

Thrust Cylindrical Roller Bearings

Detail Introduction :

All Thrust Cylindrical Roller Bearings have an optimized design of roller and raceway contact line to avoid edge effect. Moreover, the bearings are of separate construction, where the shaft, seat ring and cage roller set can be mounted separately. Two-way thrust roller bearings can be mounted in both directions of the shaft, and can be easily combined with a spacer using the 811 or 812 series shaft, seat ring, and cage roller assemblies.

Thrust Cylindrical Roller Bearing are usually machined to normal grade, but can also be machined to P6, P5, P4 and P2 accuracy when used in high precision. The axial structure of thrust cylindrical roller bearing is very compact and can withstand very large axial load, also can withstand shock load, good rigidity. We produce one-way and two-way thrust tapered roller bearings, the contact profile of the rollers and raceways use logarithmic bus to obtain a better stress distribution and prolong the service life of the bearings.

Thrust cylindrical roller bearings are often combined into high stiffness bearing configurations that can withstand heavy loads and vibration loads without difficulty. The conditions of use of thrust cylindrical roller bearings do not allow any angular deviation or eccentricity between the shaft and the bearing housing.

In general, thrust cylindrical roller bearings have the following characteristics.

1. Thrust cylindrical roller bearings are divided into single row cylindrical roller bearings and double row cylindrical roller bearings according to the number of roller groups in the bearing. Single row cylindrical roller bearings can withstand single direction axial load and limit the axial displacement of a direction, double row cylindrical roller bearings can withstand two-way axial load and limit the axial displacement of two directions.

2. Thrust Cylindrical Roller Bearing can bear unidirectional heavy load, but such bearing roller rolling, due to the roller two ends of the line speed is different, so that the roller in the ring raceway inevitably produce sliding, therefore, the limit speed is lower than the thrust ball bearing, usually only for low-speed operation occasions.

Due to their characteristics, thrust cylindrical roller bearings have a wide range of applications, mainly for low speed applications, and can provide a high degree of practicality.

The main application areas of thrust cylindrical roller bearing.

Thrust bearings are special bearings used to withstand axial forces, that is, bearings with forces in the direction parallel to the shaft, thrust bearings are also called thrust bearings. Which thrust cylindrical roller bearings can withstand one-way axial load, it is much larger than the axial load capacity of thrust ball bearings, and rigid, occupying little axial space. Therefore, these bearings are mainly used in heavy machine tools, high-power marine gearboxes, oil drilling rigs, vertical motors and other machinery.

Thrust Cylindrical Roller Bearing have a wide range of advantages and are used for a wide range of applications, not only to play a good supporting role, but also to effectively reduce friction. NTN has become one of the most well-known and popular bearing companies in the industry.

You can learn more about thrust cylindrical roller bearing by looking at the following.

1. Bearing accuracy

The dimensional accuracy, profile accuracy and running accuracy of Types 811, 812, 893 and 874 thrust cylindrical roller bearings shall be as specified in Table 4.4 in Sec. 4. "Bearing accuracy" (page A-28). The thrust roller and cage assembly Types AXK, K881, K812, K893 and K874 are machined to the following dimensional tolerances: E11 (or E12 for bearing marked with T2) for bore diameter (D_{c1}); and c12 for outside diameter (D_c) on Type AXK, and a13 for Types K811, K81, K893 and K874. Raceway surface requirements: Where the plane portion of a shaft/a housing is used as the direct raceway surface of thrust roller and cage assembly, the raceway surface must meet the

requirements specified as a guideline in Table 1.

Characteristics	Specified requirements
Perpendicularity (Max)	IT5 (IT4)
Surface roughness	0.2a
Surface hardness	HRC58-64
Effective case depth	Refer to Formula (8.1) on page A-40.

Table 1

2. Cage guiding

To be able to center a running thrust roller and cage assembly (Type AXK, K811, K812, K893 or K874), it is necessary to guide it on its bore (shaft side) or outside surface (housing side). In general, the bore-side guide of low relative speed against the cage is mostly used. It should be used particularly for high speed running. The dimensional tolerances for shaft and housing, when the cage is guided thereby, shall be h8 for shaft diameter (bore guide) and H9 for housing bore diameter (outer surface guide) respectively, which of the guide surface shall be finefinished by grinding.

3. Bearing fit in bearing ring

Table 2 shows the tolerances for fitting of the thrust bearing rings (AS, WS and GS) on shaft or in housing.

Bearing ring		Shaft	Housing
Type AS	Locking to shaft	h10	Clearance to housing
	Locking to housing	Clearance to shaft	H11
Type WS (inner ring)		h6	??
Type GS (outer ring)		??	H7
Type ZS (central ring)	Locking to shaft	h6	??
	Locking to housing	??	H7

Table 2

4. Mounting related dimensions

The mounting dimensions for bearing ring Types WS, GS and ZS relative to a shaft or housing are listed in the relevant dimension table. The fitting surface of AS bearing ring must be flat and have the rigidity sufficient to support thrust load throughout its entire surface. The bearing ring has to be installed in correct orientation so that its raceway surface is seated onto the rolling elements. (As shown in the diagram in the relevant dimension table, the narrower chamfering on the bearing ring marks the raceway surface.)

Complete guide to Thrust Cylindrical Roller Bearing.

NTN bearings have always led the industry for many years and have delivered many high quality bearings to the industry, becoming a very important enterprise in the industry and a weather vane for the quality and development of bearings in the industry.

The following will provide you with detailed answers to some questions about thrust cylindrical roller bearings.

1. What is thrust cylindrical roller bearing?

Thrust Cylindrical Roller Bearing can withstand large axial loads in one direction, but not radial loads, because they do not have self-aligning capability. Thrust cylindrical roller bearings are separated bearings, can only withstand one-way axial load and slight shock, can limit the axial displacement of the shaft (or shell) in one direction, so it can be used as a one-way axial positioning. But its bearing capacity is much larger than the thrust ball bearing. Roller rolling, due to the roller ends of the line speed is different, so that the roller in the ring raceway inevitably produce sliding, therefore, the limit speed of such bearings than thrust ball bearings low, usually only for low-speed operation occasions. Thrust Cylindrical Roller Bearing is used to bear axial heavy load configuration, not easy to be affected by shock load, rigid, axial installation space is small, mainly used in the thrust ball bearing load carrying capacity is not enough conditions. Most of the thrust cylindrical roller bearings are single row structure, can only bear axial load in one direction, whether single row or multi-row structure design is very simple.

2. What is the main structure of thrust cylindrical roller bearings?

Thrust Cylindrical Roller Bearing are generally composed of two thrust shims or more thrust shims and a number of rolling elements, generally thrust shims are divided into shaft pieces and seat pieces, rolling elements are generally the most common type of iron or copper cage combination into a whole.

Thrust cylindrical roller bearings can be divided into thrust cylindrical roller and cage assembly, shaft ring and seat ring, thrust cylindrical roller bearings also consists of thrust cylindrical roller and cage assembly, shaft ring and seat ring, where the most important parts are thrust cylindrical roller and cage assembly.

3. What are the main categories of thrust roller bearings?

Thrust roller bearings are used to bear axial load mainly shaft, radial combined load, but the radial load shall not exceed the axial load, compared with other thrust roller bearings, such bearings have a lower friction factor, higher speed, and has a tuning performance. Thrust roller bearings are divided into thrust cylindrical roller bearings, thrust spherical roller bearings, thrust tapered roller bearings, thrust needle roller bearings.

Thrust Cylindrical Roller Bearing are mainly used in oil drilling rigs, iron and steel making machinery. Thrust spherical roller bearings are mainly used in hydroelectric generators, vertical motors, ships with propeller shafts, tower cranes, extruders and other aspects.

3. Thrust tapered roller bearings are mainly used for one-way: crane hook, oil drilling rig swivel, two-way: steel rolling mill roll neck.

Thrust roller bearings in the assembly body mainly bear axial load, its application is widespread. Although the thrust bearing installation operation is relatively simple, but the actual maintenance is still often error occurs, that is, the bearing tight ring and loose ring installation position is incorrect, the result makes the bearing lose its role, the journal is quickly worn. The tight ring is installed on the end face of the stationary parts, i.e. wrong assembly. Tight ring inner ring and journal for the transition fit, when the shaft rotation drive tight ring, and with the stationary parts end surface friction, in the axial force (F_x), there will be friction torque is greater than the inner diameter with the resistance moment, resulting in tight ring and shaft with the surface forced to rotate, intensify the journal wear.

4. What are the characteristics of thrust ball bearings and thrust roller bearings, and which one is better?

Thrust ball bearings generally have better centripetal performance, but the load is smaller than thrust roller bearings. Thrust ball bearings are designed to withstand thrust loads when running at high speeds, and are made up of gasket-like rings with ball rolling raceway grooves.

Thrust roller bearings are much larger, thrust roller bearings are used to bear axial load mainly shaft, radial combined load, but the radial load shall not exceed 55% of the axial load. Compared with other thrust roller bearings, this kind of bearing friction factor is lower, higher speed, and has the spherical performance. Thrust cylindrical roller bearings and thrust roller bearings are suitable for low speed occasions, thrust tapered roller bearings speed is slightly higher than the thrust cylindrical roller bearings.

Thrust ball is more suitable for equipment with smaller load capacity, while thrust roller has better performance in load capacity, high speed, ground noise and impact resistance.

5. What are the causes of thrust cylindrical roller bearing failure?

Thrust Cylindrical Roller Bearing is a precision part, which requires a strict procedure in use and maintenance, if it is not used and maintained properly, it cannot achieve the expected performance effect of the bearing, and it is easy to cause early fatigue damage to the bearing.

There are many reasons that lead to early damage of thrust cylindrical roller bearings, such as improper installation, poor lubrication, pollution caused by the working environment and excessive load, you can learn more about the following aspects:

1. Improper installation: the use of brute force when installing, using a hammer to directly hit the bearing surface, the bearing collar raceway and rolling body caused damage and deformation, so that the bearing operation process, vibration increased, early fatigue damage. Installation is not in place, installation has a skew or not installed to the thrust ball bearing bit, resulting in bearing clearance is too small. Inner and outer ring is not in the same center of rotation, resulting in different heart, uneven

force, so that the bearing early fatigue damage.

Therefore, the installation of thrust cylindrical roller bearing should choose the appropriate or professional bearing installation tools, do not allow direct hammering of the bearing, not allowed to transmit pressure through the rolling body installation is completed with a special measuring tool to the bearing bit to test.

2. Poor lubrication: poor lubrication is one of the main reasons for premature bearing damage, such as not timely filling lubricant or lubricating oil; lubricant or lubricating oil is not filled in place; improper selection of lubricant or lubricating oil; incorrect lubrication and so on. Lubrication should choose the correct lubricant or lubricating oil and use the correct lubrication filling method.

3. bearing space pollution: pollution can lead to premature damage of thrust cylindrical roller bearing, pollution refers to the presence of dust, metal debris, etc. into the internal bearing. The main reasons for contamination are: premature opening of the bearing package before use, the installation of the assembly environment is not clean, the operating environment of the bearing is not clean, the working medium pollution with impurities, etc.. Therefore, in the use of thrust cylindrical roller bearings should pay extra attention to this point.

4. Overload fatigue: overload fatigue damage is a common way of bearing damage. Common causes of fatigue damage are: bearing long-term overload operation; not timely replacement and maintenance; improper maintenance; equipment bearings exposed to pollutants or moisture environment. If the equipment is down for a long period of time, the machine should be covered with grease paper or similar material to avoid prolonged exposure of the equipment to air.

6. How to install thrust cylindrical roller bearing?

1. Thrust Cylindrical Roller Bearing room tolerance selection and control: thrust cylindrical roller bearing pressed into the thrust cylindrical roller bearing should rotate flexibly without blocking feeling. If there is obvious rotation inflexibility, it indicates that the size of the shaft is too large, the tolerance should be adjusted downward. If there is obvious "rustling" feeling, it may be too big tolerance or bad roundness of the shaft. So in the control of good shaft and thrust cylindrical roller bearing room tolerance also need to control the roundness.

2. Thrust roller bearing assembly method: because thrust cylindrical roller bearing is a high-precision products, such as improper assembly is easy to cause damage to the thrust roller bearing groove, resulting in damage to the thrust cylindrical roller bearing. Thrust cylindrical roller bearing in the assembly should have a special mold, can not be randomly knocked, in the pressure into the shaft can only be small circle force, pressure big circle can only big circle force. Assembly requires the use of pneumatic or hydraulic pressure, the upper and lower die in the pressure assembly to be outside the horizontal state, such as tilt will lead to thrust cylindrical roller bearings groove due to force damage, and the thrust cylindrical roller bearings produce guide ring.

3. Assembly of foreign objects to prevent: Thrust Cylindrical Roller Bearing in the installation to the rotor to do dynamic balancing is easy to dynamic balancing when the generated iron chips into the thrust roller bearings inside, so it is best to install thrust cylindrical roller bearings before doing dynamic balancing. Thrust cylindrical roller bearing room is best not to apply oil or grease, such as non-coating can not be controlled in the thrust cylindrical roller bearing room has to stay.

4. paint rust prevention: paint rust is characterized by more in the sealed motor, the motor in the assembly sound is very good, but in the warehouse after some time, the motor noise becomes very large, remove the Thrust Cylindrical Roller Bearing has serious rust phenomenon. The problem is mainly because the insulating paint volatile acid in a certain temperature, humidity to form corrosive substances, the thrust roller bearing groove corrosion caused by thrust roller bearing damage. The problem can only be used good insulating paint, and after drying ventilation after a period of assembly.

7. How to maintain Thrust Cylindrical Roller Bearings?

Thrust Cylindrical Roller Bearings is used to bear axial load mainly shaft, radial combined load, but the radial load shall not exceed 55% of the axial load. Compared with other thrust roller bearings, thrust cylindrical roller friction factor is lower, higher speed, and has the alignment performance, can effectively reduce the relative sliding of the rollers and raceways in the work, and roller long, large

diameter, the number of rollers, high load capacity, usually using oil lubrication, individual low-speed case available grease lubrication. If you want to further extend the life of the thrust cylindrical roller bearings, you should maintain from the following aspects.

1. Pay attention to check the quantity and quality of lubricating oil in the thrust cylindrical roller bearing box frequently.
2. Regularly check the operating temperature of the thrust cylindrical roller bearings.
3. Regularly check and adjust the thrust clearance.
4. Check whether the seal device at both ends of the thrust shaft is working well.
5. Thrust cylindrical roller bearing with cooling water pipe should be cleaned regularly and pay attention to its sealing.

8. How do I know if my thrust bearing is bad?

Thrust cylindrical roller bearings are single-directional role of split axial bearings, they can withstand heavy axial load and shock load, but can never withstand any radial load. The slight shrinkage of the roller ends optimizes the linear contact between the raceway and the rollers, which can effectively prevent peak stresses at the roller ends and extend the bearing life from the surface.

The high rigidity of the axial cylindrical roller bearing and the small axial space required allow the shaft and seat rings as well as the cylindrical roller and cage assembly to be mounted individually. If abnormalities occur during use, you should react promptly. Thrust Cylindrical Roller Bearings are proven to be damaged when the following conditions occur.

When the wear is severe, a worn Thrust Cylindrical Roller Bearing will increase the clearance between its rollers, which will cause the bearing to move excessively within its seat, resulting in a rattling, squealing or growling noise from the gearbox, which is usually most noticeable when the clutch pedal is depressed to release the clutch, at which point you should promptly or replace the bearing with a new one.

The cause of Thrust Cylindrical Roller Bearing failure can be traced to a single problem or a combination of problems, but in general, it is usually attributable to one or more related problems, including poor crankshaft surface finish, bearing overload, or misaligned bearing surfaces.

Video: <https://www.youtube.com/watch?v=ILruNkelINY>

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