

# 风力发电机组主轴承 密封圈安装说明

Wind turbine main shaft seal  
installation instructions



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Effect of sealing products installed on its use is large, proper and careful installation is a prerequisite to guarantee seals working properly. Users at its sole please read this installation guide carefully before installing the sealing products, with a view to achieve the best product. If you have any questions, please call.

密封产品的安装对其使用效果影响很大, 正确、细心的安装是保证密封件正常工作的前提条件。用户在自行安装密封产品之前请认真阅读本安装指南, 以期达到产品的最佳效果。如有疑问, 欢迎来电垂询。

## ■ Rotary shaft type seal installation structure and requirements

### 旋转轴唇形密封件的安装结构及要求

#### ● The material of the shaft

##### 轴的材料

The material of the shaft is made of carbon steel, stainless steel. High speeds, chrome plated, reached Rockwell HRC50~55 hardness, coating should not be too thin to avoid flaking; need for quenching and tempering time of shafts cannot be too short, tempering speed should be slower to ensure quenched surface evenly.

轴的材料为碳钢、不锈钢。高速时表面镀铬, 硬度达到洛氏 HRC50~55, 镀层不能太薄, 避免剥落; 需要调质处理的轴调质时间不能太短, 速度要慢, 以确保调质表面均匀。

#### ● Design of the Shaft and the Groove

##### 轴和沟槽的设计

Shaft surface must be smooth, free of burrs and scratches, so as not to damage the sealing lip; in addition, spiral traces of processing production pumping effect caused by leakage, it is recommended that the oil seal installation area to ground. Surface roughness of Ra0.1~0.5 $\mu$ m. Smooth surface finish requirements as the speed increases, but overly smooth surface is not recommended.

轴的表面必须光滑, 没有毛刺和刮痕, 以免伤害密封唇部; 另外, 螺旋状的加工痕迹会生产泵吸效应而导致泄漏, 所以建议油封安装区域要研磨。工作表面粗糙度为 Ra0.1~0.5 $\mu$ m。表面光洁度随速度增加而要求光洁, 但是过于光滑的表面也不推荐。

In order to install or to remove without damage to the seals, shaft and Groove, designers had to design a chamfer or rounded corners, as shown in figures 1-1 and 1-2.

为了安装或拆卸时不损坏密封件、轴和沟槽，设计师必须设计倒角或圆角，如图 1-1 和图 1-2 所示。

b Seal High	b1 (0.85 x b) mm	b2 (b + 0.3) mm	r max.
7	5.95	7.3	0.5
5	6.80	8.3	0.5
10	8.50	10.3	0.5
12	10.30	12.3	0.7
15	12.75	15.3	0.7
20	17.00	20.3	0.7

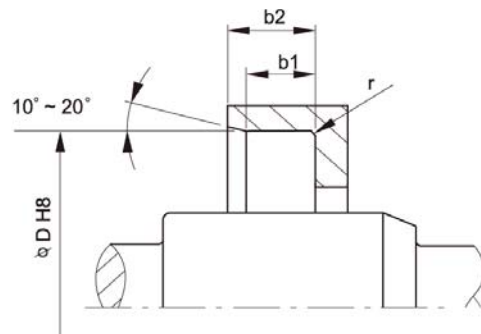


Fig.1-1

Design of Groove chamfer

d	d3	R	d	d3	R
<10	d -1.5	2	70~95	d -4.5	5
10~20	d -2.0	2	95~130	d -5.5	6
20~30	d -2.5	3	130~240	d -7.0	8
30~40	d -3.0	3	240~500	d -11.0	12
40~50	d -3.5	4	500~800	d -14.0	14
50~70	d -4.0	4	800~1250	d -18.0	16

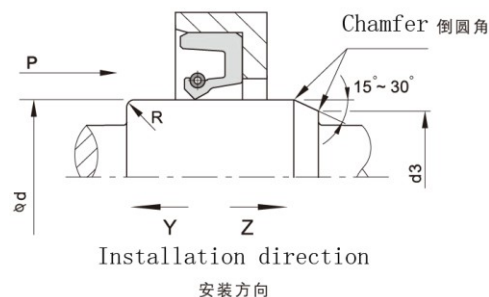


Fig.1-2

Design of shaft chamfer

## Rotary shaft type seal installation

### 旋转轴唇形密封件的安装

Installation is a prerequisite for guarantee the good features of the seals carefully. In view of the online installation of the wind turbine main shaft seal, some special requirements need attention. The installation sequence must follow the end Cap—Seal—Plate. Details as follows:

细心安装是保证密封圈良好功能的先决条件，针对风电主轴密封现场安装情况，提出一些特别的要求，安装顺序务必按照端盖——密封件——压板，具体操作要求如下：

#### 1. The Preparations before installation

##### 1、安装前准备

1.1. First install the end cover in place, and screw nut must be fastened. Please ensure the concentricity between the end cover and the shaft, this is to ensure the concentricity between the seal and the shaft.

1.1、先将端盖安装到位，螺母锁死固定，请须保证端盖与轴的同心度，这样才能确保密封件与轴的同心度。

1.2. Cleaning grooves: The surface of the shaft and the inside of the cavity hole must be free of foreign matter such as rust-proof oil or sand. When cleaning with washing oil and gasoline, be sure to wipe clean. It is

very effective to clean the hard-to-observe parts by spraying with compressed air.

1.2、清洁沟槽: 轴表面与腔体孔内面确认不得附有防锈油或砂尘等异物, 如已附有时, 须予以清洁。用洗油和汽油清洗时, 务必擦拭干净。用压缩空气喷射, 可清理干净不易观察的部位, 非常有效。

1.3. There should be no burrs or defects when the inner surface of the cavity hole, the chamfered part and the oil seal pass through the shaft end and the shaft. Because burrs and defects will damage the lips and the peripheral surface during installation, they can be removed with emery.

1.3、腔体孔内面、倒角部分以及油封在通过轴端与轴时, 不应有毛刺及缺陷。因为毛刺及缺陷会在安装时损伤唇口端部与外周面, 可用金刚砂予以除去。

1.4. It is confirmed that there is no defect or rust when the lip part contacts the shaft surface, the defect and rust on the shaft surface are the direct cause of leakage.

1.4、确认在唇口部接触轴表面时无缺陷及锈蚀, 轴表面的缺陷与锈蚀是泄漏的直接原因。

1.5. Check whether the product is intact before installation; make sure that the oil seal is not attached with oil seals such as sand and dust, which will cause leakage. Do not rub the end of the lip with your nails and hard objects. The end of the lip is the most important part of the oil seal.

1.5、安装前检查产品是否完好无损; 确认油封不要附着有砂、尘等异物的油封, 这会造成泄露。不要用指甲及硬物摩擦油封唇口端部, 唇口端部是承担油封功能的最重要的部分。

## 2. Seal installation

### 2、密封件安装

2.1 Apply grease evenly to the inside of the groove cavity and the shaft surface, and ensure that it is fully applied. Apply grease between the lips to make it easier to install the oil seal and prevent seal damage.

2.1、在沟槽腔体内面与轴表面均匀涂抹润滑脂, 须保证全部涂抹到位。在双唇口之间涂抹润滑脂, 这样便于油封的安装, 防止密封件损伤。

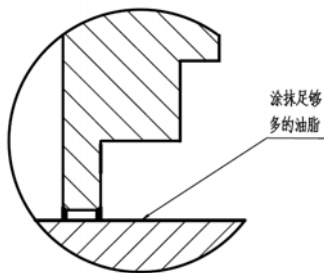


图 2. 安装沟槽油脂涂抹  
Fig 2. Mounting groove

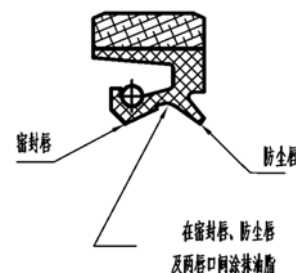


图 3. 密封件油脂涂抹位  
Fig 3. Seal grease application

2.2 When installing the oil seal, press the radial seal ring into the groove horizontally to ensure uniform force around the oil seal. If you cannot squeeze into the groove by hand, you can use a flat wooden board and a rubber hammer to strike the circumference of the seal evenly. Make sure that the seal enters the groove

horizontally and evenly. Do not install one side in place first. This will cause an inclined installation and will cause leakage.

2.2、安装油封时将径向密封圈水平压入沟槽内, 保证油封四周受力均匀。如无法通过手挤压进入沟槽, 可借用平整的木板与橡胶锤, 均匀地敲击密封件圆周, 须保证密封件是水平均匀进入沟槽。不要先将一侧安装到位, 这会造成倾斜安装, 将导致泄漏发生的可能。

2.3 During the installation, always pay attention to ensure that the spring is in the spring groove and the sealing lip is in the correct state. After the seal has completely entered the groove, check whether the lip part and the spring are in working state, that is, the spring is in the spring groove, and the lip part is not turned over.

2.3、安装过程中, 时刻注意保证弹簧处于弹簧槽内, 密封唇口处于正确状态。待密封件完全进入沟槽内, 检查唇口部分与弹簧是否处于工作状态, 即弹簧在弹簧槽内, 唇口部分没有出现翻转。

### 3. The complete of installation

#### 3、安装完成

3.1 Install the pressure plate: After the seal is installed, install the pressure plate. When the pressure plate is tightened, it must be tightened in accordance with the requirements of step 2.2. This can ensure that the pressure plate is tightened under the horizontal uniform force as much as possible.

3.1、安装压板: 密封件安装好后再安装压板, 在压板紧固时, 须按照步骤 2.2 的要求紧固, 这样可以尽可能地保证了压板在水平均匀受力下紧固。

3.2 Clean the site and complete the installation.

3.2 清洁现场, 完成安装。

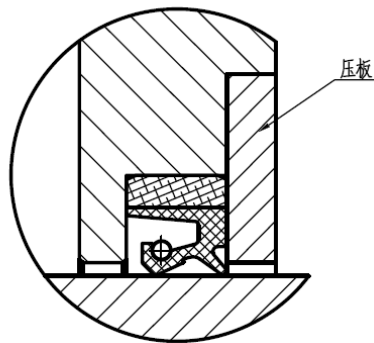


图 4. 安装完成示意图

Fig 4. Installation complete diagram

