

应用建议

Application Advice

沿轴产生的感应电压会产生同时经过轴两端轴承、轴承座的电流回路，这类轴电压产生的一个原因是由于电机内部磁通量分布不均匀，

尤其在一些极对数较少的电机中，此时，只需绝缘一端轴承就可以完全切断电流回路，通常绝缘非驱动端轴承。

如果电压发生在轴与轴承座之间，电流会以相同方向通过每个轴承，这主要是由于变频器带来的共模电压导致，在这种情况下，电机两端的轴承都应采用绝缘轴承。

选择绝缘的关键因素是电流电压的时间特性。如果是直流电压或低频交流电压，绝缘效果取决于绝缘层的纯电阻值；如果是高频交流电压，如使用变频器的设备中，此时，取决于绝缘层的容抗值。

The induced voltage generated along the axis produces a current loop that passes through both ends of the shaft and the bearing housing. One reason for this type of shaft voltage is due to the uneven distribution of magnetic flux inside the motor.

Especially in some motors with few pole pairs, in this case, it is only necessary to insulate one end of the bearing to completely cut off the current loop, usually the non-drive end bearing. If the voltage occurs between the shaft and the housing, the current will pass through each bearing in the same direction, mainly due to the common mode voltage brought by the inverter. In this case, the bearings at both ends of the motor should be insulated bearings.

The key factor in choosing insulation is the time characteristic of the current and voltage. In the case of DC voltage or low frequency AC voltage, the insulation effect depends on the pure resistance value of the insulation layer; if it is a high frequency AC voltage, such as in a device using a frequency converter, at this time, it depends on the capacitance value of the insulation layer.

可提供的轴承类型

Available bearing types

- 1、单列深沟球轴承
- 2、单列圆柱滚子轴承
- 3、也可根据客户需求，提供四点接触球轴承、带凸缘的圆锥滚子轴承、圆锥滚子轴承单元（TBU）、牵引电机轴承单元等类型

1. single row deep groove ball bearings
2. single row cylindrical roller bearing
3. can also provide four-point contact ball bearings, tapered tapered roller bearings, tapered roller bearing units (TBU), traction motor bearing units, etc. according to customer needs

设计及变型

Design and variant

- 1、外圈带绝缘涂层的绝缘轴承后缀
 - J20B-击穿电压500VDC，干燥工作环境，涂层厚度 100微米
 - J20A-击穿电压1000VDC，干燥工作环境，涂层厚度>300微米，外径 500mm时优先选用
 - J20AB-击穿电压1000VDC，干燥、潮湿工作环境，涂层厚度100微米
 - J20AA-击穿电压3000VDC，干燥、潮湿工作环境，涂层厚度200微米
- 2、内圈带绝缘涂层的绝缘轴承后缀
 - J20C-击穿电压3000VDC，干燥、潮湿工作环境，涂层厚度200微米

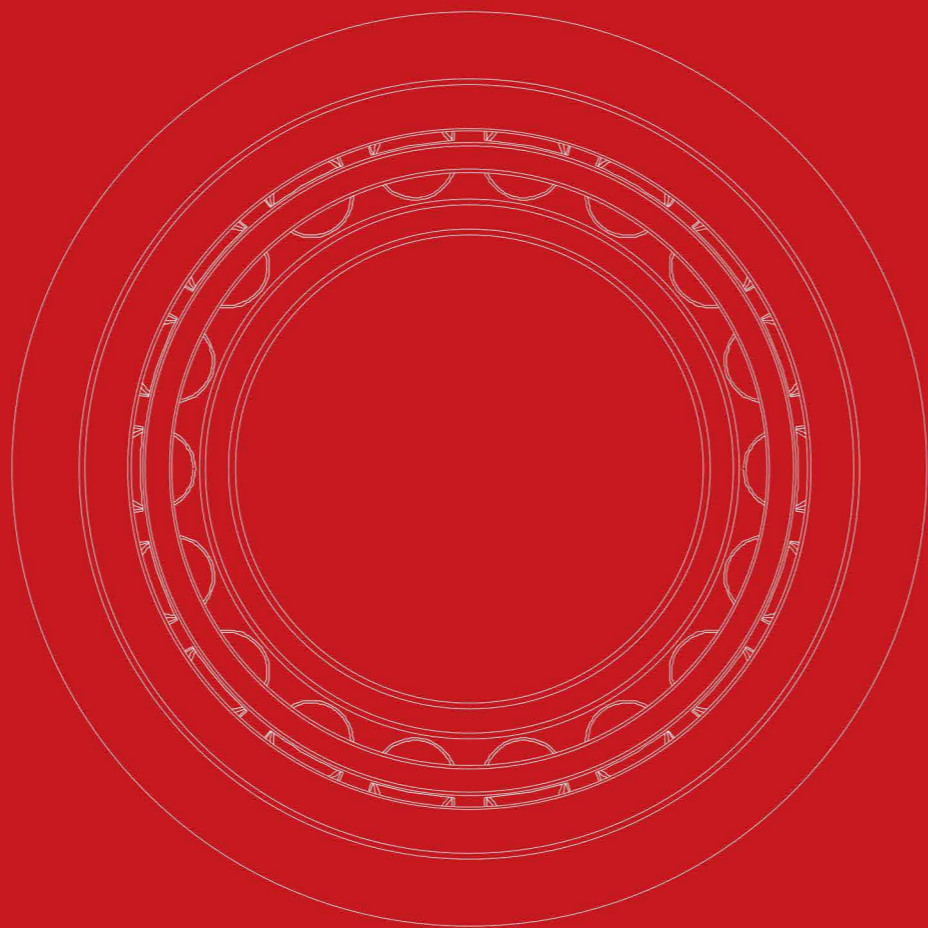
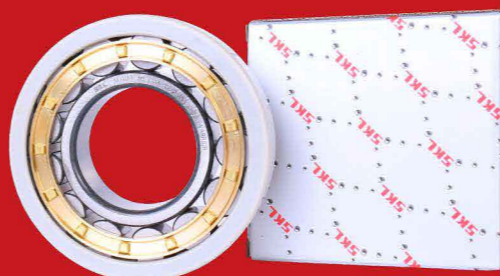
说明：型号尺寸表中显示的型号为标准绝缘设计，当默认后缀不能满足客户使用工况时，请订货时明确说明选择的绝缘轴承后缀。对于需要更高压的应用，SKL还能提供外圈带绝缘涂层厚度超过300毫米的轴承。

1. Insulated bearing suffix with outer coating and insulating coating
 - J20B-breakdown voltage 500VDC, dry working environment, coating thickness 100 microns
 - J20A-breakdown voltage 1000VDC, dry working environment, coating thickness >300 microns, outer diameter 500mm preferred
 - J20AB - breakdown voltage 1000VDC, dry, humid working environment, coating thickness 100 microns
 - J20AA-breakdown voltage 3000VDC, dry, humid working environment, coating thickness 200 microns
2. Insulated bearing suffix with insulating coating on inner ring
 - J20C-breakdown voltage 3000VDC, dry, humid working environment, coating thickness 200 microns

Note: The model shown in the model size table is a standard insulation design. When the default suffix does not meet the customer's working conditions, please specify the selected insulation bearing suffix when ordering. For applications requiring higher pressures, SKL also offers bearings with an outer ring with an insulating layer thickness of over 300 mm.

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静音电绝缘轴承

SILENT ELECTRICALLY-INSULATED BEARING



应用领域

Application Field

轨道车辆的牵引电机和轮对轴承、动力传输系统的交流和直流电机、风发电及相关设备、齿轮箱、减速机、工程机械等需要对轴承进行绝缘的工况。

Traction motors and wheelset bearings for rail vehicles, AC and DC motors for power transmission systems, wind power generation and related equipment, gearboxes, reducers, construction machinery, etc. require insulation of the bearings.

原理

Principle

在内圈或外圈的外表面涂覆有绝缘的氧化铝层，通过应用等离子喷涂工艺，获得高质量的光洁度。该涂层硬度高、耐磨损，并有很好的热传导和绝缘性能。

The outer surface of the inner or outer ring is coated with an insulating layer of alumina, and a high quality finish is obtained by applying a plasma spray process. The coating is high in hardness, wear resistant, and has good heat transfer and insulation properties.

特性

Characteristic

无论是内圈还是外圈带陶瓷涂层的轴承，所有能阻止电流通过的滚动轴承均可称为电绝缘轴承，陶瓷涂层可防止电流通过，具有良好的绝缘能力，混合式轴承的滚动体由陶瓷制成，因此也具有绝缘能力，它由滚动体来防止电流通过。电绝缘轴承的特性为：

- 1、防止电气腐蚀
- 2、高电阻（最小电阻为200M，可承受高达3000V的直流电压）
- 3、电气性能好（采用独特的密封胶，用来防止凝结水的渗透）

通过采用新的计算和加工方法，优化设计的滚动体与滚道的接触状态，更小的表面粗糙度和更高的几何精度等措施，使电绝缘轴承高速运转时静音效果显著。

Whether it is a bearing with ceramic coating on the inner ring or the outer ring, all rolling bearings that can block the passage of current can be called electrically insulated bearings. The ceramic coating can prevent the passage of current and has good insulation ability. The rolling elements of the hybrid bearing are composed of it is made of ceramic and therefore has an insulating ability, which is prevented by the rolling elements from passing current. The characteristics of electrically insulated bearings are:

- 1, to prevent electrical corrosion
- 2, high resistance (minimum resistance is 200M , can withstand DC voltage up to 3000V)
- 3, good electrical performance (using a unique sealant to prevent the penetration of condensate)

By adopting new calculation and processing methods, the contact state of the designed rolling element and the raceway is optimized, and the measures such as smaller surface roughness and higher geometric precision make the electric insulating bearing have a significant mute effect at high speed.



带泵步进电机 ▲



直流无刷电机 ▲



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高铁用齿轮箱 ▲



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