal seal ring and the outdoor plane of the installation cavity with a depth gauge, preferably at least 6 evenly distributed points to ensure that the installation is in place and flat. If it is skewed, it needs to be adjusted and pushed again. It is required that the deflection of sealing surface should not exceed 1/2000 of the outer diameter of floating oil seal. For example, if the outer diameter of floating oil seal is 500mm, the deflection of sealing surface should not be greater than 500/2000=0.25mm after installation.
6. Before the equipment is docked, check the sealing surface of the metal seal ring again, and clean it with silk or other lint free cloth to ensure there are no impurities such as dust. Both sealing surfaces are evenly coated with a layer of clean lubricant film, making sure not to stain the oil on other surfaces. Closing and dropping the upper cover carefully, and the lower cover alignment to maintain concentric, to prevent touching the sealing surface.
7. After the equipment is assembled, inject lubricating oil, and test run for about 2 hours. Test the oil temperature and sealing parts for leakage and abnormal sound and other phenomena.

■ **AIGI A type floating oil seal installation correct error comparison:**

Incorrect installation will occur the overall jamming is not in place, the compression volume increases; part is not in place, the sealing surface is skewed, the fit is not good, the rubber ring provides an uneven response force, regional formation of rebound dead spot. Therefore excessive friction on the sealing surface, bite burn, or the formation of gaps, resulting in leakage.

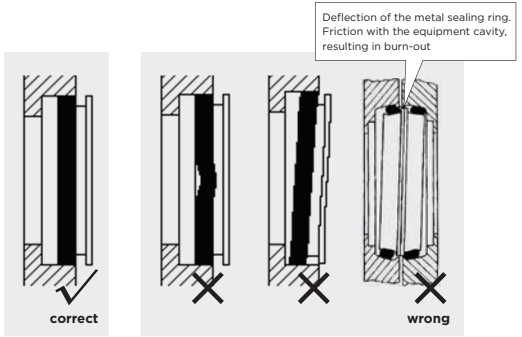
AIGI 319A/329A Series

■ **AIGI A type floating oil seal installation correct error comparison:**

Incorrect installation will occur the overall jamming is not in place, the compression volume increases; part is not in place, the sealing surface is skewed, the fit is not good, the rubber ring provides an uneven response force, regional formation of rebound dead spot. Therefore excessive friction on the sealing surface, bite burn, or the formation of gaps, resulting in leakage.

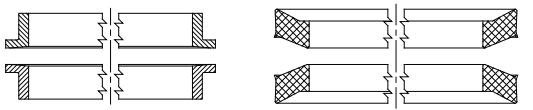
■ **Precautions for use:**

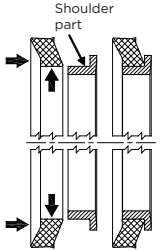
- The lubricant is generally recommended to be submerged to 1/2-2/3 of the floating oil seal;
- No metal chips, dirt and other impurities should be present in the system The total amount of impurities on a square meter surface cannot exceed 500mg, and the size of impurities cannot exceed 1mm.



AIGI B series floating oil seal component details:

NO.	Component	Amount	Materials
1	Metal sealing ring	2	FM02
2	Rubber disc type spring pad (gasket)	2	OJ01/OJ02





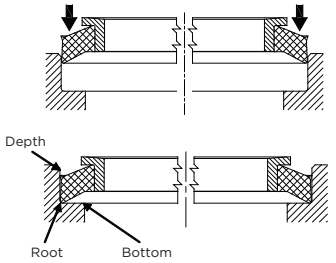
■ **Pre-installation inspection**

1. Please unpack the oil seal only before installation.
2. Clean the chamber where the B-type floating oil seal is installed. Make sure the area in contact with the O-ring has no contaminants such as grease, dirt, metal shavings, etc. Older equipment can be cleaned with a scraper to remove dirt and rust from the chamber surface, and then cleaned with a non-oil based cleaner. Finally wipe it clean with a silk or other lint free cloth (no lint).

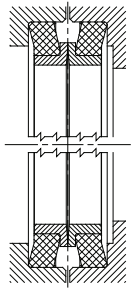
3. Check the installation chamber and installation gap size again. Adjusting by adding thin shims cording to the design requirements and specific circumstances.
4. Check the metal sealing ring and gasket to ensure their integrity and cleanliness. If the sealing surface is damaged or scratched, it must be repaired.
5. Hold and place the metal seal ring carefully to prevent damage to the sealing surface or deformation of the ring body. Install the two gaskets on the bottom of the outer taper of the two metal sealing rings separately and adjust them with proper stretching to avoid distortion or uneven stretching.

■ **Installation steps**

1. Install half pairs of B-type floating oil seals (metal seal ring with gasket installed) in the corresponding chambers separately. To ensure accurate installation, it is required to be installed horizontally downward without tilting, vertical or upside down. It is forbidden to apply lubricating grease on the floating oil seal during installation. After installation and before the equipment docking, clean grease can be applied on the sealing surface (bright belt).
2. Hold the inner side of the metal seal ring with both hands, as well as the rubber ring. Push it down with appropriate force evenly against the inner wall of the mounting groove of the chamber, so that the rubber ring is smoothly embedded in 1/4-1/3 of the mounting groove.

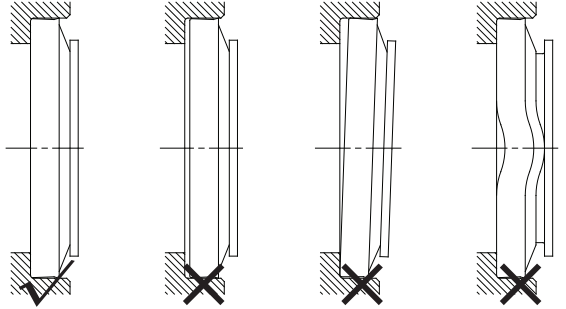


4. Check the distance between the sealing surface of the metal seal ring and the outdoor plane of the installation cavity with a depth gauge, preferably at least 6 evenly distributed points to ensure that the installation is in place and flat. If it is skewed, it needs to be adjusted and pushed again. It is required that the deflection of sealing surface should not exceed 1/2000 of the outer diameter of floating oil seal. For example, if the outer diameter of floating oil seal is 500mm, the deflection of sealing surface should not be greater than 500/2000=0.25mm after installation.
5. Before the equipment is docked, check the sealing surface of the metal seal ring again, and clean it with silk or other lint free cloth to ensure there are no impurities such as dust. Both sealing surfaces are evenly coated with a layer of clean lubricant film, making sure not to stain the oil on other surfaces. Closing and dropping the upper cover carefully, and the lower cover alignment to maintain concentric, to prevent touching the sealing surface.
6. After the equipment is assembled, inject lubricating oil, and test run for about 2 hours. Test the oil temperature and sealing parts for leakage and abnormal sound and other phenomena.



■ **AIGI B type floating oil seal installation correct error comparison:**

Incorrect installation will occur the overall jamming is not in place, the compression volume increases; part is not in place, the sealing surface is skewed, the fit is not good, the rubber ring provides an uneven response force, regional formation of rebound dead spot. Therefore excessive friction on the sealing surface, bite burn, or the formation of gaps, resulting in leakage.



■ **Precautions for use:**

1. The lubricant is generally recommended to be submerged to 1/2-2/3 of the floating oil seal;
2. No metal chips, dirt and other impurities should be present in the system. The total amount of impurities on a square meter surface cannot exceed 500mg, and the size of impurities cannot exceed 1mm.