

Single Row Hybrid Deep Groove Ball Bearings

Detail Introduction :

Single row Hybrid deep groove ball bearings have rings made of bearing steel and rolling elements made of bearing quality silicon nitride (Si_3N_4).

Hybrid bearings are not only excellent electrical insulators, but are also approved for higher speeds and require significantly less maintenance than bearings made entirely of steel.

Silicon nitride has very good electrical insulating properties and this material protects the rings from current damage, thus extending the service life of single row hybrid deep groove ball bearings.

The basic type of single row Hybrid deep groove ball bearing consists of an outer ring, an inner ring, a set of steel balls and a set of cages.

The main types of single row and double row two, its structure is also divided into sealed and open two kinds of structure, open refers to the bearing without sealing structure, sealed deep groove ball is divided into dustproof seal and oil-proof seal. Dustproof seal cover material for steel plate stamping, only play a simple prevent dust into the bearing raceway. The oil-proof type is a contact oil seal, which can effectively prevent the grease inside the bearing from spilling out.

Single row Hybrid deep groove ball bearings mainly bear radial load, but also can simultaneously bear radial load and axial load. When it only bear radial load, the contact angle is zero. When the deep groove ball bearing has a large radial clearance, with angular contact bearing performance, can withstand the larger axial load, deep groove ball bearing friction coefficient is very small, the limit speed is also very high.

The Main Features of Single Row Hybrid Deep Groove Ball Bearings.

Single row Hybrid deep groove ball bearing is the most commonly used rolling bearing, its structure is simple, easy to use, mainly used to bear radial load, but when increasing the bearing radial clearance, has a certain angular contact ball bearing performance, can withstand diameter, axial combined load. In the high speed and should not use thrust ball bearing, can also be used to bear pure axial load. With a single row of mixed deep groove ball bearing specifications of the same size of other types of bearings, such bearings friction coefficient is small, high limit speed. But not impact resistant, not suitable for heavy load.

Single row mixed deep groove ball bearing installed in the shaft, in the bearing axial clearance range, can limit the shaft or shell two directions of axial displacement, so can be in two directions for axial positioning. In addition, this type of bearing also has a certain ability to adjust the heart, when relative to the shell hole tilt $2^\circ \sim 10^\circ$, still can work normally, but the bearing life has a certain influence.

In general, single row Hybrid deep groove ball bearings have low density, high hardness, low friction coefficient, wear resistance, self-lubrication and good rigidity, especially suitable for high-speed, high-precision and long-life hybrid ceramic ball bearings rolling body.

Main Applications of Single Row Hybrid Deep Groove Ball Bearings.

Because single row Hybrid deep groove ball bearings have the characteristics of high temperature resistance, cold resistance, wear resistance, corrosion resistance, anti-magnetic electrical insulation, oil-free self-lubrication, high speed, etc.. Therefore can be used in extremely harsh environments and special working conditions, can be widely used in aviation, aerospace, navigation, petroleum, chemical, automotive, electronic equipment, metallurgy, electric power, textile, pumps, medical equipment, scientific research and national defense military and other fields, is a very high use rate of bearings, such bearings are being gradually recognized as an indispensable alternative.

With the continuous progress of processing technology, the increasing level of technology, single row Hybrid deep groove ball bearings cost continues to decline, has only been in the past in some high, precise, pointed areas of small-scale applications, and gradually spread to various industrial areas of the national economy, the product market price is also gradually approaching practical, to the user can accept the The single row Hybrid deep groove ball bearing has been applied to a large area of the wave has come!

The Single Row Hybrid Deep Groove Ball Bearings Can Be found in the Following Pages.

Hybrid deep groove ball bearings

Deep groove ball bearings are the most widely used bearing type, especially in electric motors. SKF hybrid deep groove ball bearings:

are non-separable

are suitable for high speeds

accommodate radial loads and axial loads in both directions because their uninterrupted raceway grooves have a close osculation with the balls

are available with a bore diameter ranging from 5 to 180 mm

with a bore diameter $d \geq 45$ mm, are most suitable for electric motors in the power range 0,15 to 15 kW as well as for power tools and high-speed drives

SKF hybrid deep groove ball bearings in this size range are the most cost-effective solution against electrical erosion.

Basic design bearings

are available with a bore diameter $d \geq 10$ mm (fig. 1)

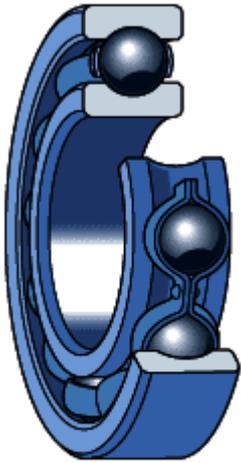


fig. 1

Sealed bearings

use the same seals as described under Capped bearings

are lubricated for the life of the bearing and should not be washed or relubricated

are virtually maintenance-free

When capped bearings must operate under certain conditions, such as very high speeds or high temperatures, grease may appear between the inner ring and capping device. For bearing arrangements where this would be detrimental, appropriate actions should be taken.

WARNING

Seals made of FKM (fluoro rubber) exposed to an open flame or temperatures above 300 °C (570 °F) are a health and environmental hazard! They remain dangerous even after they have cooled.

Read and follow the safety precautions under this WARNING.

Safety precautions for fluoro rubber and Polytetrafluoroethylene

Fluoro rubber (FKM) and Polytetrafluoroethylene (PTFE) are very stable and harmless up to normal operating temperatures of 200 °C (390 °F). However, if exposed to temperatures above 300 °C (570 °F), such as fire or the open flame of a cutting torch, FKM and PTFE give off hazardous fumes. These fumes can be harmful if inhaled, as well as if they contact the eyes. In addition, once the seals have been heated to such temperatures, they are dangerous to handle even after they have cooled.

Therefore, they should never come in contact with the skin.

If it is necessary to handle bearings with seals that have been subjected to high temperatures, such as when dismantling the bearing, the following safety precautions should be observed:

Always wear protective goggles, gloves and appropriate breathing apparatus.

Place all off the remains of the seals in an airtight plastic container marked with a symbol for “material will etch”.

Follow the safety precautions in the appropriate material safety data sheet (MSDS).
 If there is contact with the seals, wash hands with soap and plenty of water and, if contact has been made with the eyes, flush eyes with plenty of water and consult a doctor immediately. If the fumes have been inhaled, consult a doctor immediately.

The user is responsible for the correct use of the product during its service life and its proper disposal. SKF takes no responsibility for the improper handling of FKM or PTFE, or for any injury resulting from their use.

Greases for sealed bearings

The standard grease, suitable for most common operating conditions of electric motors and generators, is indicated by the designation suffix WT (table 1).

Grease	Temperature range ¹⁾							Thickener	Base oil type	NLGI grade	Base oil viscosity [mm ² /s or cSt]		Grease performance factor (GPF)
	-50	0	50	100	150	200	250 °C				at 40 °C (105 °F)	at 100 °C (210 °F)	
MT33								Lithium soap	Mineral	3	100	10	1
MT47								Lithium soap	Mineral	2	70	7.3	1
LHT23								Lithium soap	Ester	2-3	27	5.1	2
LT								Lithium soap	PAO	2	18	4.5	1
WT								Polyurea	Ester	2-3	70	9.4	4
GJN								Polyurea	Mineral	2	115	12.2	2
HT								Polyurea	Mineral	2-3	96	10.5	2
VT378								Aluminium complex soap	PAO	2	150	15.5	~2)
GFJ								Aluminium complex soap	Synthetic hydrocarbon	2	100	14	1
GE2								Lithium soap	Synthetic	2	25	4.9	2
GFM								Calcium sulphonate complex	Mineral	2	113	5.8	1.5

table 1

For additional information about greases, refer to Selecting a suitable grease.

Grease life

The estimated grease life is typically at least twice as long as for same-sized bearings with steel balls (Grease life for capped bearings).

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XL hybrid bearings

are identified by the designation suffix VA970

are designed to meet the application requirements for electric generators in larger wind turbines.

are available for the most commonly used generator sizes (product table)

Cages

SKF hybrid deep groove ball bearings are fitted with one of the following cages:

a stamped steel cage, riveted, ball centred (no designation suffix)

a glass fibre reinforced PA66 cage, snap-type, ball centred (designation suffix TN9)

a glass fibre reinforced PEEK cage, snap-type, ball centred (designation suffix TNH)

a machined brass cage, riveted, ball centred (designation suffix M)

For additional information, refer to Cages.

When used at high temperatures, some lubricants can have a detrimental effect on polyamide cages.

For additional information about the suitability of cages, refer to Cages.

Hybrid bearings with special steel rings and coatings

For specific application requirements, hybrid bearings can be customized:

bearing rings stabilized for temperatures $\leq 300\text{ }^{\circ}\text{C}$ ($570\text{ }^{\circ}\text{F}$)

bearing rings made of through-hardened stainless steel for enhanced corrosion and wear-resistance and with good high-temperature properties

bearing rings made of through-hardened stainless steel for cryogenic temperatures

bearing rings made of high-temperature tool steel

ring coating with zinc chromate or thin dense chromium for corrosion protection

ring coating based on molybdenum for low friction, especially in vacuum or gas applications

For availability and detailed information, contact SKF.

The Complete Guide to Single Row Hybrid Deep Groove Ball Bearings.

Skf bearing is the leader in the bearing industry, a variety of bearings can provide manufacturers with very great convenience, can further improve the quality of equipment, skf developed and produced single row Hybrid deep groove ball bearings have many significant advantages, for the development of society has made an outstanding contribution.

Below you will find some of the most frequently asked questions and answers about single row Hybrid deep groove ball bearings.

1. What Are Single Row Hybrid Deep Groove Ball Bearings?

single row Hybrid deep groove ball bearings are made from a combination of rings made of bearing steel and rolling elements made of bearing grade silicon nitride (Si_3N_4). This construction method makes these bearings electrically insulating, even under difficult operating conditions, and the silicon nitride rolling elements can extend the life of the bearings by providing enhanced bearing performance.

The single row Hybrid deep groove ball bearing is the representative rolling bearing for a wide range of applications, suitable for operation at high or even very high speeds, and very durable, requiring no frequent maintenance. This type of bearing has a small coefficient of friction, high limiting speed, simple structure, low manufacturing costs and easy to achieve high manufacturing accuracy.

Deep groove ball bearings in addition to the basic type, there are a variety of variant structure, such as: with dust cover deep groove ball bearings; with rubber seal deep groove ball bearings; with stop groove deep groove ball bearings; with ball loading gap of large load capacity deep groove ball bearings; double row deep groove ball bearings.

2. Single Row Hybrid Deep Groove Ball Bearings What Are the Advantages?

1. bearing ring using high-quality bearing steel, rolling body using silicon nitride, so the insulation performance is excellent, can prevent the bearing in the harmful current, can significantly extend the service life.

2. ordinary bearing steel, stainless steel, silicon nitride and zirconium oxide four bearing material performance comparison, single row Hybrid deep groove ball bearing as an important mechanical foundation parts, because it has metal bearings can not be compared to the excellent performance, high temperature resistance, super strength, etc. in the world of new materials a horse first.

3. single row Hybrid deep groove ball bearings full of corrosive media under harsh conditions of operation.

4. Single row hybrid deep groove ball bearings due to the density of rolling small ball than steel low, the weight is much lighter, so the rotation of the centrifugal effect on the outer ring can be reduced by 40%, and thus the service life is greatly extended.

5. Single row mixed deep groove ball bearing by thermal expansion and contraction of the impact than

steel is small, and therefore in the bearing clearance is certain, can allow the bearing in the temperature change more drastic environment work.

6. Because the single row hybrid deep groove ball bearing modulus of elasticity is higher than steel, when the force is not easy to deformation, so it is conducive to improve the working speed, and to achieve a higher precision.

3. What are the Main Uses of Single Row Hybrid Deep Groove Ball Bearings?

single row Hybrid deep groove ball bearing is the most representative rolling bearing, a wide range of uses, suitable for high speed or even very high speed operation, and very durable, without frequent maintenance, the size range and form of this type of bearing changes in a variety of applications in precision instruments, low-noise motors, automobiles, motorbikes and general machinery and other industries, is the most widely used in the mechanical industry in a class of bearings, the specific applications are shown below.

1. Automotive: automotive bearings used, the highest speed requirements is the turbocharger bearings, requiring bearings with good acceleration responsiveness, as well as high-speed rotation under the low torque, low vibration and low temperature rise. As it works with a low temperature rise, it is able to reduce the amount of lubricating oil, thus reducing the resistance to oil mixing, reducing the bearing torque and increasing the speed.
2. Electric motors: motors using single-row hybrid deep groove ball bearings can be permanently insulated, and when motors are used for speed reduction and energy saving devices, internal leakage can cause the phenomenon of arc discharge.
3. Aircraft engines: In the fuel pump of aircraft engines, it can work in liquid oxygen and liquid hydrogen medium for a long time, and it has been proven to undergo 50 firing processes without damage.
4. Aircraft parts: The aircraft manufacturing industry has used ball screws fitted with single-row hybrid deep groove ball bearings for aircraft flap adjusters and has also tried to use hybrid ceramic bearings in the engines of gas turbines.

4. What are Ceramic Bearings?

With the rapid development of science and technology, the era of continuous progress, modern equipment, with the development of modern equipment needs, the production process of the bearing requirements are relatively high.

Ceramic bearings have high temperature resistance, cold resistance, wear resistance, corrosion resistance, anti-magnetic electrical insulation, oil-free self-lubrication, high speed and other characteristics. They can be used in extremely harsh environments and special working conditions, and can be widely used in aviation, aerospace, navigation, petroleum, chemical industry, automotive, electronic equipment, metallurgy, electric power, textile, pumps, medical equipment, scientific research and national defence and military fields, which are high-tech products of new material applications.

Ceramic bearing ring and rolling body using full ceramic materials, there are zirconium oxide (ZrO₂), silicon nitride (Si₃N₄), silicon carbide (SiC) three. The retainer is made of polytetrafluoroethylene, nylon 66, polyetherimide, zirconium oxide, silicon nitride, stainless steel or special aviation aluminium, thus expanding the application of ceramic bearings.

The advantages of ceramic bearings are: high load carrying capacity, good heat resistance, high limiting speed, low frictional temperature rise during operation, low frictional losses, high durability, good corrosion resistance, etc.

5. How to Maintain Single Row Hybrid Deep Groove Ball Bearings?

1. Keep the bearings and their surroundings clean, even if the naked eye can not see the smile of dust into the bearings, will increase the bearing wear, vibration and noise.
2. Use the installation should be careful, do not allow strong stamping, do not allow direct hammering of the bearing, do not allow the transmission of pressure through the rolling body.
3. Use suitable and accurate mounting tools Use special tools as far as possible, and strongly avoid using cloth and short fibres and the like.
4. prevent single row Hybrid deep groove ball bearings rust, directly with the hands to pick up the

bearing, to fully wash away the hands of sweat, and coated with high-quality mineral oil before operation, in the rainy season and summer especially to pay attention to anti-rust. But in some special operating conditions, the bearing can get longer than the traditional calculation of life, especially in the case of light load, these special operating conditions is, when the rolling surface (track and rolling parts) by a lubricant film effectively separated and limit the contaminants may lead to surface damage.

6. How Many Types of Processing are There for Deep Groove Ball Bearings?

Deep groove ball bearing structure: deep groove ball bearing structure is simple, compared with other types of easy to achieve high manufacturing accuracy, so easy to series mass production, manufacturing costs are also low, the use of extremely common. Deep groove ball bearings in addition to the basic type, there are a variety of variant structure, such as: with dust cover deep groove ball bearings, with rubber seal deep groove ball bearings, deep groove ball bearings with stop groove, with ball loading gap of large load capacity deep groove ball bearings, double row deep groove ball bearings.

Deep groove ball bearing parts of the processing form as follows:

1. Multi-process processing: general bearing production requires 20 ~ 40 processes, more than 70 channels.
2. Forming processing: bearing parts of the working surface are rotary forming surface, suitable for processing with forming method.
3. precision machining:: the majority of the surface of the bearing parts to be grinded, grinding size and geometric accuracy are in μm for the unit.

7. Single Row Hybrid Deep Groove Ball Bearings: What are the characteristics?

Single row hybrid deep groove ball bearings are the most commonly used rolling bearings. It has a simple structure and is easy to use. Mainly used to bear radial load, but when increasing the bearing radial clearance, has a certain angular contact ball bearing performance, can bear the diameter, axial combined load. In the high speed and should not use thrust ball bearing, can also be used to bear pure axial load. With deep groove ball bearing specifications of the same size of other types of bearings, such bearings friction coefficient is small, high limit speed. But not impact resistance, not suitable for heavy load.

Single mixed deep groove ball bearing installed in the shaft, in the bearing of the axial clearance range, can limit the shaft or shell two directions of axial displacement, so can be in two directions for axial positioning. In addition, this type of bearing also has a certain adjusting ability, when relative to the shell hole tilt $2^\circ \sim 10^\circ$, still can work normally, but the bearing life has a certain influence.

8. Single Row Hybrid Deep Groove Ball Bearings Clearance Standard

Bearing radial clearance is also divided into original clearance, installation clearance and working clearance. Usually, the original radial clearance of the bearing is greater than the clearance of the bearing at work. Clearance is an important technical parameter of the bearing, it directly affects the load distribution, vibration, noise, friction, service life and mechanical movement accuracy and other technical performance. Strictly speaking, the dynamic load rating of the bearing is with the size of the clearance and change.

The rated load listed in the product sample (C and C0) is the value of the load when the working clearance is zero. Clearance is too large, will cause bearing internal bearing area reduce, rolling contact surface stress increase, bearing movement accuracy decline, vibration and noise increase, bearing life shorten: such as clearance is too small, will cause heat heating, even will lead to bearing in operation "bite dead" phenomenon. Therefore, according to the type of bearing and working conditions to choose different levels of bearing clearance is very important.

Standard single row Hybrid deep groove ball bearing has C2, standard (CN), C3, C4 and C5 level internal clearance, all with GB4604 in line.