

Double Row Self Aligning Ball Bearings

Detail Introduction :

The center of curvature of the outer ring raceway surface is the same as the bearing center, so it has the same alignment function as self-aligning ball bearings. The double row self aligning ball bearing can bear radial load and axial load in two directions. Radial load capacity is large, suitable for heavy load, shock load situation. The inner ring inner diameter is tapered hole bearing, can be directly mounted.

Double row self aligning ball bearings are particularly suitable for improper installation or shaft bending caused by deflection of the workplace, when the spherical ball bearing bearing capacity (especially axial load) is insufficient, can be used with the same alignment performance of spherical roller bearings.

The main features of double row self aligning ball bearings.

Double row self aligning ball bearings use a double row of steel balls, the outer ring raceway for the inner spherical type, so it can automatically adjust the shaft or shell deflection or different heart caused by the shaft misalignment, tapered hole bearings by using fasteners can be easily mounted on the shaft, mainly to bear radial load.

Double Row Self Aligning Ball Bearings can bear small axial load at the same time in addition to radial load. The axial displacement of the shaft (shell) is limited within the clearance limit, with self-aligning performance, allowing normal operation under the condition that the inner and outer relative tilt is not large, suitable for supporting the seat hole can not strictly ensure the coaxiality of the parts. It is because double row self aligning ball bearing outer ring raceway is spherical, with self-aligning performance, so it can compensate for the error caused by different center degrees and shaft deflection.

Double Row Self Aligning Ball Bearing have very significant characteristics, whether in terms of quality or practicality and other aspects have very obvious advantages, so the practicality is very strong, recognized by the community, has been widely used in a number of industries, double row spherical roller bearings specific applications are as follows.

The main applications of double row self aligning ball bearings.

double row self aligning ball bearings are mainly used to bear radial load, in bearing radial load at the same time, can also bear a small amount of axial load, but generally can not bear pure axial load, its limit speed is lower than the deep groove ball bearings. This type of bearing is used in the bending of the double-supported shaft under load, as well as double-supported seat hole can not ensure strict coaxiality of the parts, but the inner ring centerline and outer ring centerline relative tilt shall not exceed 3 degrees.

With the dust cover and with the seal spherical ball bearing assembly has been filled with the appropriate amount of grease, should not be heated before installation and do not need to clean, the use of the process does not need to be lubricated, adapt to the operating temperature - 30 ° to + 120 ° between.

Now double row self aligning ball bearings are mainly used in precision instruments, low-noise motors, automobiles, motorcycles and general machinery, etc., is the most widely used in the machinery industry, has a very high market demand, not only that, NTN also develops and produces a variety of enterprise type bearings, NTN bearings for the development of society. NTN bearings have made outstanding contributions to the development of society.

The detailed description of double row self aligning ball bearings can be understood by the following.

1.Design features and characteristics

The outer ring raceway of self-aligning ball bearings forms a spherical surface whose center is common to the bearing center. The inner ring of the bearing has two raceways. The balls, cage, and inner ring of these bearings are capable of a shifting in order to compensate for a certain degree of

misalignment with the outer rings. As a result, the bearing is able to align itself and compensate for shaft / housing finishing unevenness, bearing fitting error, and other sources of misalignment as shown in Fig. 1.

However, since axial load capacity is limited, self-aligning ball bearings are not suitable for applications with heavy axial loads.

Furthermore, if an adapter is used on the tapered bore of the inner diameter, installation and disassembly are much simpler and for this reason adapters are often used on equipment with drive shafts.

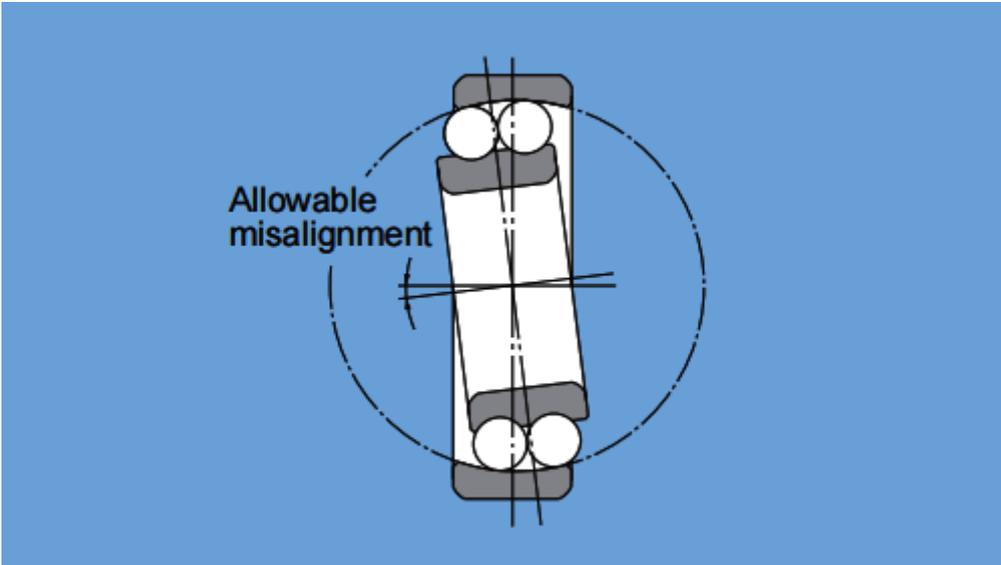


Fig. 1

2. Standard cage types

All bearing series are equipped with a pressed cage, except 2322S, which is equipped with a machined cage.

3. Ball protrusion

Bearings with part numbers listed in Fig. 2 below have balls which protrude slightly from the bearing face.

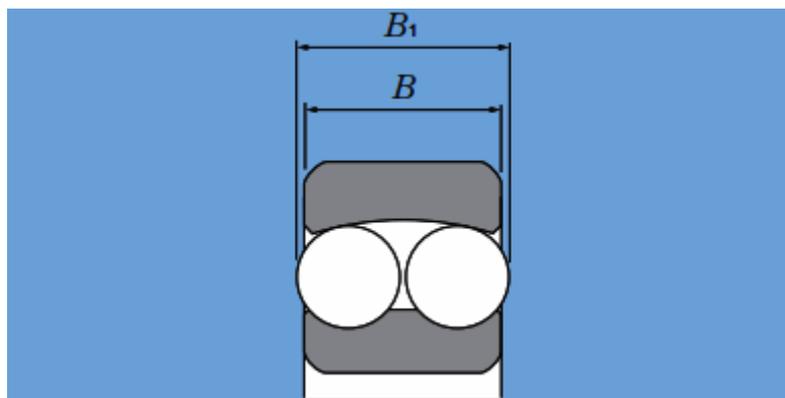


Fig. 2

their degree of protrusion is listed below

Bearing number	Width dimension B	Total width dimension B1
2222S (K)	53	54
2316S (K)	58	59
2319S (K)	67	68

2320S (K)	73	74
2321S	77	78
2322S (K)	80	81
1318S (K)	43	46
1319S (K)	45	49
1320S (K)	47	53
1321S	49	55
1322S (K)	50	56

4? Allowable misalignment angle

Listed below are the allowable misalignment angles for bearings with self-aligning characteristics when placed under normal load conditions. This degree of allowable misalignment may be limited by the design of structures around the bearing.

Allowable misalignment under normal loads (loads equivalent to 0.09 Cr): 0.07 rad (4?)

Complete guide to Double Row Self Aligning Ball Bearings.

NTN bearings in the process of development for many years has accumulated very rich experience, the development and production of a variety of bearings have been sold around the world, for the development of many enterprises to provide high-quality bearings, and with a number of well-known enterprises reached a long-term cooperative relationship, Double Row Self Aligning Ball Bearing is to reach the world NTN's double row self-aligning ball bearings have reached the world's leading level. The following will provide you with detailed answers to some common questions about double row self aligning ball bearings.

1. What is double row self aligning ball bearings?

Double row self aligning ball bearings are bearings in the middle of the outer side of the inner hole box raceway surface of the two dovetail guides, with sphere-like steel balls. The diameter of the heart-aligning function bearing and the nominal diameter of the bearing seat are in collaboration with the curved surface, and have positive heart-aligning function between each other, which can compensate for the center line non-overlap and the deformation of the bottom edge of the equipment due to the deviation of the equipment.

Double row self aligning ball bearing can bear larger radial load, but also can bear certain axial load. This kind of bearing outer ring raceway is spherical, so has the adjusting performance, when the shaft is bent or tilted and the inner ring centerline and outer ring centerline relative tilt does not exceed $1^\circ \sim 2.5^\circ$, the bearing can still work. Double row spherical ball bearing bore has cylindrical and conical two. In order to strengthen the lubrication performance of the bearing, the ring-shaped oil groove and three oil holes are processed on the outer ring of the bearing.

Nowadays double row self aligning ball bearing has a wide range of applications, mainly in fine appearance, low noise motors, automobiles, motorcycles, woodworking machinery, textile machinery drive shaft, mining machinery, electromechanical equipment, plastic machinery, work equipment, medical equipment, fitness and sports equipment and general machinery and other aspects.

2. What are the advantages of double row self-aligning ball bearings?

1. Adapt to the alignment error situation: double row self aligning ball bearings can better adapt to the alignment error situation than any other bearings. This means that the bearing can run smoothly in the case of shaking.

Excellent high-speed performance: Double Row Self Aligning Ball Bearing have the lowest starting and running friction among all roller bearings. In other words, the bearings have excellent high speed performance.

3. Minimum maintenance requirements: Only a small amount of lubricant is required to make the self-

aligning ball bearings operate efficiently. Its lower friction and excellent design extend the re-lubrication interval. Sealed bearings do not require relubrication.

4. Low noise and vibration levels: A large number of comparative tests have shown that: double row spherical ball bearings have precise, smooth raceways, giving them the lowest vibration and noise levels.

5. In the shaft, housing will appear deflection, can be automatically adjusted to have automatic alignment, not to increase the bearing burden.

6. Spherical ball bearing radial load capacity is large, mainly applicable to the phenomenon of heavy load, shock load.

7. Good anti-vibration ability, long service life, and good sealing function.

8. can make up for the concentricity error caused by processing, installation and shaft deformation, application areas double row self aligning ball bearings are mainly applicable to those bearings that can cause considerable shaft deflection or misalignment.

3. What are the two main configurations of double row self aligning ball bearings?

1. Cylindrical bore

Because it contains multiple rows of bearing steel balls and curved raceways in the outer side, double row self-aligning ball bearings can be actively aligned.

2. Can accept the shaft and the bearing seat in the middle of the focus of the wrong, applicable easy to show the shaft stretch strain and not the same heart caused by the pivot distortion of the working conditions.

3. The friction is the least among all the tilting bearings.

4. Even under the condition of high speed rotation, it still has only a small temperature.

2. Tapered bore

1. Tapered bore spherical ball bearings have the characteristics of cylindrical bore spherical ball bearings.

2. Because can adjust the bearing side gap, this kind of bearing is mostly used in the load actual effect of bumpy double support plate shaft and its two bearing seat hole can't guarantee strictly the same boat parts.

3. Key for accepting axial load, can also accept a very small number of radial load.

4. Generally can not accept pure radial load. The practicality of this kind of bearing is only second to groove ball bearing.

5. Its limit speed is lower than the same standard groove ball bearing, but its load-bearing capacity is higher than groove ball bearing.

4. Some precautions when using double row spherical ball bearings.

In general use conditions, 12 series and 22 series bearings allow tilting angle of 2.5° , 13 series and 23 series bearings allow tilting angle of 3° , when the bearing is used in full tilt conditions must ensure that the bearing and surrounding parts have sufficient clearance; when the speed increases, tilting the bearing noise has a tendency to increase. Due to the limitation of noise, the actual tilting angle of the bearing may be much smaller than the maximum tilting angle; for the bearing with tapered bore, it is difficult to accurately measure the bearing clearance after installation, so the installation of the bearing with tapered bore requires certain experience and technology; the working temperature of the bearing with polyamide cage should be less than 120°C .

5. Double row self aligning ball bearings why can adjust the heart?

double row self aligning ball bearings outer ring raceway surface curvature center and bearing center, so has the same self-aligning ball bearings with the same alignment function. In the shaft, shell deflection, can automatically adjust, not to increase the bearing burden; spherical ball bearings can withstand larger radial load, but also can withstand a certain amount of axial load. This kind of bearing outer ring raceway is spherical, so has the spherical performance, when the shaft is bent or tilted and make the inner ring center line and outer ring center line relative tilt not more than 1 degree to 2, 5 degrees, the bearing can still work.

Spherical bearing outer ring and rolling body contact surface for the spherical shape, and rolling body spherical external circle must be consistent with the raceway surface where the circle, in order to

achieve the spherical function. Different from this, double row deep groove ball bearings and double row angular contact ball bearings, are double row bearings, because of the lack of the above two elements, so can not achieve the spherical function. Single row deep groove ball, the raceway surface of the ring is spherical, because the raceway surface of the circle, and rolling body alignment (assuming its alignment) external circle, not consistent, so also can not achieve the alignment function.

6. How should double row self aligning ball bearings be properly checked after installation?

After the double row self aligning ball bearings are installed, a running check is performed in order to check if the installation is correct. Small machines can be rotated by hand to confirm whether the rotation is smooth. Check items such as foreign objects, scars, indentations caused by poor operation, due to poor installation, poor processing of the mounting seat and torque instability, due to small clearance, installation errors, sealing friction caused by excessive torque, etc., if there is no abnormality, then you can start power operation.

Large machinery can not manually rotate, so no-load start immediately cut off the power, mechanical idling, check whether there is vibration, noise, rotating parts have contact, etc., to confirm no abnormalities, into the power operation.

Power operation, starting from no-load low speed, slowly increase to the rated operation of the set conditions. In the test run, check whether there is abnormal sound, change of temperature of spherical ball bearing, leakage or discoloration of lubricant, etc. If abnormalities are found, the operation should be immediately suspended, check the machinery, and if necessary, remove the double row self aligning ball bearing to check.

Double row self-aligning ball bearing temperature, generally can be based on the external temperature of the bearing housing speculation. But using the oil hole to directly measure the temperature of the outer ring of the bearing is more accurate. Bearing temperature, from the start of operation gradually increase, usually 1 ~ 2 hours after the temperature stability. If the bearing is poorly mounted, the temperature will rise sharply and abnormally high temperatures will occur. The reasons for this are too much lubricant, too little bearing clearance, poor mounting, and excessive friction in the sealing device. High-speed rotating occasions, double-row spherical ball bearing structure, lubrication method of the wrong choice is also its cause.

Double spherical ball bearing rotation sound with a stethoscope and other checks, there is a strong metal noise, foreign sound, irregular sound, etc. indicates abnormal. The cause of poor lubrication, shaft or bearing seat precision, bearing damage, foreign body invasion, etc.. Transient high temperature effect of the steel surface and the role of oxygen in the air, rise into an extremely thin (20 ~ 30nm) iron oxide thin layer. It is worth noting that the oxide layer thickness corresponds to the total thickness test result of the surface grinding deterioration layer. This indicates that the oxide layer thickness is directly related to the grinding process and is an important sign of grinding quality.

7. How to maintain double row self aligning ball bearings?

Reasonable maintenance will effectively extend the service life of double row self-aligning ball bearings, you can take the following measures.

1. First of all, you must buy the real double row self aligning ball bearing, if you buy a fake bearing and then how to do not long life.
2. Before installing the bearings, first check whether the double row self-aligning ball bearing is short of oil, whether clean, and then in the check to install the machine parts, are determined to grease and clean, after the correct installation of bearings.
3. bearing trial, are installed after the double spherical ball bearing trial operation, running for a while to check what abnormalities are not found, this bearing can be normal into the use of the state.
4. To regularly check, double spherical ball bearing lubrication are vital, in the maintenance of bearings, first of all, check whether the bearing surface clean, if not clean enough, then first flush with gasoline or alcohol, and then is the vital part, is on the grease. To the bearing on the grease, do not add too much grease, as long as a little grease in the two between the friction, if there are pollutants, it is possible to feel out. To double row spherical ball bearings using grease, should avoid with cotton fabric contact to any part of the bearing, this will make some residual fiber may be stained rolling and

will cause damage. It is best to determine the time of each inspection, and then according to the normal time to check whether the lack of oil is clean, do these points double row self-aligning ball bearings can be a long life.

8. Double row self aligning ball bearings installation and adjustment.

Double row self aligning ball bearings inner and outer ring and rolling body using vacuum degassing bearing steel, good fatigue resistance. And cage using aluminum, iron and manganese bronze material, high strength, good elasticity, better wear resistance. And in order to ensure the long life of double-row spherical ball bearings, in the installation and adjustment should pay attention to the following measures.

Double row self-aligning ball bearing according to its interference with the size of the surface grouping, each group will double row self aligning ball bearing according to its clearance size in order, the corresponding shaft or seat hole diameter to do the same grouping, the interference with the size of the surface of the double row self-aligning ball bearing group and the diameter of the shaft group or seat hole group corresponding matching, and the size of the small and diameter of the corresponding group matching. The small size and diameter of the corresponding group matching. In each corresponding group, the clearance will be large double row self-aligning ball bearings to take the tight fit, clearance small double row self-aligning ball bearings to take a more relaxed fit.

Support both ends of the journal and seat hole coaxiality and its verticality with the support end face to kind of guarantee, to prevent additional load generation. If possible, the role of mechanical elements other than double-row spherical ball bearings should be slightly away from the more easily damaged end of the double-row spherical ball bearings, while the shaft and rotating parts system to run as smoothly as possible.

9. What is the difference between spherical ball bearings and spherical roller bearings?

1. Spherical roller bearings: Spherical roller bearings have two rows of rollers, mainly used to bear radial load, but also can withstand the axial load in either direction. This kind of bearing radial load capacity is high, especially suitable for heavy load or vibration load work, but can not bear pure axial load, good alignment performance, can compensate for the same bearing error.

Main uses: paper making machinery, speed reducing device, railroad vehicle axle, rolling mill gear box seat, crusher, all kinds of industrial speed reducer, etc.

2. Spherical ball bearings: Spherical ball bearings have two rows of steel balls, the inner ring has two raceways, the outer ring raceway for the inner spherical shape, with automatic self-aligning performance. It can automatically compensate the coaxiality error due to the shaft winding and shell deformation, which is suitable for the parts where the support seat hole cannot guarantee the strict coaxiality. The bearing mainly bears radial load, in bearing radial load at the same time, can also bear a small amount of axial load, usually not used to bear pure axial load, such as bearing pure axial load, only a column of steel balls under stress. Main uses: combine harvesters and other agricultural machinery, blowers, paper machines, textile machinery, woodworking machinery, bridge cranes walking wheel and drive shaft.

Spherical roller bearings and spherical ball bearings cavity of the application of the difference between.

1. Low-speed, heavy-duty working conditions, applicable to spherical roller bearings.

2. High-speed, light load conditions, applicable to spherical ball bearings.