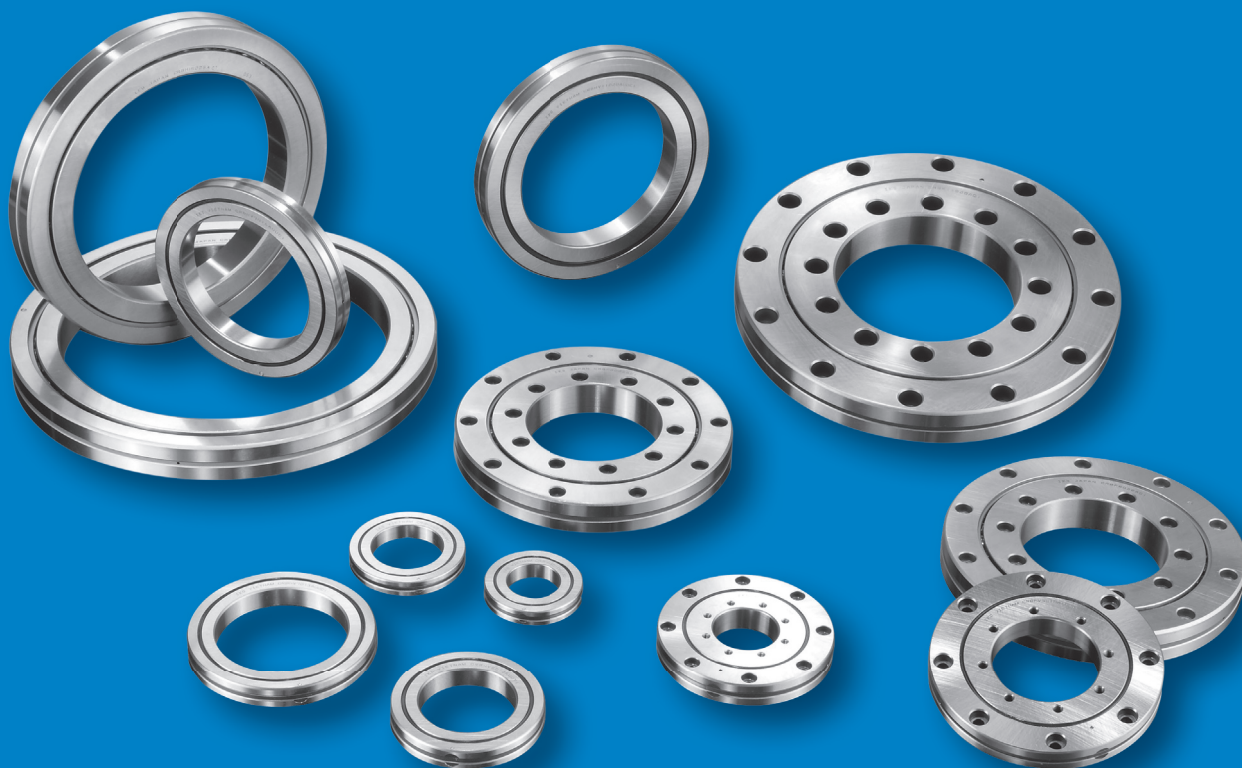




赛伯克斯轴承
CyberX Bearing

精密交叉滚子轴承

Precision Cross Roller Bearing



赛伯克斯工业科技(洛阳)有限公司
Cyberx Industrial Technology (Luoyang) Co., Ltd.



企业简介

COMPANY INTRODUCTION

赛伯克斯工业科技（洛阳）有限公司，坐落于中国著名的轴承之都——洛阳，继承并发扬了洛阳轴承的创新精神与技术精髓。自2006年起，公司开始为日本加茂公司定制BRD交叉滚子轴承，自此专注于研发与制造高品质的精密交叉滚子轴承、转台轴承、转盘轴承以及各类定制轴承，积累了近二十年的专业技术经验。本公司产品成功突破了国外品牌的技术垄断，成为德国INA、日本NSK、IKO、THK等知名品牌轴承的优质替代品，广泛应用于机器人技术、自动化设备、数控机床、医疗机械、航空航天、通信雷达、气象监测、新能源等多个高端领域。

赛伯克斯公司凭借洛阳轴承生产基地的先进技术资源，致力于提供长期稳定且高性价比的产品，赢得了国内外客户的广泛赞誉。我们的产品覆盖了中国20多个省份和城市，并且成功打入国际市场，远销至美国、德国、意大利、西班牙、挪威、俄罗斯、韩国、印度、南美等全球多个国家和地区。赛伯克斯公司以其卓越的产品质量和 service 赢得了客户的高度认可。我们诚挚邀请广大客户莅临洽谈合作，期待与您建立真诚的伙伴关系，共同迈向共赢的未来。

Cyberx Industrial Technology (Luoyang) Co., Ltd., located in the renowned "Capital of Bearings" in China—Luoyang, carries forward the spirit of innovation and the essence of technology from Luoyang bearings. Since 2006, the company has been customizing BRD crossed roller bearings for Japan's Kamo Corporation, and has since specialized in the research and development as well as manufacturing of high-precision crossed roller bearings, rotary table bearings, turntable bearings, and various customized bearings, accumulating nearly two decades of professional technical experience. Our products have successfully broken through the technological monopoly of foreign brands, becoming a high-quality alternative to well-known brands such as Germany's INA, Japan's NSK, IKO, and THK bearings. They are widely used in multiple high-end fields including robotics technology, automation equipment, CNC machine tools, medical machinery, aerospace, communication radar, meteorological monitoring, and new energy.

Cyberx Company, leveraging the advanced technological resources of the Luoyang bearing production base, is committed to providing long-term stable and cost-effective products, which has earned widespread acclaim from domestic and international customers. Our products are distributed across more than 20 provinces and cities in China and have successfully entered the international market, being exported to numerous countries and regions around the world, including the United States, Germany, Italy, Spain, Norway, Russia, South Korea, India, and South America. Cyberx Company has won high recognition from customers for its outstanding product quality and service. We cordially invite customers to visit and discuss cooperation, looking forward to establishing a sincere partnership with you, and moving towards a win-win future together.

主要采用市场/APPLICATION



金属机床
Metal Working Machine



金属加工机械
Processing Machine



测定·分析·试验设备
Measurement, Analytical and Test Systems



医疗机械
Medical Equipment



望远镜
Telescopes



能量相关
Energy



通信设备
Communication Equipment



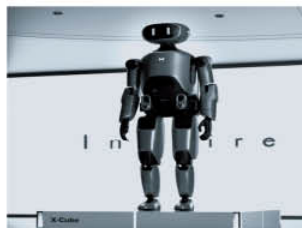
包装·装箱设备
Crating and Packaging Machines



航天设备
Space Equipment



工业机器人
Industrial Robots



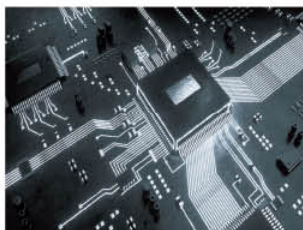
人型机器人
Humanoid Robots



玻璃·陶瓷制造装置
Glass and Ceramic Manufacturing System



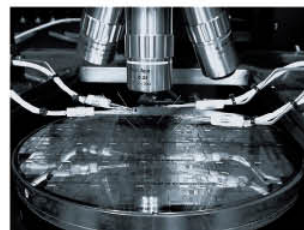
印刷·装订·纸品加工机械
Printing, Bookbinding and Paper



印刷电路制造装置
Printed Circuit Board Manufacturing Machines



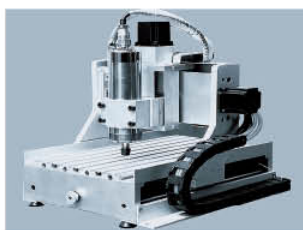
航空器相关
Aircraft



半导体制造装置
Semiconductor Manufacturing Systems



FPD制造装置
Flat Panel Display Manufacturing Systems



木材·轻金属·塑料加工机床
Wood, Light Metal and Plastic Machine Tools



造纸机械
Paper-making Machines



光学相关机械
Optical Machines

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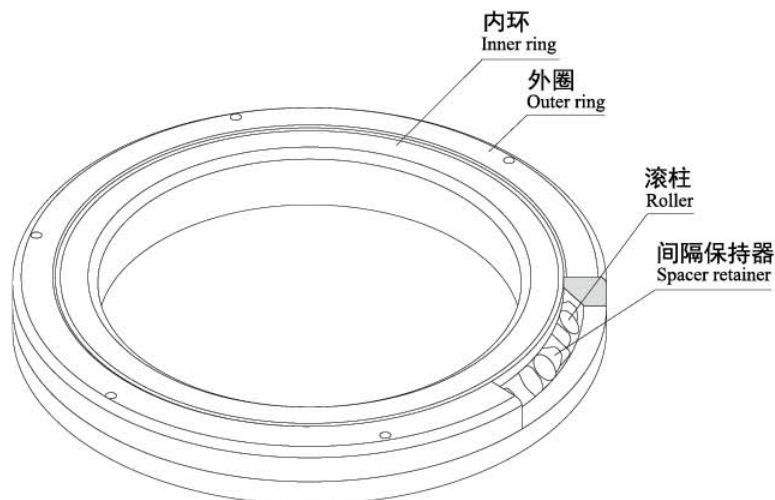
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特长与类型 Features and Types

■ 交叉滚子轴承的特长 >> Features of the Cross-Roller Bearing



交叉滚子轴承RB型的结构
Structure of Cross Roller-Ring Model RB

◎ 结构与特点 Structure and Features

在交叉滚子轴承中，因圆柱形滚柱在呈90°的V形沟槽滚动面上通过间隔保持器被相互垂直排列，这种设计使得单个轴承就可承受径向载荷、轴向载荷及力矩载荷等所有方向的负荷。

尽管内外圈尺寸被最小限度的小型化，但是交叉滚子轴承仍具有高刚性，所以最适合于工业用机器人的关节部或旋转部、加工中心机的旋转工作台、机械手旋转部、精密旋转工作台、医疗设备、测量仪、IC制造装置等的用途。

With the Cross-Roller Bearing, cylindrical rollers are arranged with each roller perpendicular to the adjacent roller, in a 90°V groove, separated from each other by a spacer retainer. This design allows just one bearing to receive loads in all directions including radial, axial and moment loads.

Since the Cross-Roller Bearing achieves high rigidity despite the minimum possible dimensions of the inner and outer rings, it is optimal for applications such as joints and swiveling units of industrial robots, swiveling tables of machining centers, rotary units of manipulators, precision rotary tables, medical equipment, measuring instruments and IC manufacturing machines.

◎ 高旋转精度 High Rotation Accuracy

因在垂直排列的滚柱间装有间隔保持器，防止了滚柱的侧倒或滚柱的相互摩擦，所以能防止旋转扭矩的

增加。另外，与以往使用铁板保持器的类型相比，不会发生滚柱的一方接触现象或锁死现象。即使被施加预压，也能获得稳定的旋转运动。

并且，由于内圈或外圈是分割为2部分的构造，可以调整预压，所以可获得高精度的旋转运动。

The spacer retainer fitting among cross-arrayed rollers prevents rollers from skewing and the rotational torque from increasing due to friction between rollers. Unlike conventional types using steel sheet retainers, the Cross-Roller Bearing does not cause unilateral contact of roller or seize. Thus, even under a preload, the Cross-Roller Bearing provides stable rotation.

Since the inner and outer rings are designed to be separable, the preload can be adjusted, and this feature enables accurate rotation.

◎操作容易 Easy Handling

被分割的内圈或外圈，在装入滚柱和间隔保持器后，与交叉滚子轴圈固定在一起，以防止互相分离，故安装交叉滚子轴承时操作十分简单。

The inner and outer rings, which are separable, are secured to the Cross-Roller Bearing body after being installed with rollers and spacer retainers in order to prevent the rings from separating from each other. Thus, it is easy to handle the rings when installing the Cross-Roller Bearing.

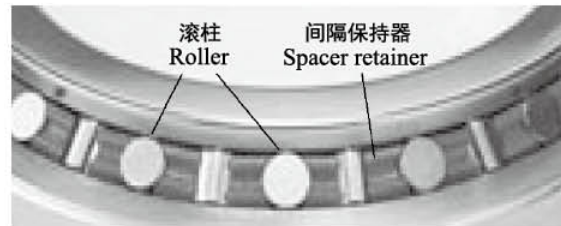
◎防止滚柱侧倒 Skewing Prevention

通过间隔保持器使滚柱间的相互摩擦消失，还防止了滚柱的侧倒，从而能获得稳定的旋转扭矩。

The spacer retainer keeps rollers in their proper position, thereby preventing them from skewing (tilted rollers). This eliminates friction between rollers, and therefore secures a stable rotational torque.

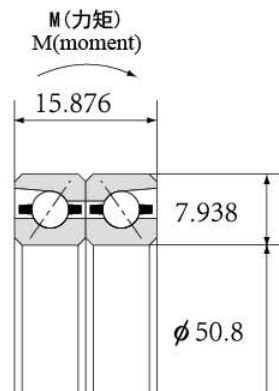
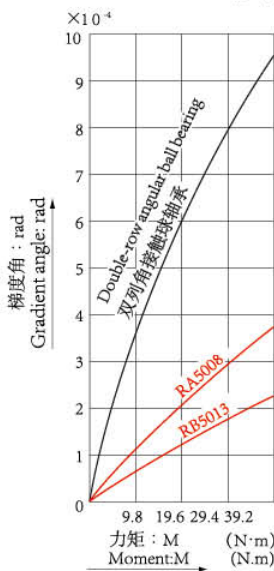
◎大幅度地提高了刚性（比传统型号提高3~4倍） Increased Rigidity (Three to Four Times Greater than the Conventional Type)

与使用双列薄形角接触球轴承不同，由于滚柱为交叉排列，因此只用1个交叉滚子轴承就可承受各个方向的负荷。并且与传统型号相比，刚性被提高了3~4倍。

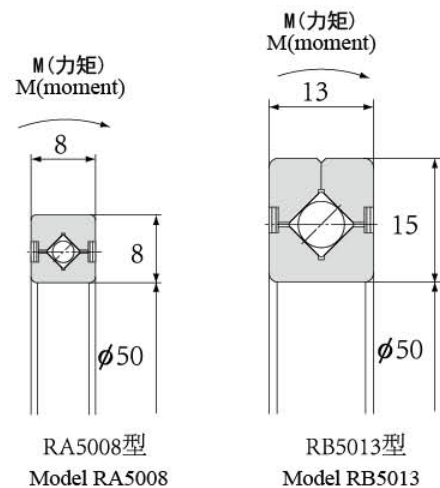


Unlike the thin angular ball bearings installed in double rows, the cross array of rollers allows a single Cross-Roller Bearing unit to receive loads in all directions, increasing the rigidity to three to four times greater than the conventional type.

力矩刚性图 Moment Rigidity Diagram



角接触球轴承
Angular ball bearing



交叉滚柱轴环
Cross Roller Ring



◎大负荷容量 Large Load Capacity

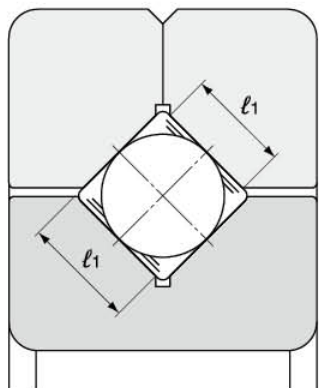
与以往的铁板保持器相比，间隔保持器可增大滚柱的有效接触长度，从而大幅提高了负荷容量。

同时，间隔保持器对每个滚柱的全长进行保持导向，但是在以往配有保持器的型号中滚柱的导向部只有滚柱中央1点。这种一点接触不能有效地防止滚柱的倾斜。

Compared with conventional steel sheet retainers, the spacer retainer allows a longer effective contact length of each roller, thus significantly increasing the load capacity. The spacer retainer guides rollers by supporting them over the entire length of each roller, whereas the conventional type of retainer supports them only at a point at the center of each roller. Such one-point contact cannot sufficiently prevent skewing.

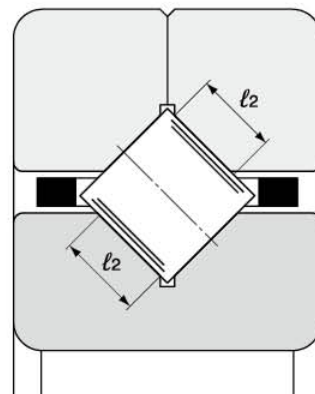
滚柱接触长度

Roller contact length



配有间隔保持器
With a spacer retainer

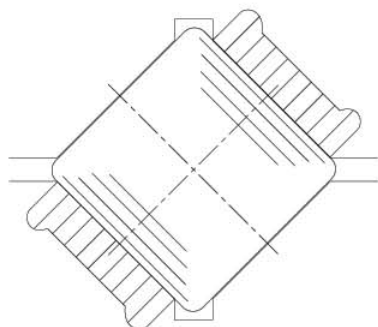
$$l_1 > l_2$$



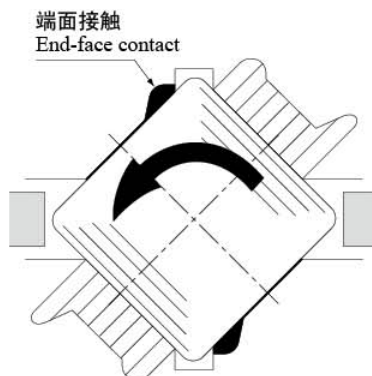
配有钢板保持器 (传统型)
With a steel sheet retainer (conventional type)

在传统型号中，如下图所示，外圈侧和内圈侧的负荷区域相对于滚柱长度的中央为不对称结构。因而，随著负荷的增大，力矩也增大，引起端面接触。此外，由于摩擦阻力增大，从而不能进行平稳的旋转运动，磨损也将加快。

In conventional types, the loaded areas are asymmetrical between the outer ring and the inner ring sides around the roller longitudinal axis. The greater the applied load is, the greater the moment becomes, leading end-face contact to occur. This causes frictional resistance, which hinders smooth rotation and quickens wear.



负荷区对称
配有间隔保持器
Loaded areas symmetrical
With a spacer retainer



端面接触
End-face contact
负荷区不对称
配有间隔保持器 (传统型)
Loaded areas asymmetrical
With a steel sheet retainer (conventional type)

■ 交叉滚子轴承的类型 >>

Types of the Cross-Roller Bearing

◎ 种类与特长 Types and Features

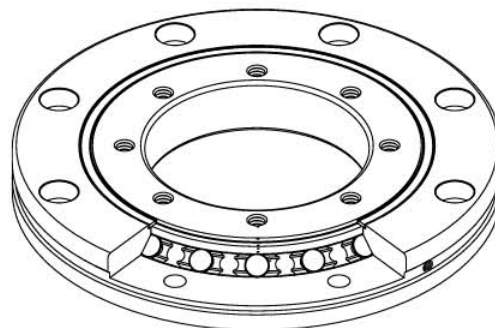
RU/CRBTF型(内外圈一体型)

Model RU/CRBTF (Integrated Inner/Outer Ring Type)

由于是内外圈一体化构造并有安装孔，所以不需要法兰和支承座，安装简便。

另外，安装对性能几乎没有影响，因此能够获得稳定的旋转精度和扭矩。能用于外圈和内圈旋转。

The integrated design of the unit's inner and outer rings, with mounting holes on both rings, eliminates the need for a special flange or housing and enables easy installation. Mounting has virtually no effect on performance, which ensures stable, accurate rotation and torque. Can be used for both outer and inner ring rotation.



RU/CRBTF型

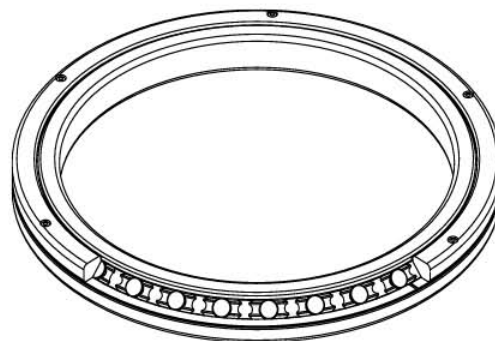
Model RU/CRBTF

RB型(外圈分割型、内圈旋转用)

Model RB (Separable Outer Ring Type for Inner Ring Rotation)

此型号为交叉滚子轴承的基本型，带有被分割的外圈，和与主体形成一体化的内圈。它最适合用于要求内圈旋转精度的部位。例如，它可用于工具机的转位工作台的旋转部分。

Cross-Roller Bearing basic type, with a separable outer ring, and an inner ring integrated with the main body. It is used in locations where the rotational accuracy of the inner ring is required. It is used, for example, in the swivel portions of index tables of machine tools.



RB型

Model RB

RAU型(内外圈一体型/RA型兼容型)

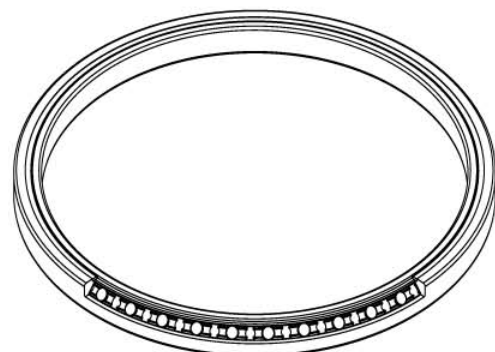
Model RAU (Integrated Inner&Outer Ring Type/Model RA Interchangeable Type)

RAU型号由于断面面积积极小，可实现装置的轻量、小型化。由于是内外圈一体化构造，可用于外圈旋转和内圈旋转。

另有宽度5mm的薄型和RA型兼容型。薄型系列的产品阵容从内径10mm超小型起可供选择。

The extremely small cross-sectional area allows it to be used in lightweight, compact devices. The integrated inner/outer ring structure can be used for both inner and outer ring rotation.

There is a 5 mm thin type and an RA interchangeable type. The thin type product lineup starts at a micro-sized 10 mm inner diameter.



RAU型

Model RAU

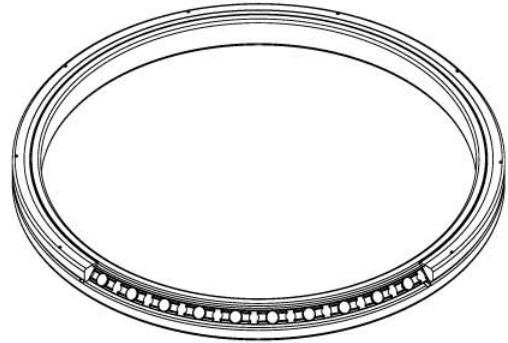


RA型 (外圈分割型、内圈旋转用)

Model RA (Separable Outer Ring Type for Inner Ring Rotation)

此型号是将RB型内外圈厚度减小到极限的紧凑型。可实现机器人和机械手旋转部等产品的轻重量、小型化设计。

A compact type similar to model RB with the thinnest possible inner and outer rings. It enables lightweight and compact designs for the swiveling hand portions of manipulators and robots.



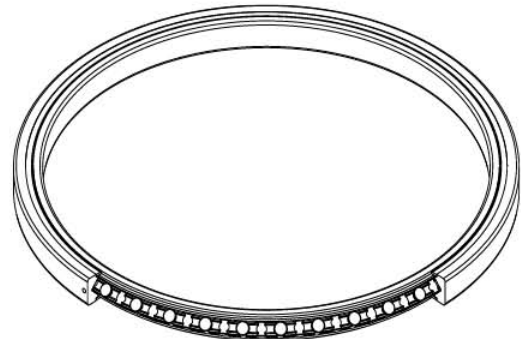
RA型
Model RA

RA-C型 (单一裂缝型)

Model RA-C (Single-Split Type)

主要的尺寸与RA型相同。由于该型号为外圈一个缺口结构，外圈也具有高刚性，因此也可用于外圈旋转。

The main dimensions are the same as that of model RA. Owing to its Single-split Outer Ring structure with a highly rigid outer ring, this model can be used for outer ring rotation.



RA-C型
Model RA-C

RBU/CRBH型 (内外圈一体型)

Model RBU/CRBH (Inner and outer ring integrated type)

在RBU形轴环中，因滚柱在呈90°的V形沟槽滚动面上通过间隔保持器被相互垂直排列，这种设计使得单个轴承就可承受径向载荷、轴向载荷及力矩载荷等所有方向的负荷。此外，内圈和外圈分别为一体化结构，所以内圈旋转、外圈旋转都可以使用。

Because the RBU/CRBH features cylindrical rollers that are arranged orthogonal between spacer cages inside a 90° V-shaped raceway, a single bearing can handle radial, axial, and moment loads in all directions. In addition, it can be used for both inner-ring and outer-ring rotation because neither the inner nor outer ring has a split structure.



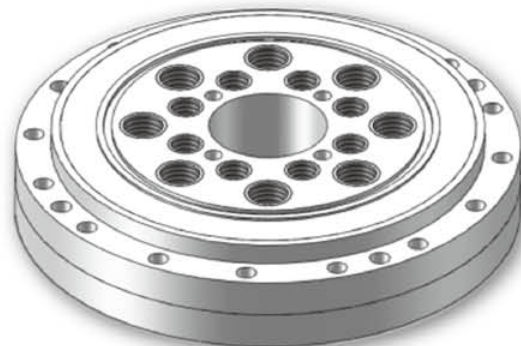
RBU/CRBH型
Model RBU/CRBH

CSF/CSG型（杯型谐波专用轴承）

Model CSF/CSG (Cup-type harmonic special bearing)

其结构为外圈分半、内圈整体型，适合于要求内圈旋转精度要求高的部位，由于内外圈已经加工了安装孔，所以不需要固定法兰和支撑座，更加有利于安装，主要应用于机器人CSF/CSG系列谐波减速器。

CSF/CSG structure is divided into half of the outer ring and the inner ring as a whole, which is suitable for the parts requiring high rotation accuracy of the inner ring. Since the inner and outer rings have been processed with mounting holes, there is no need for fixed flanges and supporting seats, which is more conducive to installation. It is mainly applied to robot CSF/CSG series harmonic reducer.



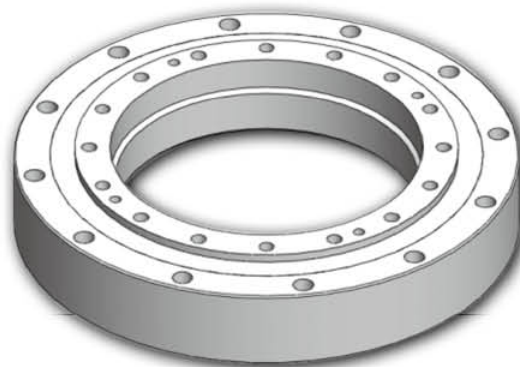
CSF/CSG型
Model CSF/CSG

SHF/SHG型（帽型谐波专用轴承）

Model SHF/SHG (Cap-type harmonic special bearing)

其结构为外圈和内圈均为整体型，适合于内圈和外圈都要求旋转精度高的部位，该系列设计为整体型结构，避免了安装过程中对轴承造成的不良影响，主要应用于机器人SHF/SHG系列谐波减速器。

Its structure is that both the outer ring and the inner ring are integral, which is suitable for the parts where both the inner ring and the outer ring require high rotation accuracy. This series is designed as an integral structure which avoids adverse effects on bearings during installation, it is more conducive to installation and is mainly applied to robot SHF/SHG series harmonic reducers.



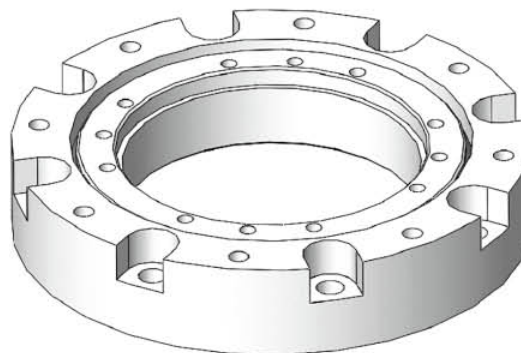
SHF/SHG型
Model SHF/SHG

SHD mini型（微型谐波专用轴承）

Model SHD mini (Mini-type harmonic special bearing)

SHD mini型（微型谐波专用轴承）结构为整体型，适合于要求外圈或内圈旋转精度要求高的部位，由于内外圈已经加工了安装孔，所以不需要固定法兰和支撑座，更加有利于安装，主要应用于机器人微型谐波减速器。

The structure is integrated design of the unit's inner and outer rings, which is suitable for the parts requiring high rotation accuracy of the inner ring. Since the inner and outer rings have been processed with mounting holes, there is no need for fixed flanges and supporting seats, which is more conducive to installation. It is mainly applied to mini series harmonic driver of the robot.



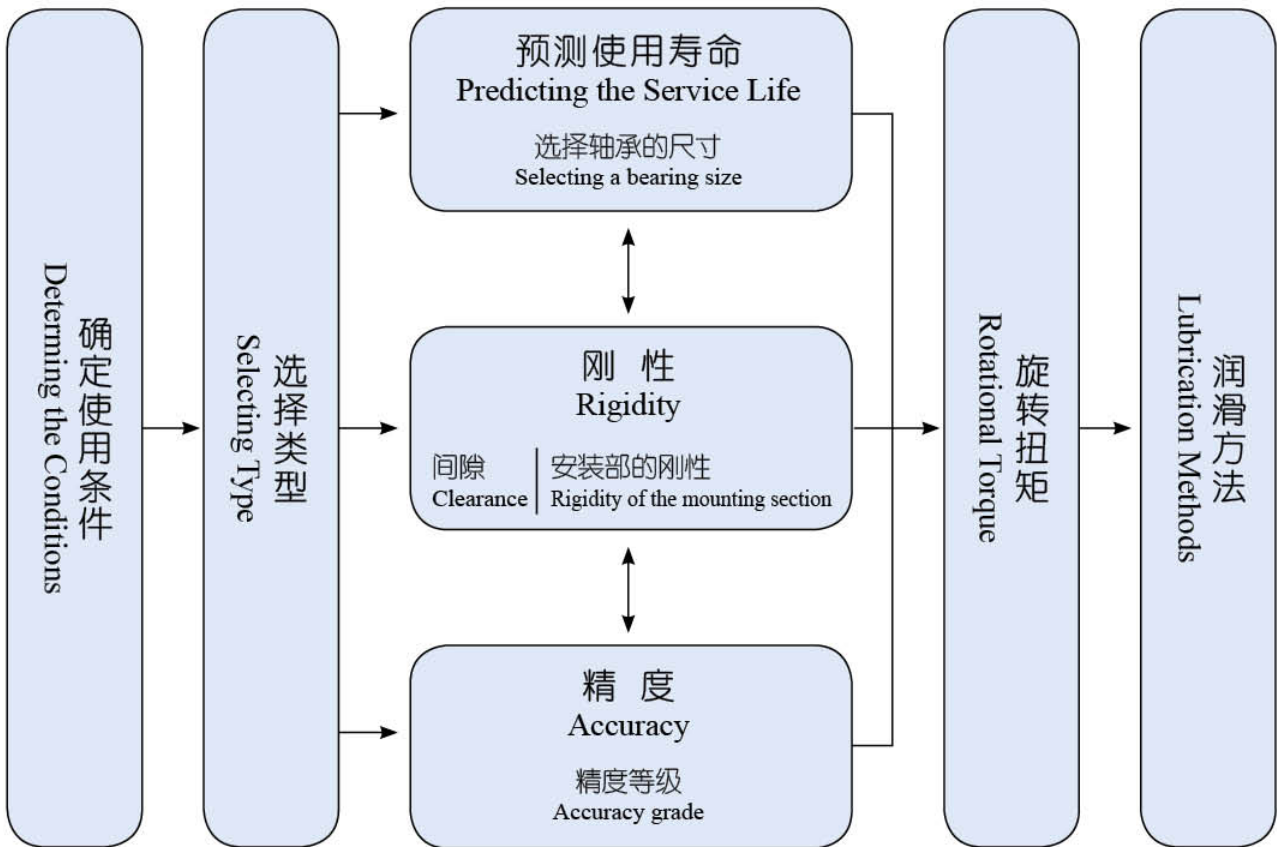
SHD mini型
Model SHD mini



选型的要点 Point of Selection

■ 交叉滚子轴承的选择 >> Selecting a Cross-Roller Bearing

◎ 选择交叉滚子轴承的一般顺序 The following diagram shows a typical procedure for selecting a Cross-Roller Bearing.



- | | |
|------------------------|--|
| ※ 内圈旋转……RB型 | Inner ring rotating……Model RB |
| ※ 外圈旋转……RE型 | Outer ring rotating……Model RE |
| ※ 安装空间……RAU型、RA型、RA-C型 | Mounting space……Models RAU, RA, and RA-C |
| ※ 带安装孔……RU型、CRBTF型 | Mounting holes……Model RU and CRBTF |

■ **额定寿命** >>
Nominal Life

◎ **计算额定寿命** Calculating the Nominal Life

额定寿命 (L_{10}) 可根据基本额定动载荷 (C) 及作用在交叉滚子轴承的载荷 (P_C)，由下式计算得出。

The nominal life (L_{10}) is obtained from the following formula using the basic dynamic load rating (C) and the load applied to the Cross-Roller Bearing (P_C).

$$L_{10} = \left(\frac{C}{P_C} \right)^{\frac{10}{3}} \times 10^6$$

L_{10} : 额定寿命 (rev.) L_{10} : Nominal life (rev.)
C: 基本额定动载荷 (N) C: Basic dynamic load rating · (N)
 P_C : 动态等价径向载荷 (N) P_C : Dynamic equivalent radial load (N)

◎ **考虑使用条件时的额定寿命的计算** Calculating the Modified Nominal Life

在实际使用中，由于在运转时大都伴随振动和冲击，导致作用在交叉滚子轴承的负荷不断变化，因此很难正确掌握。此外，使用环境温度也会对寿命造成很大影响。考虑到这些条件，可以由以下公式 (2) 计算出考虑到使用条件的额定寿命 (L_{10m})。

During use, a Cross-Roller Bearing may be subjected to vibrations and shocks as well as fluctuating loads, which are difficult to detect. In addition, the operating temperature will have a decisive impact on the service life. Taking these factors into account, the modified nominal life (L_{10m}) can be calculated according to the following formula (2).

※考虑到使用条件的系数 α ※ (Modified factor)

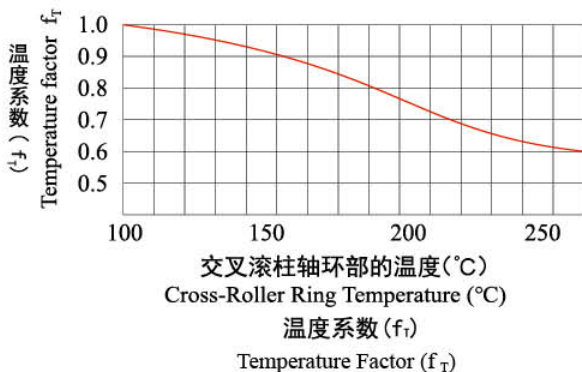
$$\alpha = \frac{f_T}{f_W}$$

α : 考虑到使用条件的系数 α : Modified factor
 f_T : 温度系数 f_T : Temperature factor
 f_W : 负荷系数 (参照表1) f_W : Load factor (see Table 1)

※考虑到使用条件的额定寿命 L_{10m} ※ (Modified nominal life L_{10m})

$$L_{10m} = \left(\alpha \times \frac{C}{P_C} \right)^{\frac{10}{3}} \times 10^6 \dots \dots (2)$$

L_{10m} : 考虑到使用条件的额定寿命 (rev.) L_{10m} : Modified nominal life (rev.)
C: 基本额定动载荷 (N) C: Basic dynamic load rating · (N)
 P_C : 动态等价径向载荷 (N) P_C : Dynamic equivalent radial load (N)



注) 通常工作温度在80°C以下,要超过80°C使用时,请向我司咨询。
Note) The normal service temperature is 80°C or below. If the product is to be used at a higher temperature, contact us.

※交叉滚子轴承的基本额定动载荷 (C) 是指，使一批相同的交叉滚子轴承在相同条件下分别运行，其额定寿命为 10^6 时，方向和大小都不变的径向载荷。基本额定动载荷 (C) 记载于尺寸表中。

额定寿命按照可以确保良好的润滑，并且以理想



的安装条件来进行装配的前提下，加载负荷计算得出。摇动运动和低速运动等的使用条件，有时会给润滑状态带来影响。摇动运动和低速运动状态下进行寿命计算时，请与我司商量。

The basic dynamic load rating (C) of the Cross Roller Bearing shows the radial load under which the nominal life is 1 million revolutions when a group of identical Cross Roller Bearing units independently operate, assuming a constant direction and magnitude of the load. Basic dynamic load ratings (C) are indicated in the specification tables.

Rated life is calculated according to load and presumes optimal mounting conditions and adequate lubrication. Usage involving back-and-forth motion or low-speed operation may affect lubrication requirements. Please consult us for assistance in calculating service life for usage involving back-and-forth motion or low-speed operation.

◎ f_w : 负荷系数 f_w : Load Factor

通常作旋转运动机械大多伴随着振动或冲击，例如电机和齿轮等驱动源的振动，经常重复启动停止时的冲击等，难以完全正确计算得出。因此，当振动或冲击的影响大时，将用根据经验得到的表1载荷系数基准值，除以基本额定动载荷 (C)。

Machines that perform rotary movements are often subjected to vibration and impact during operation. It is difficult to accurately identify the cause of vibration from a motor, gears, or other drive components, or of impact arising from frequent starts and stops. In the event of excessive vibration or impact, divide the basic dynamic load rating (C) by the corresponding load factor, using the empirically obtained figures in Table1 as guidelines.

表1 负荷系数(f_w) Table1 Load Factor (f_w)

使用条件 Service condition	f_w
无冲击平滑运动的情况 Smooth motion without impact	1 to 1.2
普通运行的情况 Normal motion	1.2 to 1.5
剧烈振动·冲击时 Excessive vibration or impact	1.5 to 3

◎ 计算使用寿命时间 Calculating the Service Life Time

旋转运动用 For Rotary Motion

$$L_h = \frac{L_{10}}{N \times 60}$$

※在连续进行旋转的情况下，可能会发生由于转速过快而产生大量热量的问题。关于使用转速请咨询我司。

* If rotated continuously, significant heat may be generated depending on the rotation speed. Consult with us about the rotation speed.

L_h : 工作寿命时间 (h)

L_h : Service life time (h)

N : 每分钟转数※ (min^{-1})

N : Rotation speed per minute (min^{-1})

摇摆运动用 For Oscillatory Motion

$$L_h = \frac{360 \times L_{10}}{2 \times \theta \times n_o \times 60}$$

L_h : 使用寿命时间 (h)

L_h : Service life time (h)

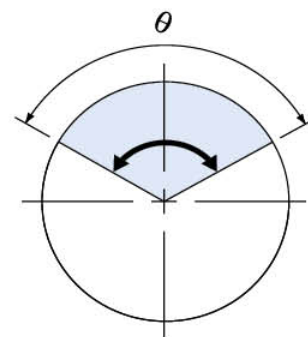
θ : 摇摆角度 ($^\circ$) (※参考右图)

θ : Rocking angle ($^\circ$) (* see figure at right)

n_o : 每分钟往返次数 (min^{-1})

n_o : Number of reciprocations per minute (min^{-1})

※摇摆角度： θ 较小时，轨道圈和滚子的接触面难以形成油膜，可能发生微



动磨损。如要以这种条件使用时，请咨询我司。

* Rocking angle: If is too small, this will hinder the formation of an oil film on the contact surfaces between the race and the roller and may cause fretting. If the product will be used in these conditions, contact us.

◎ 动态等价径向载荷 P_c Dynamic Equivalent Radial Load P_c

交叉滚柱轴承的动态等价径向载荷可按下式计算。

* The dynamic equivalent radial load of the Cross-Roller Bearing is obtained from the following equation.

$$P_c = X \cdot \left(F_r + \frac{2M}{dp} \right) + Y \cdot F_a$$

P_c : 动态等价径向载荷 (N)

F_r : 径向载荷 (N)

F_a : 轴向载荷 (N)

M : 力矩 (N·mm)

X : 动态径向系数 (参照表2)

Y : 动态轴向系数 (参照表2)

dp : 滚柱的节圆直径 (mm)

P_c : Dynamic equivalent radial load (N)

F_r : Radial load (N)

F_a : Axial load (N)

M : Moment (N·mm)

X : Dynamic radial factor (see Table2)

Y : Dynamic axial factor (see Table2)

dp : Roller pitch circle diameter (mm)

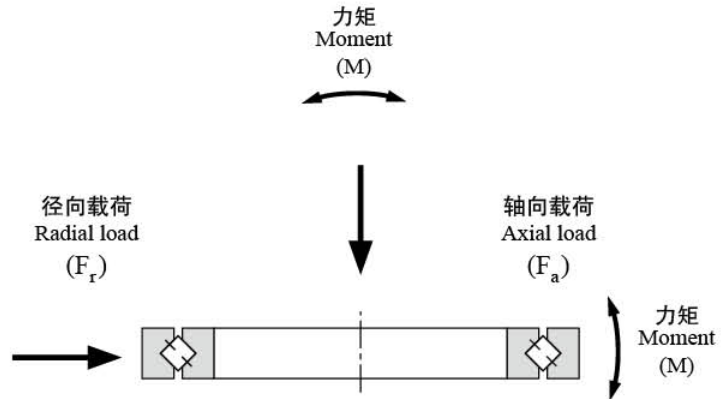


表2 动态径向系数与动态轴向系数 Table 2 Dynamic Radial Factor and Dynamic Axial Factor

分类 Classification	X	Y
$F_a / (F_r + 2M/dp) \leq 1.5$	1	0.45
$F_a / (F_r + 2M/dp) > 1.5$	0.67	0.67

※当 $F_r = 0N$ 、 $M = 0N \cdot mm$ 时，请设 $X = 0.67$ 、 $Y = 0.67$ ，来进行计算。

If $F_r = 0N$ and $M = 0N \cdot mm$, perform calculation while assuming that $X = 0.67$ and $Y = 0.67$.

※考虑预压时的寿命计算，请向我司咨询。

For service life calculation with a preload taken into account, contact us.



■ 静态安全系数 >> Static Safety Factor

基本额定静载荷 C_0 是指具有方向和大小都一定的静态负荷，其应满足使处于承受最大负荷状态下的滚柱和滚动面之间的接触区域中心计算接触应力为4000Mpa的条件。（如果接触应力大于此数值，将影响旋转。）此数值在尺寸表中以 C_0 表示。当以静态或动态方式施加负荷时，必须考虑如下所示的静态安全系数。

The basic static load rating C_0 refers to the static load with constant direction and magnitude, under which the calculated contact stress in the center of the contact area between the roller and the raceway under the maximum load is 4000 MPa. (If the contact stress exceeds this level, it will affect the rotation.) This value is indicated as “ C_0 ” in the specification tables. When a load is statically or dynamically applied, it is necessary to consider the static safety factor as shown below.

$$C_0/P_0=f_s$$

- f_s : 静态安全系数 (参照表3) f_s : Static safety factor (see Table3)
 C_0 : 基本静额定载荷 (N) C_0 : Basic static load rating (N)
 P_0 : 静态等价径向载荷 (N) P_0 : Static equivalent radial load (N)

表3 静态安全系数(f_s) Table3 Static Safety Factor (f_s)

负荷条件 Load conditions	f_s 的下限 Lower limit of f_s
普通负荷 Normal load	1~2
冲击负荷	2~3

※ 静态安全系数下限值的基准值如上表所示。考虑到寿命等的动态性能，建议确保在7以上。

* Target minimum values for the static safety factor are shown in the table above. For better service life and other aspects of dynamic performance, we recommends maintaining a figure of 7 or above.

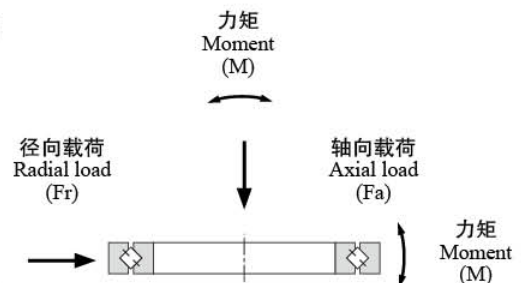
◎ 静态等价径向载荷 P_0 Static Equivalent Radial Load P_0

交叉滚子轴承的静态等价径向载荷可按下式计算。

The static equivalent radial load of the Cross-Roller Bearing is obtained from the following equation.

$$P_0 = X_0 \cdot (F_r + 2M/dp) + Y_0 \cdot F_a$$

- P_0 : 静态等价径向载荷 (N) P_0 : Static equivalent radial load (N)
 F_r : 径向载荷 (N) F_r :Radial load (N)
 F_a : 轴向载荷 (N) F_a :Axial load (N)
 M : 力矩 (N·mm) M :Moment (N·mm)
 X_0 : 静态径向系数 ($X_0=1$) X_0 :Static radial factor ($X_0=1$)
 Y_0 : 静态轴向系数 ($Y_0=0.44$) Y_0 :Static axial factor ($Y_0=0.44$)
 dp : 滚柱的节圆直径 (mm) dp :Roller pitch circle diameter (mm)

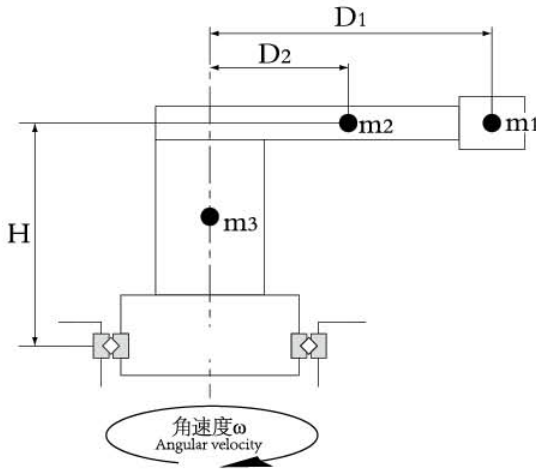


计算例①：轴承水平设置时

Example of calculation (1): Horizontal Installation

按照下述条件计算使用RB25025型时的额定寿命(L)和静态安全系数(fs)。

Calculate the nominal life (L) and the static safety factor (fs) for model RB25025 under the following conditions.



- m1=100 kg
- m2=200 kg
- m3=300 kg
- D1=300 mm
- D2=150 mm
- H =200 mm
- C =69.3 kN
- C₀ =150 kN
- dp =277.5 mm
- w =2 rad/s (w: 角速度Angular velocity)

※外加负荷 Applied load

径向载荷Radial load:

$$F_r = m_1 \cdot D_1 \times 10^{-3} \cdot w^2 + m_2 \cdot D_2 \times 10^{-3} \cdot w^2 = 100 \cdot 300 \times 10^{-3} \cdot 2^2 + 200 \cdot 150 \times 10^{-3} \cdot 2^2 = 240 \text{ N}$$

轴向载荷Axial load:

$$F_a = (m_1 + m_2 + m_3) \times g = (100 + 200 + 300) \times 9.807 = 5884.2 \text{ N}$$

力矩Moment:

$$M = m_1 \cdot g \times D_1 + m_2 \cdot g \times D_2 + (m_1 \cdot D_1 \times 10^{-3} \cdot w^2 + m_2 \cdot D_2 \times 10^{-3} \cdot w^2) \times H \\ = 100 \cdot 9.807 \times 300 + 200 \cdot 9.807 \times 150 + (100 \cdot 300 \times 10^{-3} \cdot 2^2 + 200 \cdot 150 \times 10^{-3} \cdot 2^2) \times 200 = 636420 \text{ N} \cdot \text{mm}$$

※额定寿命 Nominal life

$$F_a / (F_r + 2M/dp) = 5884.2 / (240 + 2 \times 636420 / 277.5) = 1.22 \leq 1.5$$

$$\therefore X = 1, Y = 0.45$$

因此, 动态等价径向载荷(Pc)如下计算。

Therefore, the dynamic equivalent radial load (Pc) is obtained as follows.

$$P_c = X \cdot (F_r + 2M/dp) + Y \cdot F_a = 1 \cdot (240 + 2 \times 636420 / 277.5) + 0.45 \cdot 5884.2 = 7474.7 \text{ N}$$

如果 $f_w=1.2$ 、 $f_T=1.0$, 额定寿命按下式计算, 额定寿命为 $(L_{10})9.1 \times 10^8$ 圈。

If f_w is 1.2 and f_T is 1.0, the nominal life is calculated as follows. Thus, the nominal life (L_{10}) is 9.1×10^8 rev.

$$L_{10m} = \left(\alpha \times \frac{C}{P_c} \right)^{\frac{10}{3}} \times 10^6 = \left\{ \frac{1 \cdot 69.3 \times 10^3}{(1.2 \cdot 7474.7)} \right\}^{\frac{10}{3}} \times 10^6 = 9.1 \times 10^8 \text{ 旋转}$$

$$\alpha = \frac{f_T}{f_w}$$

※静态安全系数 Static safety factor

静态等价径向载荷(P₀)如下计算。



The static equivalent radial load (P_0) is obtained as follows.

$$P_0 = X_0 \cdot (Fr + 2M/dp) + Y \cdot Fa = 1 \cdot (240 + 2 \times 636420/277.5) + 0.44 \cdot 5884.2 = 7415.8 \text{ N}$$

利用上述的 P_0 值得到如下结果，静态安全系数(f_s)为20.2。

Using the value of P_0 above, the static safety factor (f_s) is calculated to be 20.2.

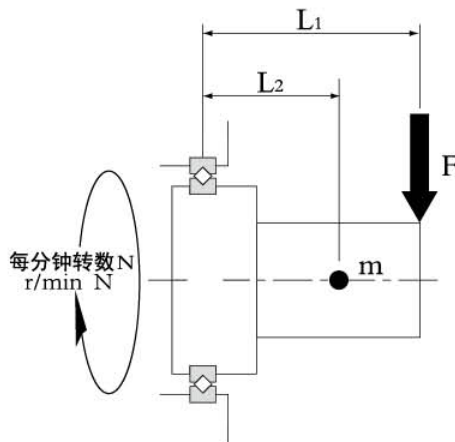
$$f_s = C_0/P_0 = 150 \times 10^3/7415.8 = 20.2$$

计算例②：轴承垂直设置时

Example of calculation (2): Vertical Installation

按照下述条件计算使用RB25025型时的额定寿命(L)和静态安全系数(f_s)

Calculate the nominal life (L) and the static safety factor (f_s) for model RB25025 used in the following conditions.



- $m=300 \text{ kg}$
- $F=1500 \text{ N}$
- $L_1=300 \text{ mm}$
- $L_2=150 \text{ mm}$
- $C=69.3 \text{ kN}$
- $C_0=150 \text{ kN}$
- $dp=277.5 \text{ mm}$
- $N=140 \text{ min}^{-1}$

※外加负荷 Applied load

径向载荷： $Fr = F + m \cdot g = 1500 + 300 \cdot 9.807 = 4442.1 \text{ N}$

轴向载荷： $Fa = 0 \text{ N}$

力矩： $M = F \cdot L_1 + m \cdot g \cdot L_2 = 1500 \times 300 + 300 \cdot 9.807 \times 150 = 891315 \text{ N} \cdot \text{mm}$

※额定寿命 Nominal life

$$Fa/(Fr + 2M/dp) = 0/(4442.1 + 2 \times 891315/277.5) = 0 \leq 1.5$$

$$\therefore X=1, Y=0.45$$

因此，动态等价径向载荷(P_c)如下计算。

$$P_c = X \cdot (Fr + 2M/dp) + Y \cdot Fa = 1 \cdot (4442.1 + 2 \times 891315/277.5) + 0.45 \cdot 0 = 10866 \text{ N}$$

如果 $f_w=1.2$ 、 $f_r=1.0$ ，额定寿命按下式计算，额定寿命为 $(L_{10})2.6 \times 10^8$ 圈。

$$L_{10m} = \left(\alpha \times \frac{C}{P_c} \right)^{\frac{10}{3}} \times 10^6 = \left\{ \frac{1 \cdot 69.3 \times 10^3}{(1.2 \cdot 10866)} \right\}^{\frac{10}{3}} \times 10^6 = 2.6 \times 10^8 \text{ 旋转}$$

$$\alpha = \frac{f_r}{f_w}$$

※静态安全系数 Static safety factor

静态等价径向载荷(P_0)如下计算。

$$P_0 = X_0 \cdot (Fr + 2M/dp) + Y_0 \cdot Fa = 1 \cdot (4442.1 + 2 \times 891315/277.5) + 0.44 \cdot 0 = 10866 \text{ N}$$

利用上述的 P_0 值得到如下结果，静态安全系数(f_s)为13.8。

$$f_s = C_0/P_0 = 150 \times 10^3 / 10866 = 13.8$$

■ 静态容许力矩 >>

Static Permissible Moment

交叉滚子轴承的静态容许力矩(M_0)可按下式计算。

The static permissible moment (M_0) of the Cross-Roller Bearing is obtained from the following equation.

$$M_0 = C_0 \cdot dp / 2 \times 10^{-3}$$

M_0 : 静态容许力矩 (kN·m) M_0 : Static Permissible Moment (kN·m)

C_0 : 基本静额定载荷 (kN) C_0 : Basic static load rating (kN)

dp : 滚柱的节圆直径 (mm) dp : Roller pitch circle diameter (mm)

◎ 静态容许力矩的计算例 Example of Calculating a Static Permissible Moment

使用型号 RB25025型 Model No. RB25025

$$M_0 = C_0 \cdot dp / 2 \times 10^{-3}$$

$C = 69.3 \text{ kN}$
 $C_0 = 150 \text{ kN}$
 $dp = 277.5 \text{ mm}$

静态容许力矩按下式计算。

The static permissible moment is calculated as follows.

$$M_0 = C_0 \cdot dp / 2 \times 10^{-3} = 150 \cdot 277.5 / 2 \times 10^{-3} = 20.8 \text{ kN} \cdot \text{m}$$

■ 静态容许轴向载荷 >>

Static Permissible Axial Load

交叉滚子轴承的静态容许轴向载荷(F_{a_0})可按下式计算。

The static permissible axial load (F_{a_0}) of the Cross-Roller Bearing is obtained from the following equation.

$$F_{a_0} = C_0 / Y_0$$

F_{a_0} : 静态容许轴向载荷 (kN) F_{a_0} : Static permissible axial load (kN)

Y_0 : 静态轴向系数 ($Y_0 = 0.44$) Y_0 : Static axial factor ($Y_0 = 0.44$)

◎ 静态容许轴向载荷的计算例 Example of Calculating a Static Permissible Axial Load

使用型号 RB25025型 Model No. RB25025

$$C = 69.3 \text{ kN} \quad C_0 = 150 \text{ kN}$$

◎ 静态容许轴向载荷(F_{a_0})按下式计算。The static permissible axial load (F_{a_0}) is calculated as follows.

$$F_{a_0} = C_0 / Y_0 = 150 / 0.44 = 340.9 \text{ kN}$$



精度规格 >> Accuracy Standards

交叉滚子轴承的精度和容许尺寸公差按照表4至表13所述来进行制造。

The Cross-Roller Bearing is manufactured with the accuracy and the dimensional tolerance according to Table4 to Table13 .

表4 RU型的内圈旋转精度 【 Table 4 Rotational Accuracy of the Inner Ring of Model RU 】 (单位Unit: μ m)

公称型号 Model No.	内圈径向振摆的公差 Radial runout tolerance of the inner ring			内圈轴向振摆的公差 Axial runout tolerance of the inner ring		
	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2
RU28	4	3	2.5	4	3	2.5
RU42	4	3	2.5	4	3	2.5
RU52	4	3	2.5	4	3	2.5
RU66	5	4	2.5	5	4	2.5
RU85	5	4	2.5	5	4	2.5
RU124	5	4	2.5	5	4	2.5
RU148	6	5	2.5	6	5	2.5
RU178	6	5	2.5	6	5	2.5
RU228	8	6	5	8	6	5
RU297	10	8	5	10	8	5
RU445	15	12	7	15	12	7

注: 1.对于RU型, P5级为标准旋转精度。(未标注在型号中。)

2.关于上述型号中没有的特殊品等的旋转精度, 请与我司商量。(无特别指定时, 旋转精度适用于RB型、RE型旋转精度的0级。)

Note: 1.For model RU, grade P5 is standard rotational accuracy.(Not indicated in model number.)

2. For the rotational accuracy of a special type or other types not shown above, contact us. (Unless otherwise speci-fied, rotational accuracy grade 0 of models RB and RE will be applied.)

表5 RU型的外圈旋转精度 【 Table 5 Outer Ring Rotation Accuracy of RU Type 】 (单位Unit: μ m)

公称型号 Model No.	外圈径向振摆的公差 Radial runout tolerance of the outer ring			外圈轴向振摆的公差 Axial runout tolerance of the outer ring		
	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2
RU28	8	5	4	8	5	4
RU42	8	5	4	8	5	4
RU52	8	5	4	8	5	4
RU66	10	6	5	10	6	5
RU85	10	6	5	10	6	5
RU124	13	8	5	13	8	5
RU148	15	10	7	15	10	7
RU178	15	10	7	15	10	7
RU228	18	11	7	18	11	7
RU297	20	13	8	20	13	8
RU445	25	16	10	25	16	10

注: 1.对于RU型, P5级为标准旋转精度。(未标注在型号中。)

2.关于上述型号中没有的特殊品等的旋转精度, 请与我司商量。(无特别指定时, 旋转精度适用于RB型、RE型旋转精度的0级。)

Note: 1.For model RU, grade P5 is standard rotational accuracy.(Not indicated in model number.)

2.For the rotational accuracy of a special type or other types not shown above, contact us. (Unless otherwise specified, rotational accuracy grade 0 of models RB and RE will be applied.)

◎表6 RB和RBU/CRBH型的内圈旋转精度

【 Table 6 Inner Ring Rotation Accuracy of RB & RBU/CRBH Type 】

(单位Unit: μ m)

轴承内径d Inner diameter(d) (mm)		内圈径向振摆的公差 Radial run-out tolerance of the inner ring					内圈轴向振摆的公差 Axial run-out tolerance of the inner ring				
以上 Above	以下 Or less	P0级 Grade P0	P6级 Grade P6	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2	P0级 Grade P0	P6级 Grade P6	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2
18	30	13	8	4	3	2.5	13	8	4	3	2.5
30	50	15	10	5	4	2.5	15	10	5	4	2.5
50	80	20	10	5	4	2.5	20	10	5	4	2.5
80	120	25	13	6	5	2.5	25	13	6	5	2.5
120	150	30	18	8	6	2.5	30	18	8	6	2.5
150	180	30	18	8	6	5	30	18	8	6	5
180	250	40	20	10	8	5	40	20	10	8	5
250	315	50	25	13	10	(6)	50	25	13	10	(6)
315	400	60	30	15	12	(7)	60	30	15	12	(7)
400	500	65	35	18	14	(9)	65	35	18	14	(9)
500	630	70	40	20	16	(10)	70	40	20	16	(10)
630	800	80	(45)	(23)	(18)	(11)	80	(45)	(23)	(18)	(11)
800	1000	90	(50)	(25)	(20)	(12)	90	(50)	(25)	(20)	(12)
1000	1250	100	(55)	(28)	(22)	—	100	(55)	(28)	(22)	—

注： 括号内数值为特殊对应，因此请向我司咨询。

Note: The values in parentheses are available only on special orders. Contact us for details.

◎表7 RE和RBU/CRBH型外圈旋转精度

【 Table 7 Outer Ring Rotation Accuracy of RE & RBU/CRBH Type 】

(单位Unit: μ m)

轴承外径D Outer diameter(D) (mm)		外圈径向振摆的公差 Radial run-out tolerance of the outer ring					外圈轴向振摆的公差 Axial run-out tolerance of the outer ring				
以上 Above	以下 Or less	P0级 Grade P0	P6级 Grade P6	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2	P0级 Grade P0	P6级 Grade P6	P5级 Grade P5	P4级 Grade P4	P2级 Grade P2
30	50	20	10	7	5	2.5	20	10	7	5	2.5
50	80	25	13	8	5	4	25	13	8	5	4
80	120	35	18	10	6	5	35	18	10	6	5
120	150	40	20	11	7	5	40	20	11	7	5
150	180	45	23	13	8	5	45	23	13	8	5
180	250	50	25	15	10	7	50	25	15	10	7
250	315	60	30	18	11	7	60	30	18	11	7
315	400	70	35	20	13	8	70	35	20	13	8
400	500	80	40	23	15	(9)	80	40	23	15	(9)
500	630	100	50	25	16	(10)	100	50	25	16	(10)
630	800	120	60	30	20	(13)	120	60	30	20	(13)
800	1000	120	75	(38)	(25)	(16)	120	75	(38)	(25)	(16)
1000	1250	120	(75)	(40)	(27)	(18)	120	(75)	(40)	(27)	(18)
1250	1600	120	(75)	(42)	(30)	(20)	120	(75)	(42)	(30)	(20)

注： 括号内数值为特殊对应，因此请向我司咨询。

Note: The values in parentheses are available only on special orders. Contact us for details.



◎表8 RA和RAU、RA-C型内圈旋转精度

【 Table 8 Inner Ring Rotation Accuracy of RA & RAU & RA-C Type 】

(单位Unit: μm)

轴承内径d Inner diameter(d) (mm)		径向振摆和轴向振摆的公差 Tolerance in radial runout and axial runout			
以上 Above	以下 Or less	P0级 Grade P0	P6级 Grade P6	P5级 Grade P5	P4级 Grade P4
—	18	10	—	—	—
18	40	13	—	—	—
40	65	13	10	5	4
65	80	15	10	5	4
80	100	15	13	6	5
100	120	20	13	6	5
120	140	25	18	8	6
140	180	25	18	8	6
180	200	30	20	10	8

☆ RA和RA-C型的旋转精度全部以P0级来进行制造。

The rotation accuracy of RA and RA-C models is all manufactured at P0 level.

注: 1.RA、RA-C型若需要更高的内圈旋转精度,请向我司咨询。

2.RAU型(小径、薄型宽度5mm)的旋转精度仅适用于普通级(0级)。

Note: 1.If higher accuracy than the above values is required for the inner ring in rotational accuracy for models RA and RA-C, contact us.

2.The Model RAU (small-diameter, 5 mm thin type) rotational accuracy is only available for normal grade (0).

◎表9 RA、RAU、RA-C型外圈旋转精度

【 Table 9 Outer Ring Rotation Accuracy of RA、RAU、RA-C Type 】

(单位Unit: μm)

轴承外径D Outer diameter(d) (mm)		径向振摆和轴向振摆的公差 Tolerance in radial runout and axial runout		
以上 Above	以下 Or less	P0、P6级 Grade P0 P6	P5级 Grade P5	P4级 Grade P4
—	65	13	—	—
65	80	13	8	5
80	100	15	10	6
100	120	15	10	6
120	140	20	11	7
140	180	25	11	7
180	200	25	15	10
200	250	30	15	10

注: 1.RA-C型的外圈旋转精度表示为分割前的数值。

2.RAU型(小径、薄型宽度5mm)的旋转精度仅适用于普通级(0级)。

Note: 1.The rotational accuracy of the outer ring for model RA-C indicates the value before separation.

2.The Model RAU (small-diameter, 5 mm thin type) rotational accuracy is only available for normal grade (0).

◎表10 轴承内径尺寸公差 (RU、RB、RE、RA、RAU、RA-C、RBU、CRBH)

 【 Table 10 Bearing inner diameter dimension tolerance (RU、RB、RE、RA、RAU、RA-C、RBU、CRBH) 】 (单位Unit: μm)

轴承内径d Inner diameter(d) (mm)		轴承内径d的公差 Tolerance of bearing inner diameter d							
		0、P6、P5、P4、P2级 Grade 0、P6、P5、P4、P2		PE6级 Grade PE6		PE5级 Grade PE5		PE4、PE2级 Grade PE4、PE2	
以上 Above	以下 Or less	高 Upper	低 Lower	高 Upper	低 Lower	高 Upper	低 Lower	高 Upper	低 Lower
—	18	0	-8	—	—	—	—	—	—
18	30	0	-10	0	-8	0	-6	0	-5
30	50	0	-12	0	-10	0	-8	0	-6
50	80	0	-15	0	-12	0	-9	0	-7
80	120	0	-20	0	-15	0	-10	0	-8
120	150	0	-25	0	-18	0	-13	0	-10
150	180	0	-25	0	-18	0	-13	0	-10
180	250	0	-30	0	-22	0	-15	0	-12
250	315	0	-35	0	-25	0	-18	—	—
315	400	0	-40	0	-30	0	-23	—	—
400	500	0	-45	0	-35	—	—	—	—
500	630	0	-50	0	-40	—	—	—	—
630	800	0	-75	0	—	—	—	—	—
800	1000	0	-100	0	—	—	—	—	—
1000	1250	0	-125	0	—	—	—	—	—

注: 1.RA、RA-C和RU型的标准内径精度为0级,若需要比0级更高的精度,请向我司咨询。

2. dm表示轴承内径2点测量得到的最大直径和最小直径的算术平均值。

3. 表中轴承内径的精度等级无数值表示的型号,低精度级也适用最高数值。

Note 1. Standard inner diameter accuracy of models RA and RA-C is 0. For higher accuracy than 0, contact us.

2. "dm" represents the arithmetic average of the maximum and minimum diameters obtained in measuring the bearing inner diameter at two points.

3. For accuracy grades in bearing inner diameter with no values indicated in the table, the highest value among low accuracy grades applies.

◎表11 RU型内外圈宽度公差

【 Table 11 RU type inner and outer ring width tolerance 】

 (单位Unit: μm)

公称型号 Model No.	B的公差 Tolerance of B	
	高 Upper	低 Lower
RU28	0	-75
RU42	0	-75
RU52	0	-75
RU66	0	-75
RU85	0	-75
RU124	0	-75
RU148	0	-75
RU178	0	-100
RU228	0	-100
RU297	0	-100
RU445	0	-150



◎表12 轴承外径尺寸公差 (RU、RB、RE、RA、RAU、RA-C、RBU、CRBH)

【 Table 12 Bearing outer diameter dimension tolerance (RU、RB、RE、RA、RAU、RA-C、RBU、CRBH)】

(单位Unit: μm)

轴承外径D Outer diameter(D) (mm)		轴承外径D的公差 Tolerance of bearing outer diameter D							
		0、P6、P5、P4、P2级 Grade 0、P6、P5、P4、P2		PE6级 Grade PE6		PE5级 Grade PE5		PE4、PE2级 Grade PE4、PE2	
以上 Above	以下 Or less	高 Upper	低 Lower	高 Upper	低 Lower	高 Upper	低 Lower	高 Upper	低 Lower
—	18	—	—	—	—	—	—	—	—
18	30	0	-9	—	—	—	—	—	—
30	50	0	-11	0	-9	0	-7	0	-6
50	80	0	-13	0	-11	0	-9	0	-7
80	120	0	-15	0	-13	0	-10	0	-8
120	150	0	-18	0	-15	0	-11	0	-9
150	180	0	-25	0	-18	0	-13	0	-10
180	250	0	-30	0	-20	0	-15	0	-11
250	315	0	-35	0	-25	0	-18	0	-13
315	400	0	-40	0	-28	0	-20	0	-15
400	500	0	-45	0	-33	0	-23	—	—
500	630	0	-50	0	-38	0	-28	—	—
630	800	0	-75	0	-45	0	-35	—	—
800	1000	0	-100	0	—	—	—	—	—
1000	1250	0	-125	0	—	—	—	—	—
1250	1600	0	-160	0	—	—	—	—	—

注：1.RA、RA-C和RU型的标准外径精度为0级,若需要比0级更高的精度,请向我司咨询。

2.Dm表示轴承外径2点测量得到的最大直径和最小直径的算术平均值。

3.表中轴外径的精度等级无数值表示的型号,低精度级也适用最高数值。

Note: 1.Standard outer diameter accuracy of models RA and RA-C is 0. For higher accuracy than 0, contact us.

2."Dm" represents the arithmetic average of the maximum and minimum diameters obtained in measuring the bearing outer diameter at two points.

3.For accuracy grades in bearing outer diameter with no values indicated in the table, the highest value among low accuracy grades applies.

◎表13 RB、RE、RBU、CRBH型内外圈宽度公差（所有级别通用）

 【 Table 13 RB、RE、RBU、CRBH type inner and outer ring width tolerance (Common to all levels) 】 (单位Unit: μm)

轴承内径d Inner diameter(d) (mm)		B的公差 Tolerance of B		B1的公差 Tolerance of B1	
		适用于RB的内圈和RE的外圈 Applicable to RB's inner ring and RE's outer ring		适用于RB的外圈和RE的内圈 Applicable to RB's outer ring and RE's inner ring	
以上 Above	以下 Or less	高 Upper	低 Lower	高 Upper	低 Lower
18	30	0	-75	0	-100
30	50	0	-75	0	-100
50	80	0	-75	0	-100
80	120	0	-75	0	-100
120	150	0	-100	0	-120
150	180	0	-100	0	-120
180	250	0	-100	0	-120
250	315	0	-120	0	-150
315	400	0	-150	0	-200
400	500	0	-150	0	-200
500	630	0	-150	0	-200
630	800	0	-150	0	-200
800	1000	0	-300	0	-400
1000	1250	0	-300	0	-400

◎RAU型、RA型、RA-C型的内外圈宽度的公差

【 Tolerance in the Width of the Inner and Outer Rings for Models RAU, RA, and RA-C 】

 RAU型、RA型、RA-C型的B和B1的公差全部以 $-0.120 \sim 0$ 为基准进行制造。

 All B and B1 types of models RAU, RA, and RA-C are manufactured with a tolerance of -0.120 to 0 .



■ 径向间隙 >>

Radial Clearance

RA型、RAU和RA-C型径向间隙为表14，RBU型、CRBH型的径向间隙为表15。

RU型的径向间隙为表16，RB、RE型的径向间隙为表17。

Table 14 that of models RAU, RA, and RA-C, and Table 15 that of models RBU and CRBH

Table 16 shows the radial clearance of the Model RU, Table 17 that of the standard type of models RB and RE

◎表14 RA、RAU和RA-C型的径向游隙 【 Table 14 Radial Clearances of Models RA,RAU and RA-C 】 (单位Unit: μm)

轴承内径d Inner diameter(d) (mm)		CC0		C0	
以上 Above	以下 Or less	最小 Min.	最大 Max.	最小 Min.	最大 Max.
—	18	—	—	0	15
18	30	—	—	0	15
30	50	—	—	0	15
50	80	-8	0	0	15
80	120	-8	0	0	15
120	140	-8	0	0	15
140	160	-8	0	0	15
160	180	-10	0	0	20
180	200	-10	0	0	20
200	225	-10	0	0	20

注：RAU型（小径、薄型宽度5mm）仅适用C0间隙。

Note:The Model RAU (small-diameter, 5 mm thin type) is only available with C0 clearance.

◎表15 RBU、CRBH型的径向游隙 【 Table 15 Radial Clearances of Models RBU、CRBH 】

(单位Unit: μm)

轴承内径d Inner diameter(d) (mm)		CC0		C1		C2	
以上 Above	以下 Or less	最小 Min.	最大 Max.	最小 Min.	最大 Max.	最小 Min.	最大 Max.
—	30	-10	0	0	10	10	20
30	40	-10	0	0	10	10	20
40	50	-10	0	0	10	10	25
50	65	-10	0	0	10	10	25
65	80	-10	0	0	15	15	30
80	100	-10	0	0	15	15	35
100	120	-15	0	0	15	15	35
120	140	-15	0	0	20	20	45
140	160	-15	0	0	20	20	50
160	200	-15	0	0	20	20	50
200	250	-20	0	0	25	25	60
250	315	-20	0	0	25	25	60

◎表16 RU型的径向游隙 【 Table 16 Radial Clearances of Models RU 】

 (单位Unit: μm)

公称型号 Model No.	CC0		C0	
	启动扭矩(N·m) Starting torque (N·m)		径向间隙(μm)	Radial clearance (μm)
	最小 Min.	最大 Max.	最小 Min.	最大 Ma.
RU28	0.1	0.5	0	25
RU42	0.1	0.5	0	25
RU52	0.1	0.5	0	25
RU66	0.3	2.2	0	30
RU85	0.4	3	0	40
RU124	1	6	0	40
RU148	1	10	0	40
RU178	3	15	0	50
RU228	5	20	0	60
RU297	10	35	0	70
RU445	20	55	0	100

注： RU型的CC0间隙由启动扭矩控制。间隙CC0的启动扭矩不包括密封阻力。

Note: Model RU clearance CC0 is controlled by starting torque.Starting torque for clearance CC0 does not include seal resistance value.

◎表17 RB、RE型的径向游隙 【 Table 17 Radial Clearances of Models RB and RE 】

 (单位Unit: μm)

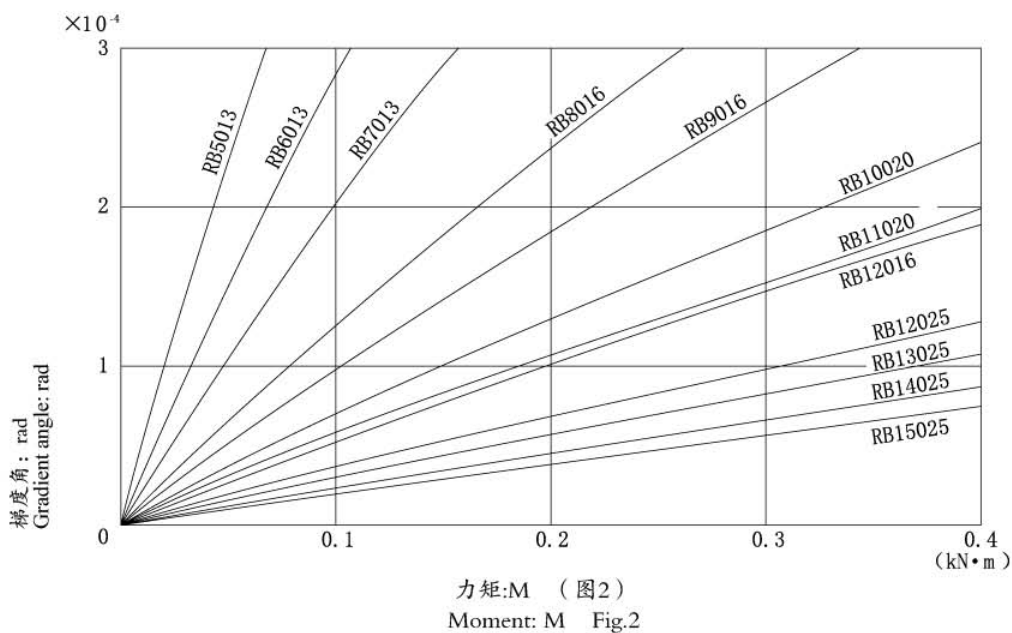
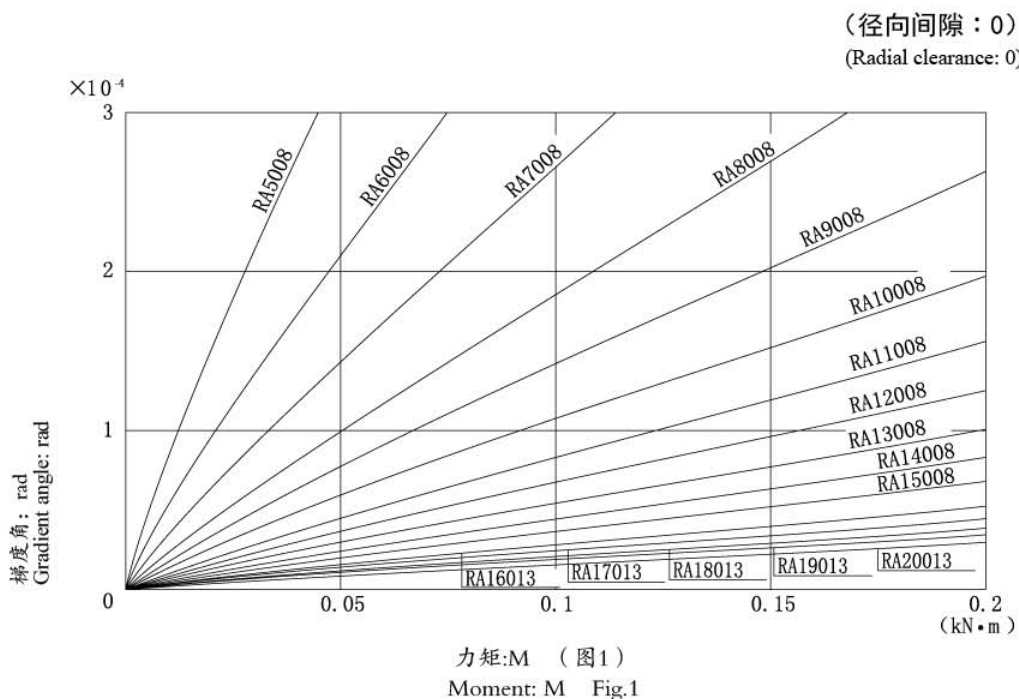
轴承内径d Inner diameter(d) (mm)		CC0		C0		C1	
以上 Above	以下 Or less	最小 Min.	最大 Max.	最小 Min.	最大 Ma.	最小 Min.	最大 Max.
18	30	-8	0	0	15	15	35
30	50	-8	0	0	25	25	50
50	80	-10	0	0	30	30	60
80	120	-10	0	0	40	40	70
120	140	-10	0	0	40	40	80
140	160	-10	0	0	40	40	90
160	180	-10	0	0	50	50	100
180	200	-10	0	0	50	50	110
200	225	-10	0	0	60	60	120
225	250	-10	0	0	60	60	130
250	280	-15	0	0	80	80	150
280	315	-15	0	30	100	100	170
315	355	-15	0	30	110	110	190
355	400	-15	0	30	120	120	210
400	450	-20	0	30	130	130	230
450	500	-20	0	30	130	130	250
500	560	-20	0	30	150	150	280
560	630	-20	0	40	170	170	310
630	710	-20	0	40	190	190	350
710	800	-30	0	40	210	210	390
800	900	-30	0	40	230	230	430
900	1000	-30	0	50	260	260	480
1000	1120	-30	0	60	290	290	530
1120	1250	-30	0	60	320	320	580
1250	1400	-30	0	70	350	350	630



■ 力矩刚性 >> Moment Rigidity

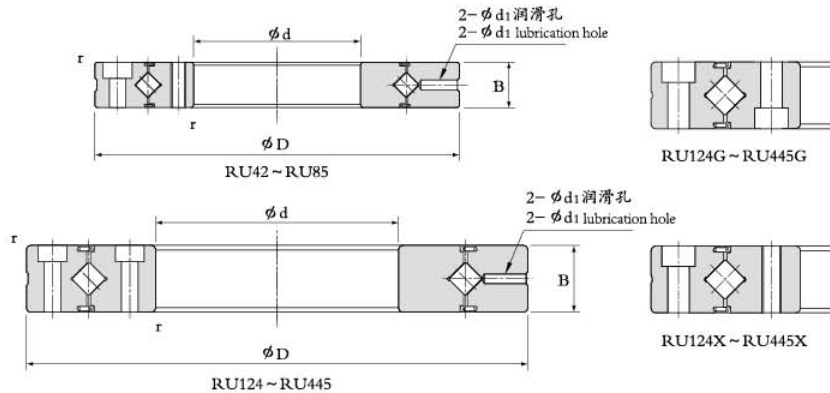
交叉滚子轴承单体的力矩刚性曲线如图1~图2所示。支承座、固定法兰和螺栓等的变形对刚性有影响。因此,有必要考虑这些零部件的强度。

Fig.1 to Fig.2 show moment rigidity diagrams for the Cross-Roller Bearing as a separate unit. Rigidity is affected by the deformation of the housing, presser flange and bolts. Therefore, the strength of these parts must be taken into account.



产品规格 Product Specification

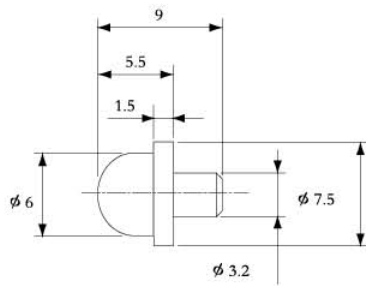
■ RU型 (内外圈一体型) >> Integrated Inner/Outer Ring Type



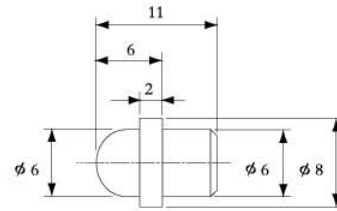
公称型号 Model No.	主要尺寸 Main dimensions						轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径Inner diameter d	外径Outer diameter D	滚子节圆直径 Roller pitch circle diameter dp	宽度 Width B B1	润滑孔 d1	倒角 Chamfer rmin	ds (max)	Dh (min)	C kN	C0 kN	Kg
RU28	10	52	28	8	3.1	0.6	24	31	2.91	2.43	0.12
RU42	20	70	41.5	12	3.1	0.6	36	47	7.35	8.35	0.29
RU52	25	80	52.5	12	3.1	0.6	46.5	58.5	7.6	8.37	0.4
RU66	35	95	66	15	3.1	0.6	59	74	17.5	22.3	0.62
RU85	55	120	85	15	3.1	0.6	77	93	20.3	29.5	1
RU124(G)	80	165	124	22	3.1	1	114	134	33.1	50.9	2.6
RU124X											
RU148(G)	90	210	147.5	25	3.1	1.5	133	162	49.1	76.8	4.9
RU148X											
RU178(G)	115	240	178	28	3.1	1.5	161	195	80.3	135	6.8
RU178X											
RU228(G)	160	295	227.5	35	6	2	208	246	104	173	11.4
RU228X											
RU297(G)	210	380	297.3	40	6	2.5	272	320	156	281	21.3
RU297X											
RU445(G)	350	540	445.4	45	6	2.5	417	473	222	473	35.4
RU445X											

注: 1.对RU型,油嘴作为任选购件提供。(参照下图) 2.如需订购,请在型号末尾标注-N。

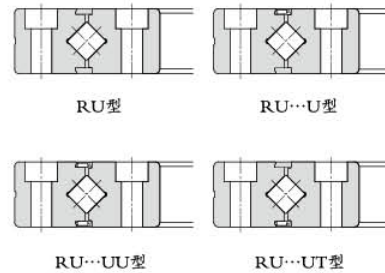
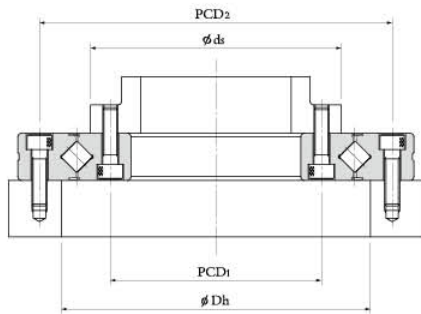
Note:1.Optional grease nipple available for model RU. (See figure below.) 2.To indicate that you want grease nipples, add "-N" to the end of the model number.



NP3.2×3.5



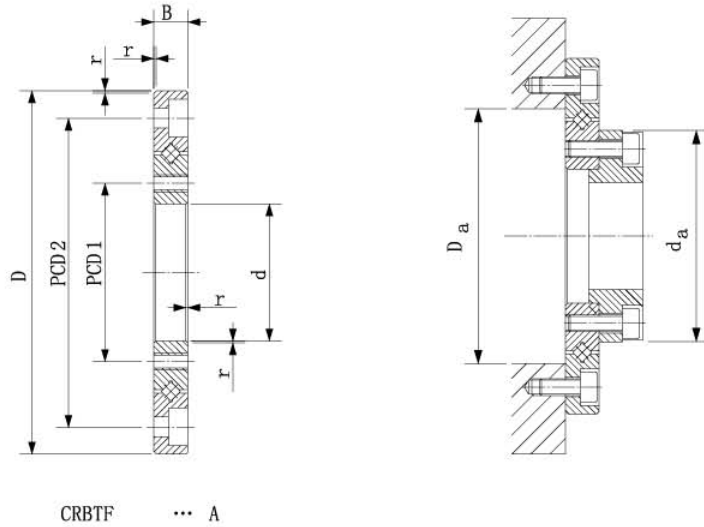
NP6×5



公称型号 Model No.	内圈安装孔 Inner ring mounting hole		外圈安装孔 Outer ring mounting hole	
	安装孔 中心径 PCD1	安装孔尺寸 Mounting hole size	安装孔 中心径 PCD2	安装孔尺寸 Mounting hole size
RU28	16	4-M3贯通through	42	6-φ3.4通孔drilled through φ6.5沉孔深度counter bore depth 3.3
RU42	28	6-M3贯通through	57	6-φ3.4通孔drilled through φ6.5沉孔深度counter bore depth 3.3
RU52	35	6-M3贯通through	67	6-φ3.4通孔drilled through φ6.5沉孔深度counter bore depth 3.3
RU66	45	8-M4贯通through	83	8-φ4.5通孔drilled through φ8沉孔深度counter bore depth 4.4
RU85	65	8-M5贯通through	105	8-φ5.5通孔drilled through φ9.5沉孔深度counter bore depth 5.4
RU124(G)	97	10-φ5.5通孔drilled through φ9.5沉孔深度counter bore depth 5.4	148	10-φ5.5通孔drilled through φ9.5沉孔深度counter bore depth 5.4
RU124X		10-M5贯通through		
RU148(G)	112	12-φ9通孔drilled through φ14沉孔深度counter bore depth 8.6	187	12-φ9通孔drilled through φ14沉孔深度counter bore depth 8.6
RU148X		12-M8贯通through		
RU178(G)	139	12-φ9通孔drilled through φ14沉孔深度counter bore depth 8.6	217	12-φ9通孔drilled through φ14沉孔深度counter bore depth 8.6
RU178X		12-M8贯通through		
RU228(G)	184	12-φ11通孔drilled through φ17.5沉孔深度counter bore depth 10.8	270	12-φ11通孔drilled through φ17.5沉孔深度counter bore depth 10.8
RU228X		12-M10贯通through		
RU297(G)	240	16-φ14通孔drilled through φ20沉孔深度counter bore depth 13	350	16-φ14通孔drilled through φ20沉孔深度counter bore depth 13
RU297X		16-M12贯通through		
RU445(G)	385	24-φ14通孔drilled through φ20沉孔深度counter bore depth 13	505	24-φ14通孔drilled through φ20沉孔深度counter bore depth 13
RU445X		24-M12贯通through		

■ CRBTF型 (安装孔型超薄交叉滚子轴承) >>

Model CRBTF (Mounting Holed Type Super Slim Crossed Roller Bearings)



公称型号 Model No.	主要尺寸 Main dimensions				边界尺寸 Boundary dimensions mm		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	宽度 Width B	倒角 Chamfer rmin	da	Da	C N	C0 N	g
CRBTF 105 AT	10	43	5	0.15	21.5	28	1500	1410	46
CRBTF 205 AT	20	53	5	0.15	31.5	38	1890	2150	66
CRBTF 305 AT	30	63	5	0.15	41.5	47.5	2140	2750	83
CRBTF 405 AT	40	73	5	0.15	51.5	58	2440	3490	103

注 (1) 倒角尺寸r的最小允许单一值。

备注 1.未提供油孔。2.润滑脂已预先包装好。

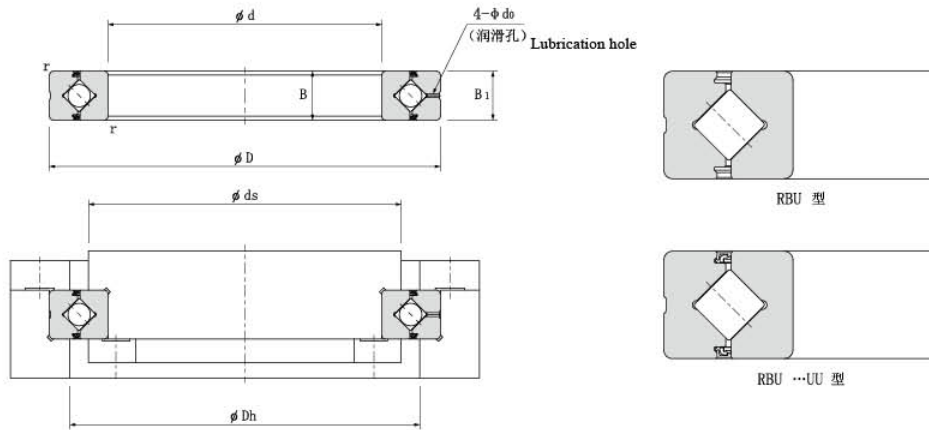
Note(1) Minimum allowable single value of chamfer dimension r

Remarks: 1. No oil hole is provided. 2. Grease is prepacked.

公称型号 Model No.	内圈安装孔 Inner ring mounting hole		外圈安装孔 Outer ring mounting hole	
	安装孔 中心径 PCD1	安装孔尺寸 Mounting hole size	安装孔 中心径 PCD2	安装孔尺寸 Mounting hole size
CRBTF 105 AT	16	6-M2.5 贯通through	35	6-φ2.9 贯通through φ5.5 沉孔深度counter bore depth 2.8
CRBTF 205 AT	26	6-M2.5 贯通through	45	6-φ2.9 贯通through φ5.5 沉孔深度counter bore depth 2.8
CRBTF 305 AT	36	8-M2.5 贯通through	55	8-φ2.9 贯通through φ5.5 沉孔深度counter bore depth 2.8
CRBTF 405 AT	46	8-M2.5 贯通through	65	8-φ2.9 贯通through φ5.5 沉孔深度counter bore depth 2.8

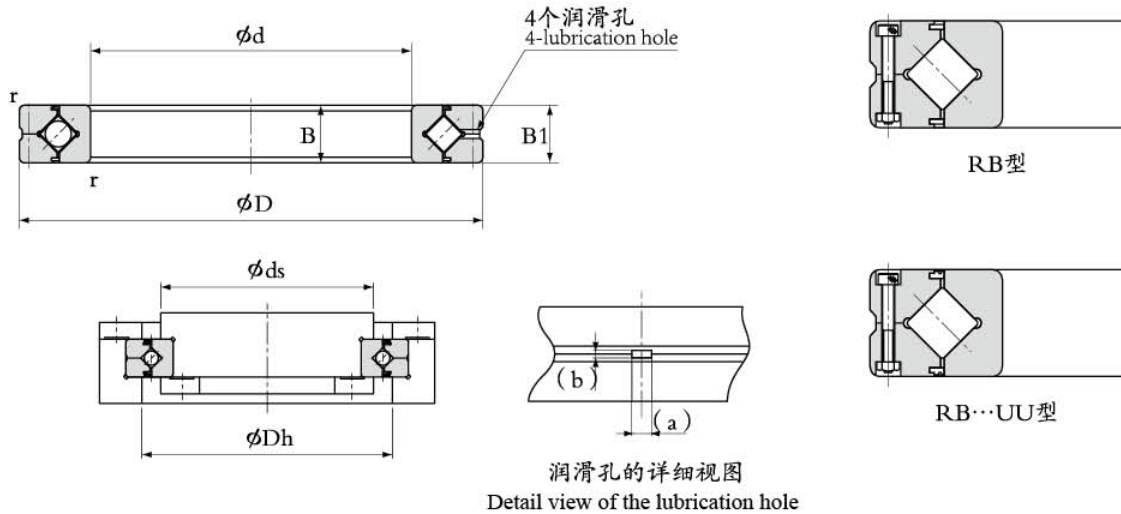


■ RBU/CRBH型 (内外圈一体型) >> Model RBU/CRBH (Integrated Inner/Outer Ring Type)



公称型号 Model No.	主要尺寸 Main dimensions						轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter d_p	高度 Width B B_1	润滑孔 Greasing hole d_o	倒角 Chamfer min	ds (max)	Dh (min)	C kN	C0 kN	Kg
RBU/CRBH 2008 AUU	20	36	27	8	1	0.5	23.5	30.5	3.23	3.1	0.04
RBU/CRBH 2508 AUU	25	41	32	8	1	0.5	28.5	35.5	3.63	3.83	0.05
RBU/CRBH 3010 AUU	30	55	41.5	10	1	0.6	37	47	7.35	8.36	0.12
RBU/CRBH 3510 AUU	35	60	46.5	10	1	0.6	41	51.5	7.64	9.12	0.13
RBU/CRBH 4010 AUU	40	65	51.5	10	1	0.6	47.5	57.5	8.33	10.6	0.16
RBU/CRBH 4510 AUU	45	70	56.5	10	1	0.6	51	61.5	8.62	11.3	0.17
RBU/CRBH 5013 AUU	50	80	64	13	1.5	0.6	57.4	72	16.7	20.9	0.27
RBU/CRBH 6013 AUU	60	90	74	13	1.5	0.6	68	82	18	24.3	0.3
RBU/CRBH 7013 AUU	70	100	84	13	1.5	0.6	78	92	19.4	27.7	0.35
RBU/CRBH 8016 AUU	80	120	98	16	1.5	0.6	91	111	30.1	42.1	0.7
RBU/CRBH 9016 AUU	90	130	108	16	1.5	1	98	118	31.4	45.3	0.75
RBU/CRBH 10016 AUU	100	140	119.3	16	2	1	109	129	31.7	48.6	0.83
RBU/CRBH 10020 AUU	100	150	125	20	2	1	113	133	33.1	50.9	1.45
RBU/CRBH 11015 AUU	110	145	126.5	15	2	0.6	119	136	23.7	41.5	0.75
RBU/CRBH 11020 AUU	110	160	135	20	2	1	120	140	34	54	1.56
RBU/CRBH 12025 AUU	120	180	148.7	25	2	1.5	133	164	66.9	100	2.62
RBU/CRBH 13025 AUU	130	190	158	25	2	1.5	143	174	69.5	107	2.82
RBU/CRBH 14016 AUU	140	175	154.8	16	2	1	147	162	25.9	50.1	1
RBU/CRBH 14025 AUU	140	200	168	25	2	1.5	154	185	74.8	121	2.96
RBU/CRBH 15013 AUU	150	180	164	13	2	0.6	157	172	27	53.5	0.68
RBU/CRBH 15025 AUU	150	210	178	25	2	1.5	164	194	76.8	128	3.16
RBU/CRBH 15030 AUU	150	230	188	30	2	1.5	173	211	100	156	5.3
RBU/CRBH 16025 AUU	160	220	188.6	25	2	1.5	173	204	81.7	135	3.14
RBU/CRBH 18025 AUU	180	240	210	25	2	1.5	195	225	84	143	3.44
RBU/CRBH 19025 AUU	190	240	211.9	25	2	1	202	222	41.7	82.9	2.99
RBU/CRBH 20025 AUU	200	260	230	25	2	2	215	245	84.2	157	4
RBU/CRBH 25025 AUU	250	310	277.5	25	2	2.5	265	290	69.3	150	5
RBU/CRBH 30025 AUU	300	360	327.5	25	2	2.5	312	348	112	245	5.29

■ **RB型 (外圈分割型) >>**
Model RB (Separable Outer Ring Type)



公称型号 Model No.	主要尺寸 Main dimensions							轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter d _p	宽度 Width B B ₁	润滑孔 d ₁		倒角 Chamfer r _{min}	d _s (max)	D _h (min)	C kN	C ₀ kN	Kg
					a	b						
RB2008	20	36	27	8	2	0.8	0.5	23.5	30.5	3.23	3.1	0.04
RB2508	25	41	32	8	2	0.8	0.5	28.5	35.5	3.63	3.83	0.05
RB3010	30	55	41.5	10	2.5	1	0.6	37	47	7.35	8.36	0.12
RB3510	35	60	46.5	10	2.5	1	0.6	41	51.5	7.64	9.12	0.13
RB4010	40	65	51.5	10	2.5	1	0.6	46.5	57.5	8.33	10.6	0.16
RB4510	45	70	56.5	10	2.5	1	0.6	51	61.5	8.62	11.3	0.17
RB5013	50	80	64	13	2.5	1.6	0.6	57	72	16.7	20.9	0.27
RB6013	60	90	74	13	2.5	1.6	0.6	67	82	18	24.3	0.3
RB7013	70	100	84	13	2.5	1.6	0.6	77	92	19.4	27.7	0.35
RB8016	80	120	98	16	3	1.6	0.6	88	110	30.1	42.1	0.7
RB9016	90	130	108	16	3	1.6	1	98	118	31.4	45.3	0.75
RB10016	100	140	119.3	16	3.5	1.6	1	109	129	31.7	48.6	0.83
RB10020	100	150	123	20	3.5	1.6	1	113	133	33.1	50.9	1.45
RB11012	110	135	121.8	12	2.5	1	0.6	117	128	12.5	24.1	0.4
RB11015	110	145	126.5	15	3.5	1.6	0.6	119	136	23.7	41.5	0.75
RB11020	110	160	133	20	3.5	1.6	1	120	143	34	54	1.56
RB12016	120	150	134.2	16	3.5	1.6	0.6	127	141	24.2	43.2	0.72
RB12025	120	180	148.7	25	3.5	2	1.5	133	164	66.9	100	2.62



公称型号 Model No.	主要尺寸 Main dimensions							轴肩尺寸 Shoulder dimensions		基本额定载荷(径向) Basic load rating (radial)		质量 Mass Kg
	内径Inner diameter d	外径Outer diameter D	滚子节圆直径 Roller pitch circle diameter Dp	宽度 Width B B1	润滑孔 d1		倒角 Chamfer rmin	Ds (max)	Dh (min)	C kN	C0 kN	
					a	b						
RB13015	130	160	144.5	15	3.5	1.6	0.6	137	152	25	46.7	0.72
RB13025	130	190	158	25	3.5	2	1.5	143	174	69.5	107	2.82
RB14016	140	175	154.8	16	2.5	1.6	1	147	162	25.9	50.1	1
RB14025	140	200	168	25	3.5	2	1.5	154	185	74.8	121	2.96
RB15013	150	180	164	13	2.5	1.6	0.6	157	172	27	53.5	0.68
RB15025	150	210	178	25	3.5	2	1.5	164	194	76.8	128	3.16
RB15030	150	230	188	30	4.5	3	1.5	169	211	100	156	5.3
RB16025	160	220	188.6	25	3.5	2	1.5	173	204	81.7	135	3.14
RB17020	170	220	191	20	3.5	1.6	1.5	184	198	29	62.1	2.21
RB18025	180	240	210	25	3.5	2	1.5	195	225	84	143	3.44
RB19025	190	240	211.9	25	3.5	1.6	1	202	222	41.7	82.9	2.99
RB20025	200	260	230	25	3.5	2	2	215	245	84.2	157	4
RB20030	200	280	240	30	4.5	3	2	221	258	114	200	6.7
RB20035	200	295	247.7	35	5	3	2	225	270	151	252	9.6
RB22025	220	280	250.1	25	3.5	2	2	235	265	92.3	171	4.1
RB24025	240	300	269	25	3.5	2	2.5	256	281	68.3	145	4.5
RB25025	250	310	277.5	25	3.5	2	2.5	265	290	69.3	150	5
RB25030	250	330	287.5	30	4.5	3	2.5	269	306	126	244	8.1
RB25040	250	355	300.7	40	6	3.5	2.5	275	326	195	348	14.8
RB30025	300	360	328	25	3.5	2	2.5	315	340	76.3	178	5.9
RB30035	300	395	345	35	5	3	2.5	322	368	183	367	13.4
RB30040	300	405	351.6	40	6	3.5	2.5	326	377	212	409	17.2
RB35020	350	400	373.4	20	3.5	1.6	2.5	363	383	54.1	143	3.9
RB40035	400	480	440.3	35	5	3	2.5	422	459	156	370	14.5
RB40040	400	510	453.4	40	6	3.5	2.5	428	479	241	531	23.5
RB45025	450	500	474	25	3.5	1.6	1	464	484	61.7	182	6.6
RB50025	500	550	524.2	25	3.5	1.6	1	514	534	65.5	201	7.3
RB50040	500	600	548.8	40	6	3	2.5	526	572	239	607	26
RB50050	500	625	561.6	50	6	3.5	2.5	536	587	267	653	41.7
RB60040	600	700	650	40	6	3	3	627	673	264	721	29
RB70045	700	815	753.5	45	6	3	3	731	777	281	836	46
RB80070	800	950	868.1	70	6	4	4	836	900	468	1330	105
RB90070	900	1050	969	70	6	4	4	937	1001	494	1490	120
RB1000110	1000	1250	1114	110	6	6	5	1057	1171	1220	3220	360
RB1250110	1250	1500	1365.8	110	6	6	5	1308	1423	1350	3970	440

注: 1. 配有密封垫片的公称型号为RB...UU。如果需要一定的精度,此型号用于内圈旋转。

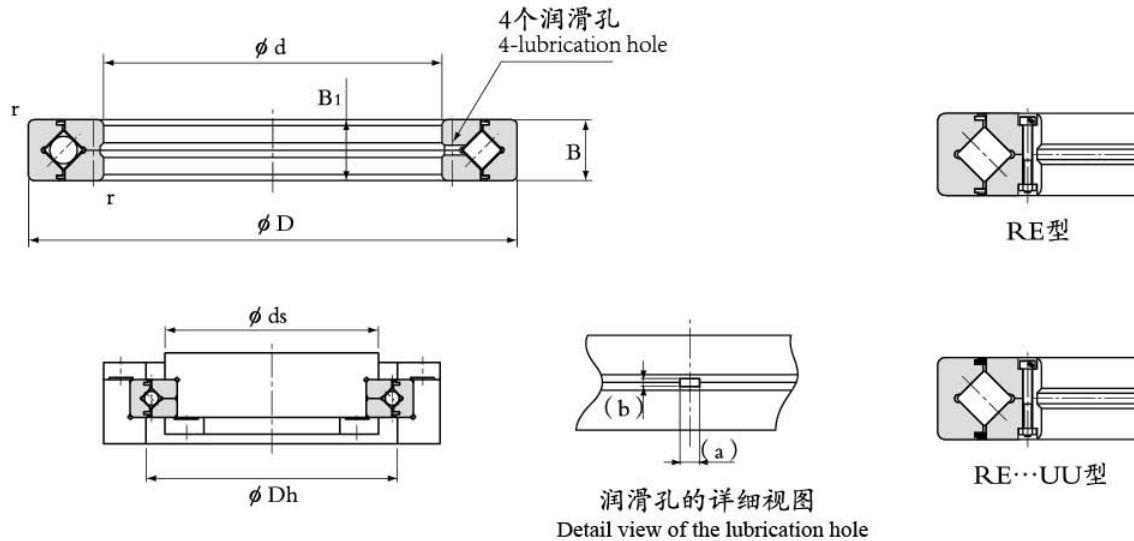
2. 润滑孔详细的(a)、(b)尺寸作为参考尺寸。

Note: 1. The model number of a type with seals attached is RB...UU. If a certain level of accuracy is required, this model is used for inner ring rotation.

2. (a) and (b) dimensions of the lubrication hole in the detailed diagram are reference values.

■ RE型 (内圈分割型) >>

Model RE (Two-piece Inner Ring Type)



润滑孔的详细视图
Detail view of the lubrication hole

公称型号 Model No.	主要尺寸 Main dimensions							轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter dp	宽度 Width B B1	润滑孔 d1		倒角 Chamfer rmin	ds (max)	Dh (min)	C kN	C0 kN	Kg
					a	b						
RE2008	20	36	29	8	2	0.8	0.5	24.5	32.5	3.23	3.1	0.04
RE2508	25	41	34	8	2	0.8	0.5	29.5	37.5	3.63	3.83	0.05
RE3010	30	55	43.5	10	2.5	1	0.6	37.5	48.5	7.35	8.36	0.12
RE3510	35	60	48.5	10	2.5	1	0.6	41.5	53.5	7.64	9.12	0.13
RE4010	40	65	53.5	10	2.5	1	0.6	47.5	58.5	8.33	10.6	0.16
RE4510	45	70	58.5	10	2.5	1	0.6	52.5	63.5	8.62	11.3	0.17
RE5013	50	80	66	13	2.5	1.6	0.6	57.5	73	16.7	20.9	0.27
RE6013	60	90	76	13	2.5	1.6	0.6	68	83	18	24.3	0.3
RE7013	70	100	86	13	2.5	1.6	0.6	78	93	19.4	27.7	0.35
RE8016	80	120	101.4	16	3	1.6	0.6	91	111	30.1	42.1	0.7
RE9016	90	130	112	16	3	1.6	1	100	121	31.4	45.3	0.75
RE10016	100	140	121.1	16	3	1.6	1	109	131	31.7	48.6	0.83
RE10020	100	150	127	20	3.5	1.6	1	115	137	33.1	50.9	1.45
RE11012	110	135	123.3	12	2.5	1	0.6	117	128	12.5	24.1	0.4



公称型号 Model No.	主要尺寸 Main dimensions							轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter Dp	宽度 Width B B1	润滑孔 d1		倒角 Chamfer rmin	Ds (max)	Dh (min)	C kN	C0 kN	Kg
					a	b						
RE11015	110	145	129	15	3	1.6	0.6	122	136	23.7	41.5	0.75
RE11020	110	160	137	20	3.5	1.6	1	125	147	34	54	1.56
RE12016	120	150	136	16	3	1.6	0.6	127	143	24.2	43.2	0.72
RE12025	120	180	152	25	3.5	2	1.5	135	166	66.9	100	2.62
RE13015	130	160	146	15	3	1.6	0.6	137	153	25	46.7	0.72
RE13025	130	190	162	25	3.5	2	1.5	145	176	69.5	107	2.82
RE14016	140	175	156.8	16	3	1.6	1	151	167	25.9	50.1	1
RE14025	140	200	172	25	3.5	2	1.5	154	186	74.8	121	2.96
RE15013	150	180	166	13	2.5	1.6	0.6	158	173	27	53.5	0.68
RE15025	150	210	182	25	3.5	2	1.5	164	196	76.8	128	3.16
RE15030	150	230	192	30	4.5	3	1.5	173	210	100	156	5.3
RE16025	160	220	192	25	3.5	2	1.5	174	206	81.7	135	3.14
RE17020	170	220	196.1	20	3.5	1.6	1.5	187	204	29	62.1	2.21
RE18025	180	240	210	25	3.5	2	1.5	195	225	84	143	3.44
RE19025	190	240	219	25	3.5	1.6	1	207	227	41.7	82.9	2.99
RE20025	200	260	230	25	3.5	2	2	215	245	84.2	157	4
RE20030	200	280	240	30	4.5	3	2	221	258	114	200	6.7
RE20035	200	295	247.7	35	5	3	2	225	270	151	252	9.6
RE22025	220	280	250.1	25	3.5	2	2	235	265	92.3	171	4.1
RE24025	240	300	272.5	25	3.5	2	2.5	258	284	68.3	145	4.5
RE25025	250	310	280.9	25	3.5	2	2.5	268	293	69.3	150	5
RE25030	250	330	287.5	30	4.5	3	2.5	269	306	126	244	8.1
RE25040	250	355	300.7	40	6	3.5	2.5	275	326	195	348	14.8
RE30025	300	360	332	25	3.5	2	2.5	319	344	75.5	178	5.9
RE30035	300	395	345	35	5	3	2.5	322	368	183	367	13.4
RE30040	300	405	351.6	40	6	3.5	2.5	326	377	212	409	17.2
RE35020	350	400	376.6	20	3.5	1.6	2.5	365	386	54.1	143	3.9
RE40035	400	480	440.3	35	5	3	2.5	422	459	156	370	14.5
RE40040	400	510	453.4	40	6	3.5	2.5	428	479	241	531	23.5
RE45025	450	500	476.6	25	3.5	1.6	1	465	486	61.7	182	6.6
RE50025	500	550	526.6	25	3.5	1.6	1	515	536	65.5	201	7.3
RE50040	500	600	548.8	40	6	3	2.5	526	572	239	607	26
RE50050	500	625	561.6	50	6	3.5	2.5	536	587	267	653	41.7
RE60040	600	700	650	40	6	3	3	627	673	264	721	29

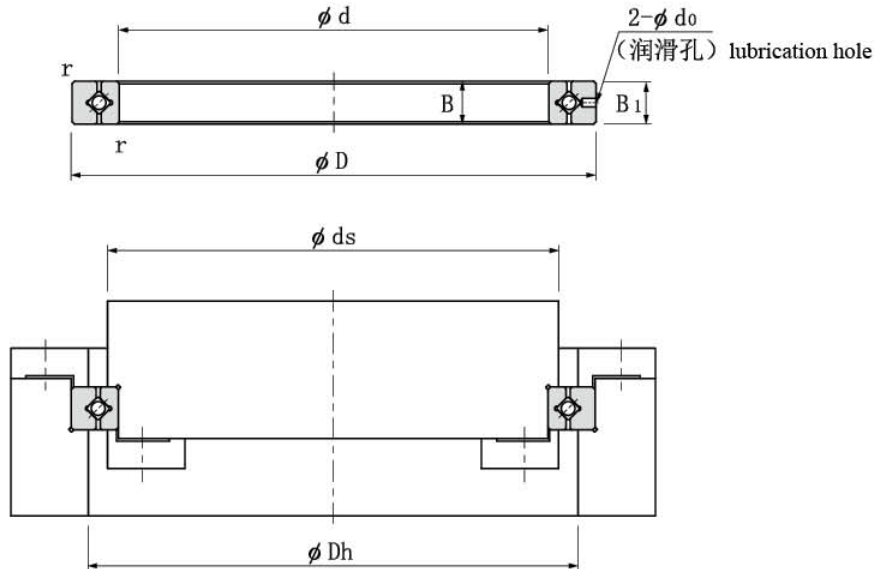
注： 1. 配有密封垫片的公称型号为RE...UU。如果需要一定的精度,此型号用于外圈旋转。

2. 润滑孔详细的(a)、(b)尺寸作为参考尺寸。

Note: 1.The model number of a type with seals attached is RE...UU. If a certain level of accuracy is required, this model is used for outer ring rotation.

2. (a) and (b) dimensions of the lubrication hole in the detailed diagram are reference values.

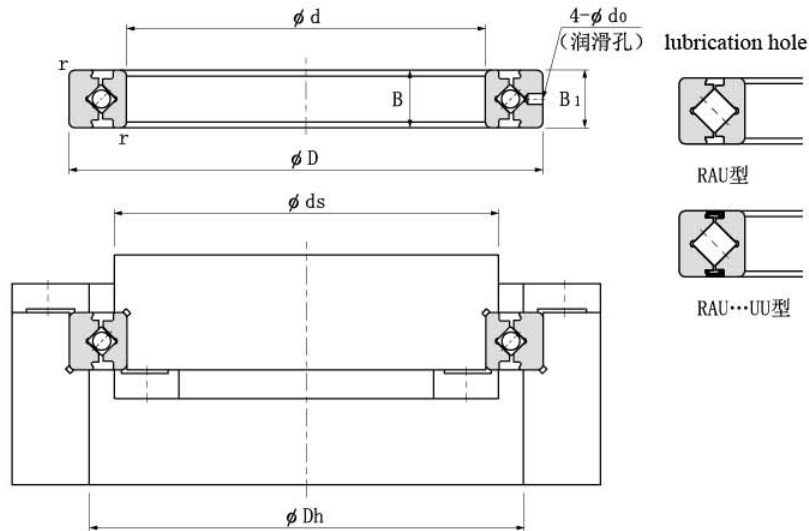
■ RAU型 (小径、薄型宽度5mm) >>
Model RAU (Small-Diameter, 5 mm Thin Type)



公称型号 Model No.	主要尺寸 Main dimensions						轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter d_p	宽度 Width B B1	润滑孔 Greasing hole d_0	倒角 Chamfer rmin	ds (max)	Dh (min)	C kN	C0 kN	Kg
RAU1005	10	21	14.7	5	1	0.15	12.5	17	1.12	0.809	0.009
RAU1505	15	26	19.7	5	1	0.15	17.5	22	1.32	1.10	0.012
RAU2005	20	31	24.7	5	1	0.15	22.5	27	1.49	1.40	0.015
RAU3005	30	41	34.7	5	1	0.15	32.5	37	1.89	2.14	0.021
RAU4005	40	51	44.7	5	1	0.15	42.5	47	2.14	2.74	0.027
RAU5005	50	61	54.7	5	1	0.15	52.5	57	2.43	3.49	0.032
RAU6005	60	71	64.7	5	1	0.15	62.5	67	2.63	4.09	0.038
RAU7005	70	81	74.7	5	1	0.15	72.5	77	2.81	4.68	0.044
RAU8005	80	91	84.7	5	1	0.15	82.5	87	3.05	5.43	0.050
RAU9005	90	101	94.7	5	1	0.15	92.5	97	3.19	6.03	0.056
RAU10005	100	111	104.7	5	1	0.15	102.5	107	3.37	6.63	0.061

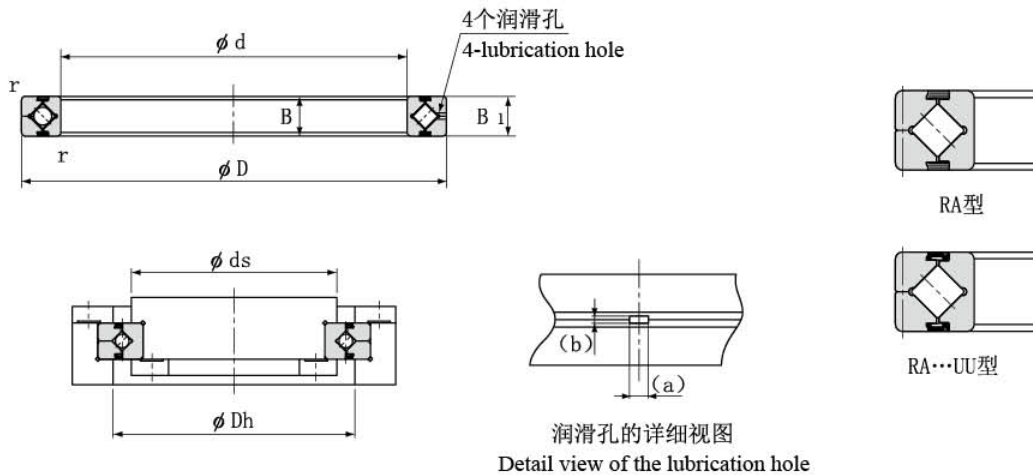


■ RAU型 (RA型兼容型) >> Model RAU (Model RA Interchangeable Type)



公称型号 Model No.	主要尺寸 Main dimensions						轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter dp	宽度 Width B B1	润滑孔 Greasing hole do	倒角 Chamfer rmin	ds (max)	Dh (min)	C kN	C0 kN	Kg
RAU5008	50	66	57	8	1.5	0.5	53.5	60.5	5.1	7.19	0.08
RAU6008	60	76	67	8	1.5	0.5	63.5	70.5	5.68	8.68	0.09
RAU7008	70	86	77	8	1.5	0.5	73.5	80.5	5.98	9.8	0.1
RAU8008	80	96	87	8	1.5	0.5	83.5	90.5	6.37	11.3	0.11
RAU9008	90	106	97	8	1.5	0.5	93.5	100.5	6.76	12.4	0.12
RAU10008	100	116	107	8	1.5	0.5	103.5	110.5	7.15	13.9	0.14
RAU11008	110	126	117	8	1.5	0.5	113.5	120.5	7.45	15	0.15
RAU12008	120	136	127	8	1.5	0.5	123.5	130.5	7.84	16.5	0.17
RAU13008	130	146	137	8	1.5	0.5	133.5	140.5	7.94	17.6	0.18
RAU14008	140	156	147	8	1.5	0.5	143.5	150.5	8.33	19.1	0.19
RAU15008	150	166	157	8	1.5	0.5	153.5	160.5	8.82	20.6	0.2
RAU16013	160	186	172	13	2	0.8	165	179	23.3	44.9	0.59
RAU17013	170	196	182	13	2	0.8	175	189	23.5	46.5	0.64
RAU18013	180	206	192	13	2	0.8	185	199	24.5	49.8	0.68
RAU19013	190	216	202	13	2	0.8	195	209	24.9	51.5	0.69
RAU20013	200	226	212	13	2	0.8	205	219	25.8	54.7	0.71

■ RA型 (外圈分割型) >>
Model RA (Separable Outer Ring Type)



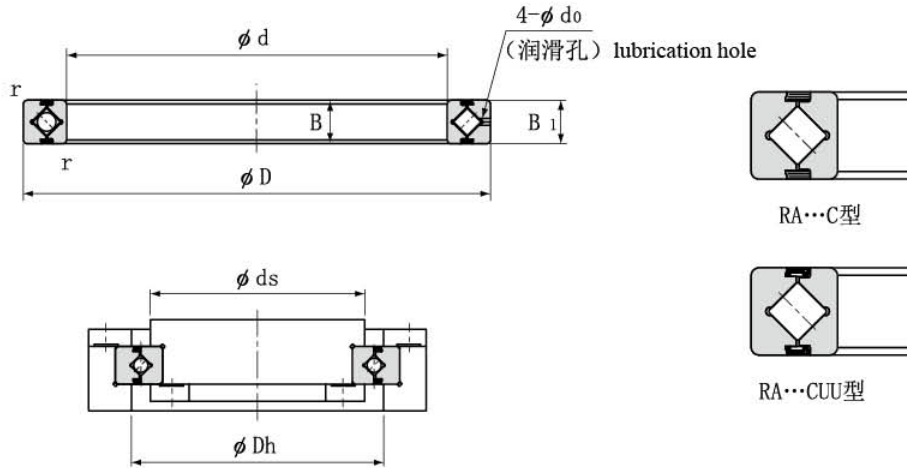
Detail view of the lubrication hole

公称型号 Model No.	主要尺寸 Main dimensions							轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter d_p	宽度 Width B B ₁	润滑孔 Greasing hole		倒角 Chamfer r _{min}	ds (max)	Dh (min)	C kN	C0 kN	Kg
					a	b						
RA5008	50	66	57	8	2	0.8	0.5	53.5	60.5	5.1	7.19	0.08
RA6008	60	76	67	8	2	0.8	0.5	63.5	70.5	5.68	8.68	0.09
RA7008	70	86	77	8	2	0.8	0.5	73.5	80.5	5.98	9.8	0.1
RA8008	80	96	87	8	2	0.8	0.5	83.5	90.5	6.37	11.3	0.11
RA9008	90	106	97	8	2	0.8	0.5	93.5	100.5	6.76	12.4	0.12
RA10008	100	116	107	8	2	0.8	0.5	103.5	110.5	7.15	13.9	0.14
RA11008	110	126	117	8	2	0.8	0.5	113.5	120.5	7.45	15	0.15
RA12008	120	136	127	8	2	0.8	0.5	123.5	130.5	7.84	16.5	0.17
RA13008	130	146	137	8	2	0.8	0.5	133.5	140.5	7.94	17.6	0.18
RA14008	140	156	147	8	2	0.8	0.5	143.5	150.5	8.33	19.1	0.19
RA15008	150	166	157	8	2	0.8	0.5	153.5	160.5	8.82	20.6	0.2
RA16013	160	186	172	13	2.5	1.6	0.8	165	179	23.3	44.9	0.59
RA17013	170	196	182	13	2.5	1.6	0.8	175	189	23.5	46.5	0.64
RA18013	180	206	192	13	2.5	1.6	0.8	185	199	24.5	49.8	0.68
RA19013	190	216	202	13	2.5	1.6	0.8	195	209	24.9	51.5	0.69
RA20013	200	226	212	13	2.5	1.6	0.8	205	219	25.8	54.7	0.71

注: 1.配有密封垫片的公称型号为RA...UU。如果需要一定的精度,此型号用于内圈旋转。2.润滑孔详细的(a)、(b)尺寸作为参考尺寸。
Note: 1. The model number of a type with seals attached is RA...UU. If a certain level of accuracy is required, this model is used for inner ring rotation. 2. (a) and (b) dimensions of the lubrication hole in the detailed diagram are reference values.



■ RA-C型 (单一裂缝型) >>
 Model RA-C (Single-Split Type)

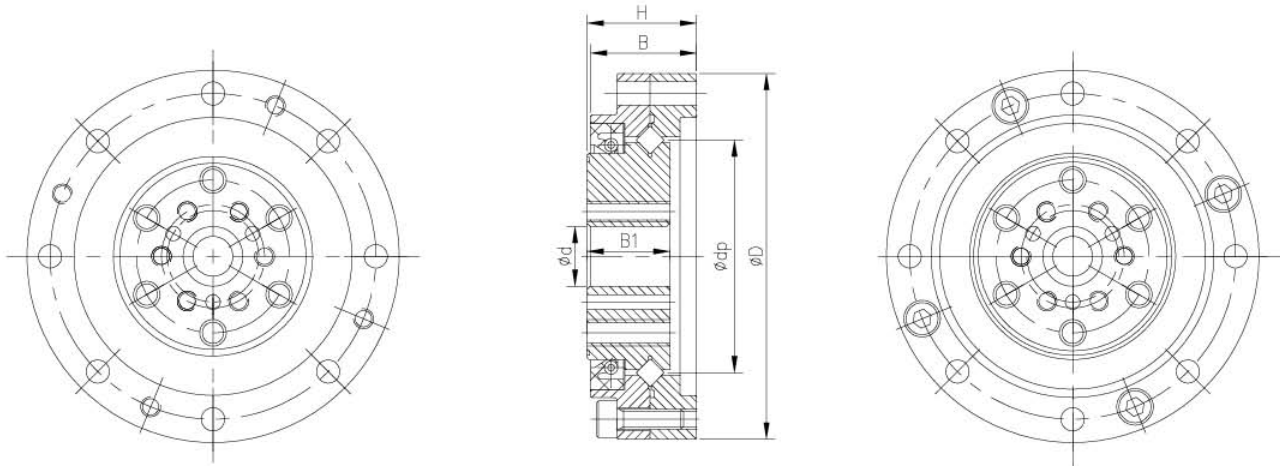


公称型号 Model No.	主要尺寸 Main dimensions						轴肩尺寸 Shoulder dimensions		基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter ϕdp	宽度 Width B B1	润滑孔 Greasing hole ϕdo	倒角 Chamfer r min	ds (max)	Dh (min)	C kN	C0 kN	Kg
RA5008C	50	66	57	8	1.5	0.5	53.5	60.5	5.1	7.19	0.08
RA6008C	60	76	67	8	1.5	0.5	63.5	70.5	5.68	8.68	0.09
RA7008C	70	86	77	8	1.5	0.5	73.5	80.5	5.98	9.8	0.1
RA8008C	80	96	87	8	1.5	0.5	83.5	90.5	6.37	11.3	0.11
RA9008C	90	106	97	8	1.5	0.5	93.5	100.5	6.76	12.4	0.12
RA10008C	100	116	107	8	1.5	0.5	103.5	110.5	7.15	13.9	0.14
RA11008C	110	126	117	8	1.5	0.5	113.5	120.5	7.45	15	0.15
RA12008C	120	136	127	8	1.5	0.5	123.5	130.5	7.84	16.5	0.17
RA13008C	130	146	137	8	1.5	0.5	133.5	140.5	7.94	17.6	0.18
RA14008C	140	156	147	8	1.5	0.5	143.5	150.5	8.33	19.1	0.19
RA15008C	150	166	157	8	1.5	0.5	153.5	160.5	8.82	20.6	0.2
RA16013C	160	186	172	13	2	0.8	165	179	23.3	44.9	0.59
RA17013C	170	196	182	13	2	0.8	175	189	23.5	46.5	0.64
RA18013C	180	206	192	13	2	0.8	185	199	24.5	49.8	0.68
RA19013C	190	216	202	13	2	0.8	195	209	24.9	51.5	0.69
RA20013C	200	226	212	13	2	0.8	205	219	25.8	54.7	0.71

注: 1.配有密封垫片的公称型号为RA...CUU。2.如果需要一定的精度,此型号用于内圈旋转。

Note: 1. The model number of a type with seals attached is RA...CUU. 2. If a certain level of accuracy is required, this model is used for inner ring rotation.

■ **CSG/CSF型 (杯型谐波专用轴承) >>**
Model CSG (Cup-type harmonic special bearing)

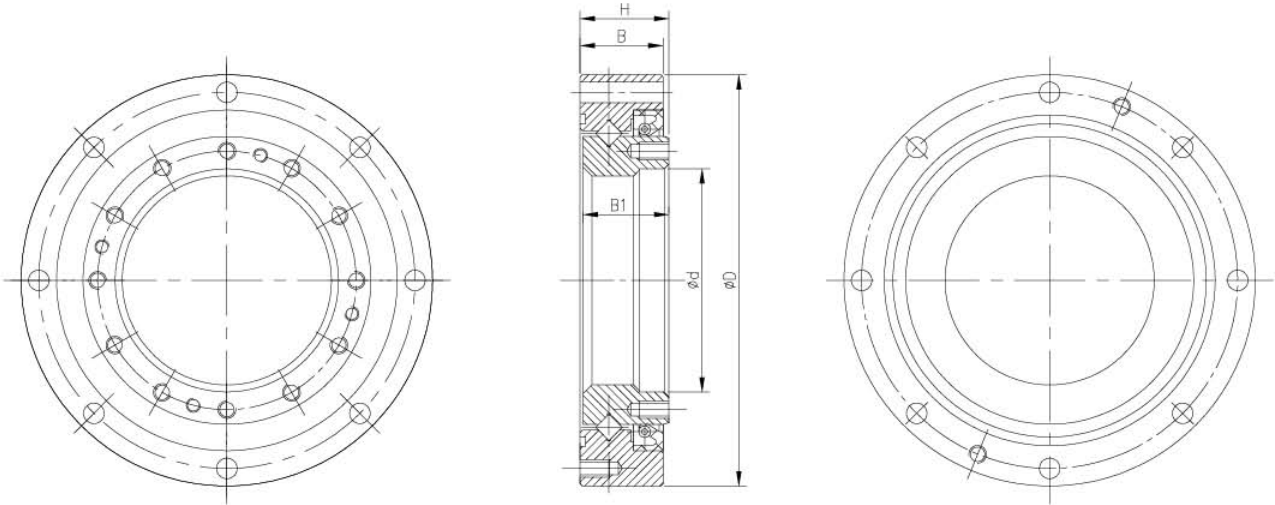


公称型号 Model No.	主要尺寸 Main dimensions						基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter dp	高度 Height H	宽度 Width B	宽度 Width B1	Cr (KN)	Cor (KN)	Kg
CSG/CSF 14	11	55	35	16.5	16	12.5	4.7	6.07	0.25
CSG/CSF 17	10	62	42.5	16.5	16	12.5	5.29	7.55	0.27
CSG/CSF 20	14	70	50	16.5	16	12	5.78	9.0	0.36
CSG/CSF 25	20	85	62	18.5	18	15	9.6	15.1	0.65
CSG/CSF 32	26	112	80	22.5	21.5	18	15	25	1.1
CSG/CSF 40	32	126	96	24	22.5	19.5	21.3	36.5	1.6
CSG/CSF 45	32	147	111	27	26	21	23	42.6	2.3
CSG/CSF 50	40	157	119	31	30	26	34.8	60.2	3.6
CSG/CSF 58	46	185	141	35	33.5	29.5	51.8	90.4	5.2
CSG/CSF 65	52	210	160	39	37	32	55.6	103	7.8

注)其它未标识尺寸, 请向我司咨询。
Note) Other unmarked size, please consult our company.



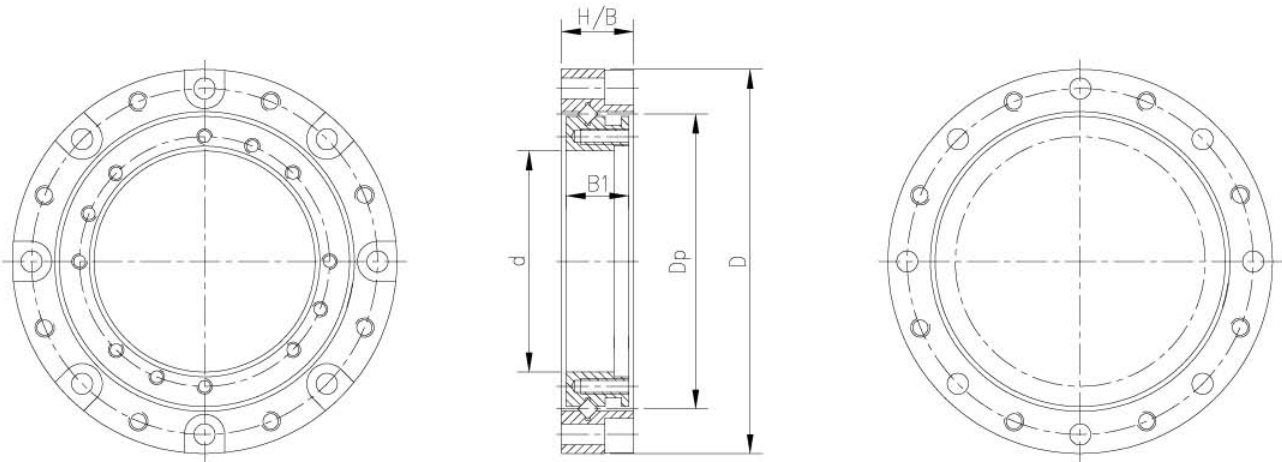
■ SHG/SHF型 (帽型谐波专用轴承) >>
 Model SHG (Cap-type harmonic special bearing)



公称型号 Model No.	主要尺寸 Main dimensions						基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆 直径 Roller pitch circle diameter dp	高度 Height H	宽度 Width B	宽度 Width B1	Cr (KN)	Cor (KN)	Kg
SHG/SHF 14	38	70	50	15.1	14.1	14.6	5.8	8.6	0.28
SHG/SHF 17	47	80	60	17	16	16.4	10.4	16.3	0.41
SHG/SHF 20	54	90	70	18.5	17.5	17.5	14.6	22	0.53
SHG/SHF 25	68	110	85	20.7	18.7	19.7	21.8	35.8	0.85
SHG/SHF 32	88	142	111	24.4	23.4	23.4	38.2	65.4	1.75
SHG/SHF 40	108	170	133	30	29	28.5	43.3	81.6	2.94
SHG/SHF 45	120	190	154	33	32	31.5	77.6	135	3.75
SHG/SHF 50	135	214	170	36	34	34.5	81.6	149	5.43
SHG/SHF 58	156	240	195	42.2	40.2	40.7	87.4	171	7.96
SHG/SHF 65	175	276	218	46	44.5	43	130	223	9.85

注)其它未标识尺寸, 请向我司咨询。
 Note) Other unmarked size, please consult our company.

■ SHD mini型号 >>
Model SHD mini



公称型号 Model No.	主要尺寸 Main dimensions						基本额定载荷 (径向) Basic load rating (radial)		质量 Mass
	内径 Inner diameter d	外径 Outer diameter D	滚子节圆直径 Roller pitch circle diameter dp	高度 Height H	宽度 Width B	宽度 Width B1	Cr (KN)	Cor (KN)	Kg
SHD-03	10	25	17.3	4.2	4	3.9	1194	1261	0.01
SHD-05	15.5	32	23	7	7	6.5	2447	2712	0.027
SHD-08	23	40	30.7	7.5	7.5	6.5	1689	2306	0.038
SHD-11	29.5	52	39	9.5	9.5	7.2	3253	4718	0.082
SHD-14	36	70	53.7	13.1	13.1	8.1	11610	16290	0.207

注)其它未标识尺寸, 请向我司咨询。
Note) Other unmarked size, please consult our company.



设计的要点 Point of Design

■ 配合 >> Fit

◎RU型的配合 Fitting of Models RU

RU型对配合基本上不作要求。但是，对安装要求位置精度时，则推荐选用h7和H7。

Fitting for model RU is typically not required. However, for fitting requiring positioning accuracy, h7 and H7 are recommended.

◎RB和RE型的配合 Fitting of Models RB and RE

关于RB和RE型的配合，建议使用表1中所示的组合。

For the fitting of models RB and RE, we recommend using the combinations indicated in Table 1.

表1 RB和RE型的配合 Table 1 Fitting of Models RB and RE

径向间隙 Radial clearance	使用条件 Service conditions		轴 Shaft	支撑座 Housing
CC0	内圈旋转负荷 Inner ring rotational load	普通负荷 Normal load	g5	H7
		大冲击和力矩 Large impact and moment		
	外圈旋转负荷 Outer ring rotational load	普通负荷 Normal load		
		大冲击和力矩 Large impact and moment		
C0	内圈旋转负荷 Inner ring rotational load	普通负荷 Normal load	h5	H7
		大冲击和力矩 Large impact and moment		
	外圈旋转负荷 Outer ring rotational load	普通负荷 Normal load	g5	Js7
		大冲击和力矩 Large impact and moment		
C1	内圈旋转负荷 Inner ring rotational load	普通负荷 Normal load	j5	H7
		大冲击和力矩 Large impact and moment	k5	Js7
	外圈旋转负荷 Outer ring rotational load	普通负荷 Normal load	g6	Js7
		大冲击和力矩 Large impact and moment	h5	k7

注)对于用于CC0间隙的配合，要避免相互干扰，否则会导致过高的预压。当选择的间隙CC0是用于机器人的关节或旋转部位时，此时选用的配合，建议应为g5和H7的组合。

Note) For the fitting for clearance CC0, avoid interference because it will cause an excessive preload. In addition, if higher rigidity is required, we recommend measuring the inner and outer diameters of the bearing and applying a slight interference fit to match the diameters.

◎RAU、RA和RA-C型的配合 Fitting of Models RAU, RA and RA-C

RAU型、RA型、RA-C型的配合方式，建议采用轴g5、g6、轴承座H7的组合。

注) 关于RAU型（小径、薄型 5mm），在设计时请不要带有配合量。

For the fitting of models RAU, RA, and RA-C, we recommend using g5 and g6 for the shaft and H7 for the housing.

Note) When using a Model RAU (small-diameter, 5 mm thin type), please design devices so that there is nointerference.

■ 支撑座及固定法兰的设计 >>

Designing the Housing and the Presser Flange

因交叉滚子轴承是薄壁小型结构，所以要充分考虑支撑座或固定法兰的刚性。当外圈被分割时，如果支撑座或固定法兰及固定螺栓的刚性不足，就不能均等地固定内圈或外圈，在受到力矩负荷时交叉滚子轴承将产生变形，滚柱的接触区域会变得不均匀，使性能显著降低。

Since the Cross-Roller Bearing is a compact, thin device, special consideration must be given to the rigidity of the housing and the presser flange. With types having a separable outer ring, insufficiency in the strength of the housing, pressure flange or the presser bolt will result in the inability to evenly hold the inner or outer ring, or the deformation of the Cross-Roller Bearing when a moment load is applied. Consequently, the contact area of the rollers will become uneven, causing performance to significantly deteriorate.

图4为交叉滚子轴承的装配例。

Fig.4 shows examples of installing the Cross-Roller Bearing.

◎支撑座 Housing

支撑座的壁厚，请按轴承断面高度的60%以上为基准进行设计（图2）

When designing the thickness of the housing, make sure it is at least 60% of the sectional height of the Cross Roller Bearing as a general guide. (Fig.2)

支撑座的壁厚 $T=(D-d)/2 \times 0.6$ 以上

Housing thickness $T=(D-d)/2 \times 0.6$ or greater

(D：外圈外径尺寸；d：内圈内径尺寸)

(D: outer diameter of the outer ring; d: inner diameter of the inner ring)

想要获得更高刚性时，需要将配合量及支撑座的壁厚也予以探讨。请在探讨时咨询我司。

If greater stiffness is desired, both the thickness of the housing and the fitting tolerance must be considered. Please contact us when making such considerations.

z 肩部的设计 Shoulder Design

请在设计时使轴的肩部尺寸(Φds)较滚动面要偏向内侧，另外支撑座的肩部尺寸(ΦDh)较滚动面要偏向外侧。

(图1)

When designing the shoulder, ensure that the shaft shoulder diameter (ds) and the housing shoulder diameter (Dh) are outside the raceway area. (Fig.1)

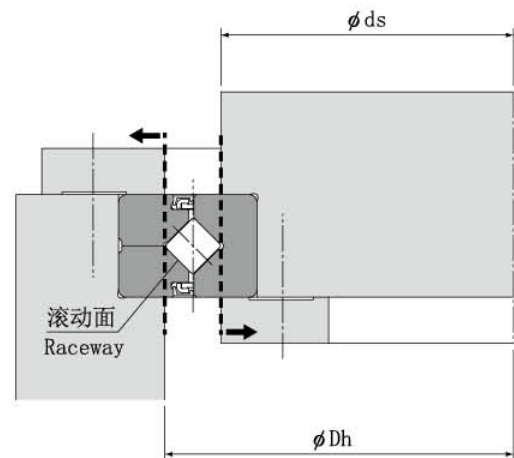


图1 (Fig 1)



当肩部尺寸靠近滚动面时，由于偏载作用可能会引起旋转不良。肩部尺寸请参照尺寸表。

If the shoulder dimensions are within the raceway area, then an uneven load may apply, resulting in a faulty rotation. For the shoulder dimensions, see the corresponding specification table.

内外圈拆卸用螺纹孔

Tapped Hole for Ring Removal

如果设置内外圈拆卸用的螺纹孔(如图2)，那么在拆卸时就不会对交叉滚柱轴承造成损伤。请避免在拆外圈时推压内圈或在拆内圈时推压外圈。

By including tapped holes for inner and outer ring removal (Fig.2), it becomes possible to remove the rings without damaging the Cross Roller Bearing. Avoid pushing the inner ring when removing the outer ring, or vice versa.

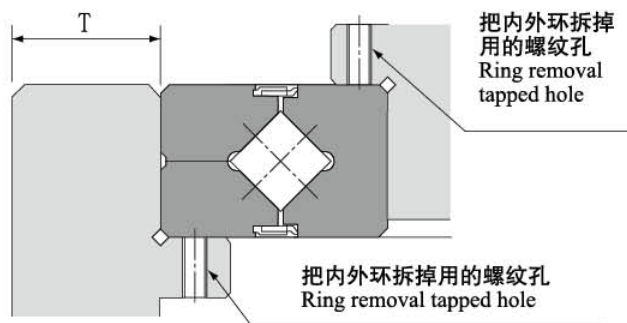


图2 (Fig 2)

内外圈的段差

Level difference between the inner and outer rings

由于交叉滚子轴承的内外圈存在段差，因此支承座需要留有间隙。间隙请设为宽度尺寸容许公差A的2倍以上。宽度尺寸的容许公差A请参照精度规格。(图3)

Since there is a level difference between the inner and outer rings of the Cross-Roller Bearing, it is necessary to provide a clearance in the housing. The clearance must be at least twice the tolerance A of the width dimension. For the tolerance A of the width dimension, see the accuracy standard.(Fig.3)

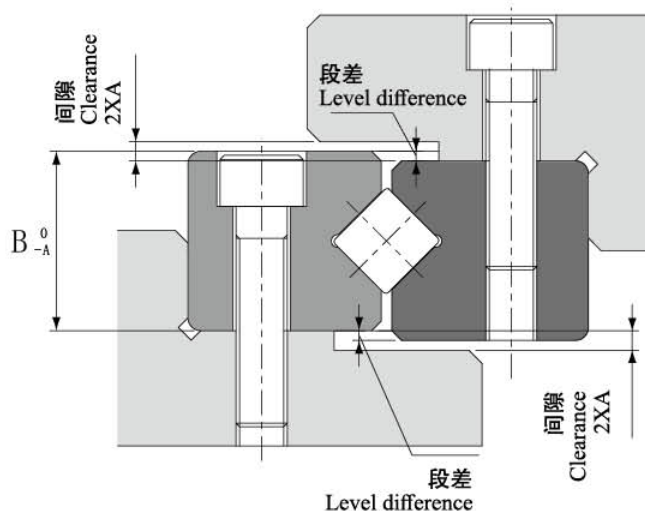


图3 (Fig 3)

表2 Table 2

型号 Model No.	宽度 Width dimension
RB	B_{-A}^0
RE	B_{-A}^0
RA.RAU	$B_{-A}^0 = B_{1-A}^0$
RA-C	$B_{-A}^0 = B_{1-A}^0$
RU	B_{-A}^0

注) RB、RE型请参照B1宽度尺寸的容许公差。

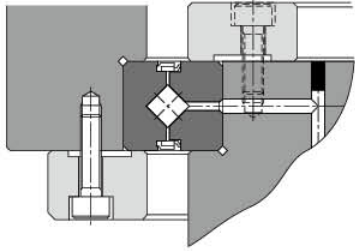
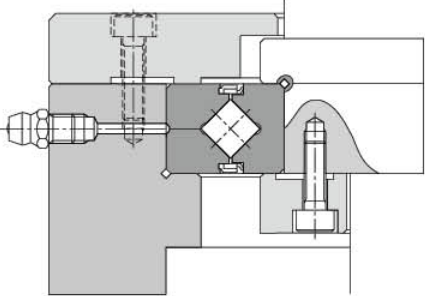
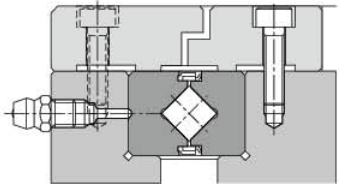
Note) For models RB and RE, refer to the tolerance of the width dimension of B1.

◎ **安装例** [Example of Assembly]

交叉滚子轴承的安装例如下图所示。

Show examples of installing the Cross-Roller Bearing.

RE型、RB型 安装例
Examples of Assembling Models RE and RB

RE型 安装例 Example of Assembling Model Re	RB型 安装例1 Example 1 of Assembling Model RB	RB型 安装例2 Example 2 of Assembling Model RB
		
<p>a. 旋转部中的外圈旋转 内外圈固定后，装配重机身部的例子 a. Outer ring rotating in the swiveling unit. A heavy body part is mounted after the inner and outer rings secured</p>	<p>b. 旋转部中的内圈旋转 (配备密封垫片) b. Inner ring rotating in the swiveling unit (with seals attached)</p>	<p>c. 旋转部的内外圈在同方向固定 (配备密封垫片) c. Inner and outer rings secured in the same direction in the swiveling unit (with seals attached)</p>

RU型 安装例
Examples of Assembling Model RU

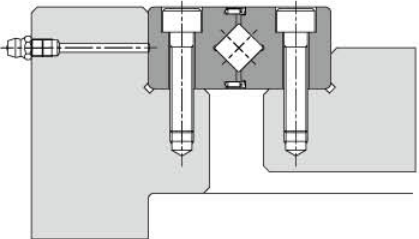
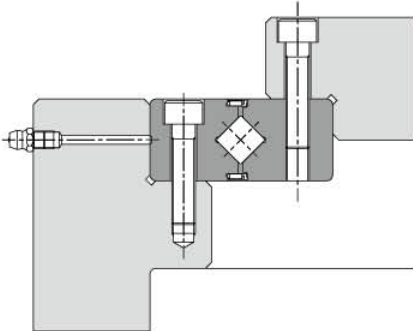
RU型 安装例1 Example 1 of Assembling Model RU	RU型 安装例2 Example 2 of Assembling Model RU
	
<p>d. 旋转部的内外圈在同方向固定 (配备密封垫片) Inner and outer rings secured in the same direction in the swiveling unit (with seals attached)</p>	<p>e. 旋转部的内外圈在同方向固定 (配备密封垫片) Inner and outer rings secured in the same direction in the swiveling unit (with seals attached)</p>

图4 (Fig 4)



◎固定法兰及固定螺栓 Presser Flange and Presser Bolt

固定法兰的壁厚(F)和法兰部的间隙(S)值,请以下述尺寸为基准。此外,至于固定螺栓的数量,虽然数量越多,系统越安稳。但是作为基准,通常可以使用表3所示的螺栓数量,进行等距配置。

$$F = B \times 0.5 \sim B \times 1.2$$

$$H = B \ 0 \ -0.1$$

$$S = 0.5 \text{ mm}$$

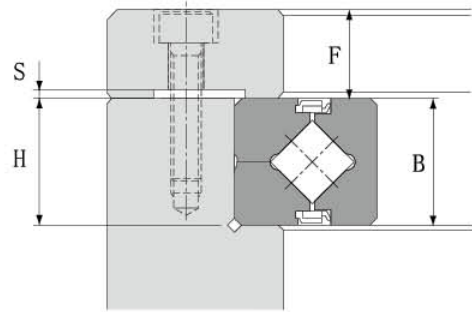
即使轴或支承座的材料是轻合金,固定法兰的材料还是建议采用铁质材料。关于RU型请使用内侧环设置的安装孔或是螺纹孔来安装。(RU不需要固定法兰)

锁紧固定螺栓时请用扭矩扳手等将螺栓结实地拧紧。支承座或固定法兰如果是用一般的中硬度钢材时,锁紧扭矩如表3所示。

When determining the thickness of the presser flange (F) or the clearance of the flange section (S), refer to the dimensions indicated below as a guide. As for the number of the presser bolts, the greater the number of the bolts, the more stable the system becomes. As a guide, however, it is normally appropriate to use the number of bolts indicated in Table3 and equidistantly arrange them.

Even if the shaft and the housing are made of light alloy, it is recommendable to select a steel based material for the presser flange. When assembling model RU, use the mounting holes or tapped holes built on the inner and outer rings (model RU does not require a presser flange).

When tightening the presser bolts, firmly secure them using a torque wrench or the like so that they will not loosen. Table4 shows tightening torques for the housing and presser flanges made of typical steel materials with medium hardness.



RB型、RE型固定螺栓的数量和螺栓尺寸
Number of Presser Bolts and Bolt Sizes
for Models RB and RE

图5 (Fig 5)

表3 RB型、RE型固定螺栓的数量和螺栓尺寸 Table3 Number of Presser Bolts and Bolt Sizes for Models RB and RE

外圈外径尺寸(D) Outer diameter of the outer ring (D)		螺栓数量 No. of bolts	螺栓尺寸 (基准值) Bolt size (reference value)
以上 Above	以下 Or less		
--	100	8或更多8 or more	M3~M5
100	200	12或更多12 or more	M4~M8
200	500	16或更多16 or more	M5~M12
500	--	24或更多24 or more	M12或更大M12 or thicker

表4 螺栓的锁紧扭矩 Table4 Bolt Tightening Torque

螺钉的公称型号 Screw model No.	锁紧扭矩 Tightening torque	螺钉的公称型号 Screw model No.	锁紧扭矩 Tightening torque
M2	0.6	M8	30
M2.3	0.8	M10	70
M2.6	1.2	M12	120
M3	2	M16	200
M4	4	M20	390
M5	9	M22	530
M6	14		

安装步骤 Procedure for Assembly

■ 安装交叉滚子轴承时,请按以下步骤进行。 >>

When assembling the Cross-Roller Bearing, follow the steps below.

◎ 组装前的准备 Preparations before assembly

1. 将支承座或其它安装部件彻底清洗干净, 并确认是否有毛刺或毛边。
2. 松开交叉滚子轴承的防分离螺栓。
3. 分割为2部分的外圈或内圈的接缝存在偏离时, 请用塑料锤等轻轻修正后再插入。(铆钉固定型请直接插入。)

1. Thoroughly clean the housing and other assembly parts, and make sure there are no burrs.
2. Loosen the bolts that prevent separation of the Cross-Roller Bearing.
3. If the two divided parts of the outer or inner ring are misaligned at the joints, correct the misalignment by gently hitting the ring with a plastic hammer or the like, and then install it. (For a type secured with rivets, install it as-is.)

◎ 将交叉滚子轴承插入支承座或轴里 Installing the Cross-Roller Bearing into the Housing or onto the Shaft

由于交叉滚子轴承为薄壁结构, 插入时易发生倾斜, 所以请在安装时一边保持水平, 一边用塑料槌均匀敲打轴环的四周, 使轴环一点点逐步装入。小心地敲打直到可以确认到轴环与靠面紧密接触时的声音。

注) 插入内圈时用锤子敲打内圈, 插入外圈时用锤子敲打外圈。

Since the Cross Roller Bearing has a thin-walled structure, it is easily tilted during insertion. Use a plastic hammer or similar tool to level the Cross Roller Bearing by gradually hammering the perimeter while inserting. Carefully hammer until the sound of the ring coming into full contact with the mounting surface can be verified.

Note) When inserting the inner ring, hammer the inner ring. When inserting the outer ring, hammer the outer ring.

◎ RU和RAU型的组装方向 Assembly directions for RU and RAU

RU型、RAU型的外圈上设有装入滚柱的插入孔。(已安装埋栓。) 组装时请注意安装朝向, 不要使埋栓位置与最大负荷区域重合。(埋栓部是外圆稍微凹陷, 在侧面敲入了固定用销的部分。)

Models RU and RAU have insertion holes for installing rollers in the outer ring. (Filler plugs are attached.) Pay attention to the mounting direction so that the filler plugs do not overlap with the area under maximum load. (The periphery of the plugged section is slightly recessed, and a fixing pin is driven into its side.)

◎ RA...C型的组装方向 Assembly directions for RA...C

RA...C型的外圈上加工有装入滚柱的开口。请在组装时注意安装朝向, 不要使开口加工部与最大负荷区域重合。(开口加工部是在刻有产品名的侧面上加工有2处小孔的部分。)

The outer ring of model RA...C has a slit for installing rollers. Position the mounting direction so that the split section does not overlap with the area under maximum load. (The split section has two small holes on the side marked with the product name.)



◎固定法兰的安装 Attaching the Presser Flange

1. 压紧法兰从一体型旋转环（RB·RA型的内圈、RE型的外圈）开始安装。RU型、RAU型从旋转轴侧开始安装。

2. 设置好压紧法兰后，转动压紧法兰数次以对齐安装螺栓的位置。RU型时也同样，数次转动轴环对齐安装螺栓的位置。

3. 将固定螺栓插入孔内。用手转动螺栓时，确认没有因螺栓孔偏离而引起螺栓难以拧入。

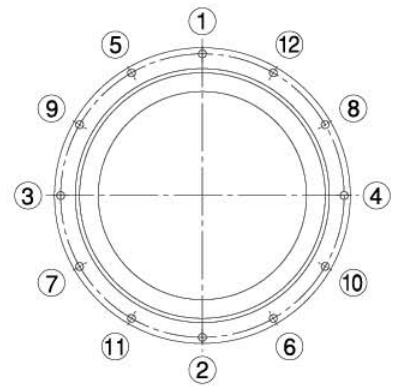
4. 拧紧压紧螺栓时从不完全锁紧到全锁紧分3~4个阶段，按对角线的顺序反复多次拧紧。当拧紧分割为2部分的内圈或外圈时，每次拧紧时将一体型的外圈侧或内圈侧往复转动4~5次（90°左右），可修正分割的2部分在对齐部的偏离。

1. Fit the presser flange to the single-piece ring (inner ring on models RB/RA, outer ring on model RE). In case of models RU and RAU, fit the presser flange to the rotational axis side.

2. Place the presser flange onto the Cross-Roller Bearing. Rock the flange several times to match the bolt holes. Also in case of model RU, rock the flange several times to match the bolt holes.

3. Insert the presser bolts into the holes. Manually turn the bolts and make sure they do not show skewing caused by misalignment of the holes.

4. Fasten the presser bolts in three to four steps from loose to fully fastened by tightening the bolts in a diamond pattern, as shown in Fig.1. When tightening the separated inner or outer ring, reciprocating the single piece outer or inner ring approximately four to five times (about 90°) will correct misalignment between the ring and the body.



使用注意事项 Precautions on Use

◎使用 Handling

1. 搬运较重（20kg以上）的产品时，请由2人以上或者使用搬运器具进行搬运。否则，可能导致划伤、破损。

2. 被分割成两部分的内圈或外圈通过使用特殊铆钉或螺栓·螺母固定以防止分离，因此在组装时请直接装入，不要将其拆卸。此外，如果间隔保持器装入错误将会严重影响旋转性能，所以请勿拆开交叉滚柱轴承。

3. 请不要让交叉滚子轴承掉落或者敲击。否则，可能导致划伤、破损。另外，受到冲击时，即使外观上看不见破损，也可能导致功能损坏。

4. 接触产品时，请根据需要使用防护手套、安全鞋等防护用具，以确保安全。

1. Please use at least two people to move any product weighing 20 kg or more, or use a dolly or another conveyance. Doing so may cause injury or damage.

2. The inner and outer rings, which are comprised of two parts, are held together with a special rivet or screws, so install as is. Incorrect installation of the spacer retainer will greatly affect rotational performance, do not disassemble the Cross Roller Bearing.

3. Take care not to drop or strike the Cross Roller Bearing. Doing so may cause injury or damage. Giving an impact to it could also cause damage to its function even if the product looks intact.

4. When handling the product, wear protective gloves, safety shoes, etc., as necessary to ensure safety.

◎使用注意事项 Precautions on Use

1. 请注意防止切屑、冷却液等异物的进入。否则可能导致破损。
 2. 在切屑、冷却液、带腐蚀性溶剂、水等可能进入产品内部的环境下使用时，请使用伸缩护罩或防护罩等避免其进入产品内部。
 3. 请避免在超过80℃的条件下使用。超过该温度可能导致树脂·橡胶部品变形，或损伤。
 4. 附着有切屑等异物时，请在清洗后重新封入润滑剂。
 5. 微动摇动时，滚动面和接触面之间难以形成油膜，可能产生微动磨损。另外，建议定期加入交叉滚子轴承转动数圈的动作，使滚动面和滚动体之间形成油膜。
 6. 请不要强行将定位部品（销、键等）敲入产品中。可能造成滚动面的压痕，导致功能损坏。
 7. 内圈或外圈的匹配标记，可能会略有偏差。因此，在插入支承座前，请松开用于固定内圈或外圈的螺栓，然后使用塑料锤等校正偏差后再进行装配。（要让固定铆钉在支承座之后。）
 8. 安装到支承座上时，内圈固定时使用锤子敲击内圈，外圈固定时使用锤子敲击外圈，将交叉滚子轴承装入。若用锤子敲击固定侧的反侧，可能会导致破损。
 9. 安装构件的刚性及精度不足时，轴承载荷在局部集中，造成轴承性能显著降低。同时，关于支承座及底座的刚性·精度、固定螺栓的强度，请进行充分探讨。
 10. 在安装或拆卸交叉滚子轴承时，请勿施加力给固定铆钉或螺栓。
 11. 当安装固定法兰时，要考虑安装部件的尺寸公差，使得法兰从侧面牢固地保持住内圈和外圈。
1. Prevent foreign material, such as cutting chips or coolant, from entering the product. Failure to do so may cause damage.
 2. If the product is used in an environment where cutting chips, coolant, corrosive solvents, water, etc., may enter the product, use bellows, covers, etc., to prevent them from entering the product.
 3. Do not use the product at temperature of 80°C or higher. Exposure to higher temperatures may cause the resin/rubber parts to deform/be damaged.
 4. If foreign material such as cutting chips adheres to the product, replenish the lubricant after cleaning the product.
 5. Slight rocking can inhibit the formation of a film of oil between the rolling surface and the area of contact, resulting in fretting. We recommends periodically rotating the Cross Roller Bearing several times to help ensure that a film forms on the surfaces and rolling elements.
 6. Do not use undue force when fitting parts (pin, key, etc.) to the product. This may generate permanent deformation on the raceway, leading to loss of functionality.
 7. The matching mark of the inner or outer ring may be slightly misaligned when delivered. In that case, loosen the bolts that secure the inner or outer ring, and correct the alignment using a plastic hammer or the like, before installing it to the housing. (Let the securing rivets follow the housing.)
 8. When installing the Cross-Roller Bearing, insert the ring by hammering the ring that is to be fixed (i.e. hammer the inner ring if the inner ring is to be fixed, or hammer the outer ring if the outer ring is to be fixed). Hammering the ring on the wrong side may cause damage.
 9. Insufficient rigidity or accuracy of mounting members causes the bearing load to concentrate on one point, and the bearing performance will drop significantly. Accordingly, give sufficient consideration to the rigidity/accuracy of the housing and base and strength of the fixing bolts.
 10. When installing or removing the Cross Roller Bearing, do not apply force to the fixing rivets or the bolts.
 11. When mounting the presser flange, take into account the dimensional tolerances of the parts so that the flange firmly holds the inner and outer rings from the side.

◎润滑 Lubrication

1. 请避免将不同的润滑剂混合使用。即使增稠剂相同的润滑脂，由于添加剂等不同，也可能相互之间产生不良影响。
2. 要在经常产生振动的场所、无尘室、真空、低温·高温等特殊环境下使用时，请使用与规格·环境相



匹配的润滑脂。

3. 润滑脂的稠度随温度而变化。交叉滚子轴承的滑动阻力随稠度而变化，请注意。

4. 由于交叉滚子轴承注有锂皂基润滑脂2号，可以不必补充油脂就开始使用。但是，此产品需要定期润滑，因为与普通的滚柱轴承相比，其内部空间容积较小，并且由于其为滚柱的滚动接触结构，需要定期润滑。为了补充润滑脂，加工有润滑孔，其与设置于内外圈的油槽相通。关于加脂时间间隔，即使旋转频率低也请每3~6个月补充相同系列的润滑脂，以使润滑脂分布于轴承内部各个结构。请根据实际设备，确定最终的加脂时间间隔和加脂量。

另外，如果轴承中充满油脂，由于油脂的粘滞阻力会使初始旋转扭矩暂时增加；但是，随着多余的油脂会流出密封垫片之外，扭矩会在短期内就恢复到正常水平。但薄型产品不具有油槽，请在支承座内径一侧设置油槽以供润滑。

5. 交叉滚子轴承可能会有多余的润滑脂从外圆流出。如果担心设备周边的润滑脂会造成污染，则需要充分考虑周围部件的结构。

1. Do not mix different lubricants. Mixing greases using the same type of thickening agent may still cause adverse interaction between the two greases if they use different additives, etc.

2. When using the product in locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, use the grease appropriate for the specification/environment.

3. The consistency of grease changes according to the temperature. Take note that the torque of the Cross Roller Bearing also changes as the consistency of grease changes.

4. Since the Cross-Roller Bearing unit contains high-quality lithium soap group grease No. 2, it can be used without initially adding grease. However, this product requires regular lubrication since it has a smaller internal space than ordinary roller bearings and because of the rolling contact structure of the rollers. To replenish grease, it is necessary to access lubrication holes that lead to the oil grooves formed on the inner and outer rings. As for the lubrication interval, normally replenish the same type of grease so that it is distributed throughout the interior at least every three to six months. Set the final lubrication interval/amount based on the actual machine.

When the bearing is filled up with grease, the initial rotational torque temporarily increases due to grease resistance. However, surplus grease will run off of the seals and the torque will return to the normal level in a short period. The thin type does not have an oil groove. Secure an oil groove in the inner diameter side of the housing for lubrication.

5. Excess grease may protrude from the outside edge of the Cross-Roller Bearing. The structure of peripheral components will require careful consideration if contamination due to grease around the edges of the device is a concern.

◎储存 Storage

存放交叉滚子轴承时，请将其在我司的出厂包装的状态下水平存放在室内，并避免高温、低温和高度潮湿的环境。

长时间保管的产品，其内部的润滑剂可能随时间而劣化，请再次添加润滑剂之后使用。

When storing the Cross Roller Bearing, enclose it in a package designated by CYBERX and store it in a room in a horizontal orientation while avoiding high temperature, low temperature and high humidity.

After the product has been in storage for an extended period of time, lubricant inside may have deteriorated, so add new lubricant before use.

◎废弃 Disposal

请将产品作为工业废弃物进行恰当的废弃处理。

Dispose of the product properly as industrial waste.



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