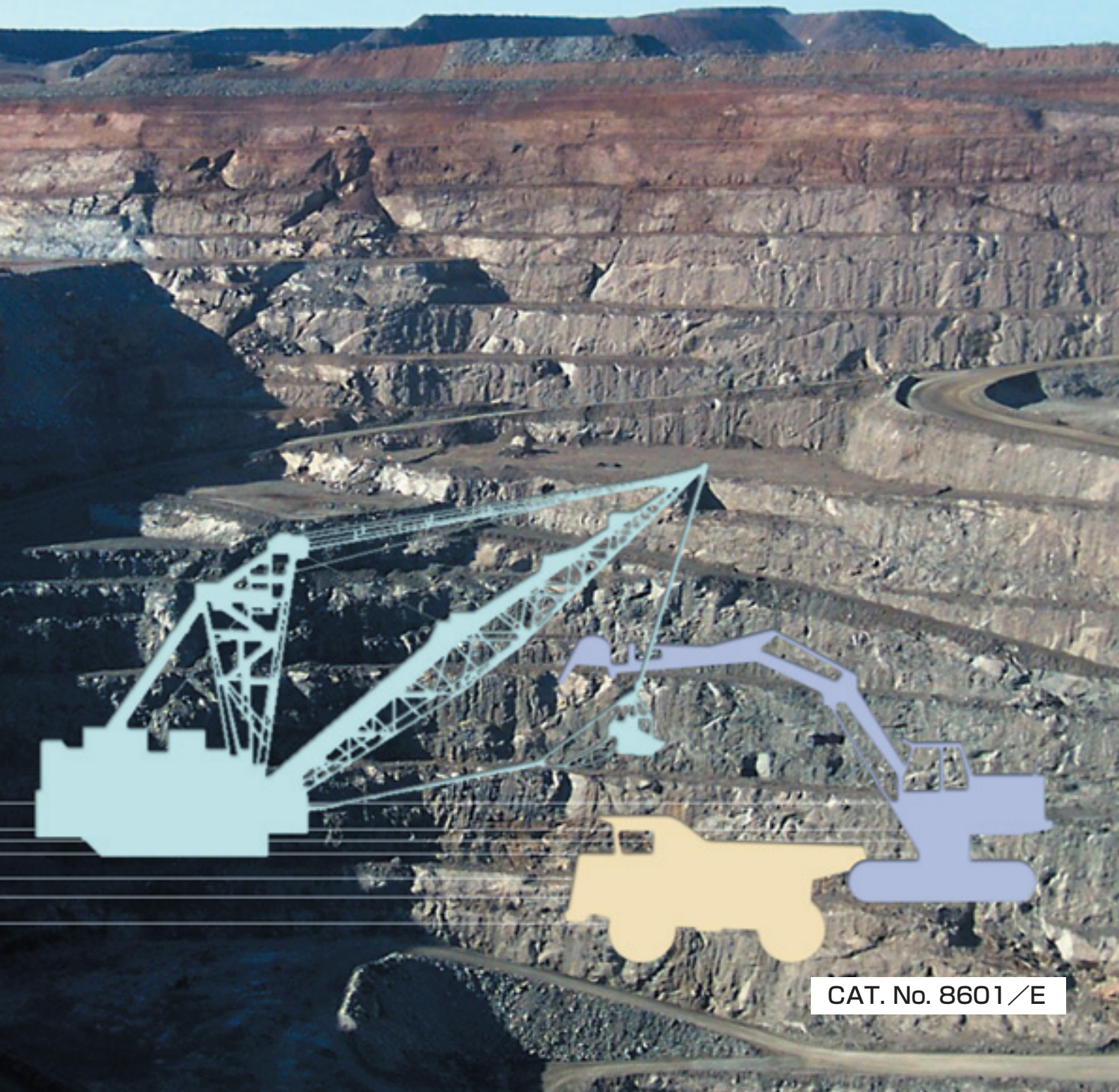


For New Technology Network

NTN®

Bearings for Mining Application

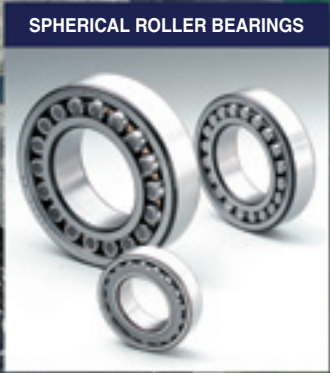
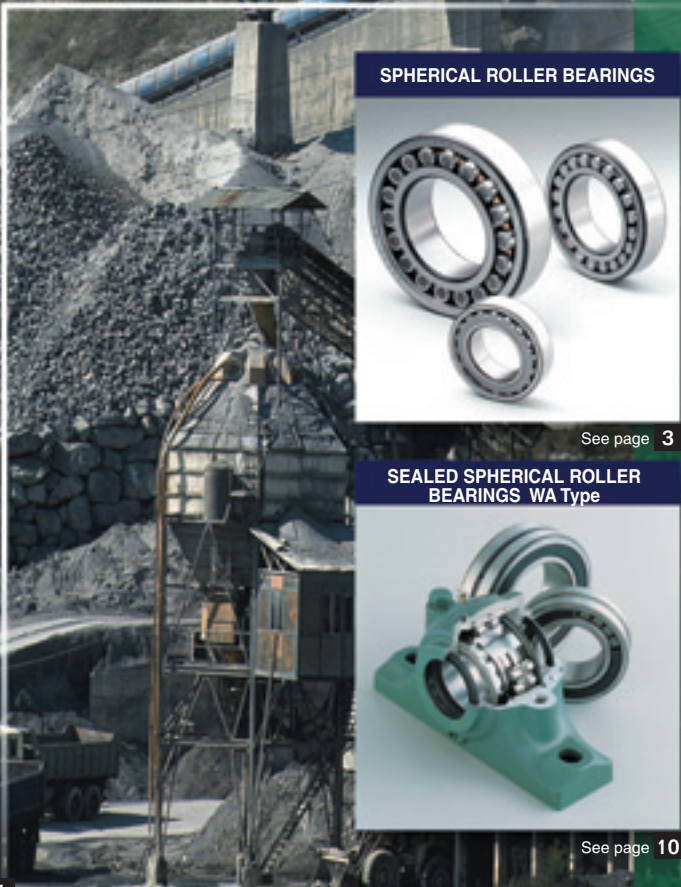


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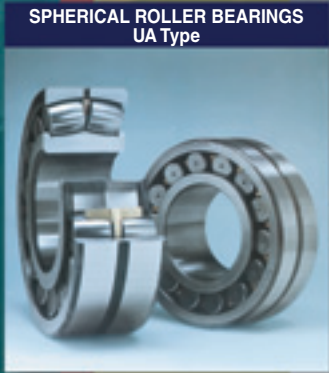
NTN Mining Application

There is a wide range of heavy duty machinery used in mining industries. They need high reliability for continuous operation. NTN can support them with high quality, heavy duty rolling bearings, plain bearings, constant velocity joints and plummer blocks. Please take a look at the variety of NTN products.

PRODUCTS



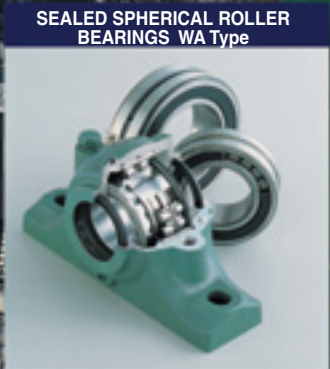
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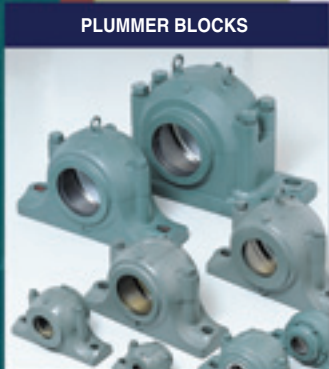
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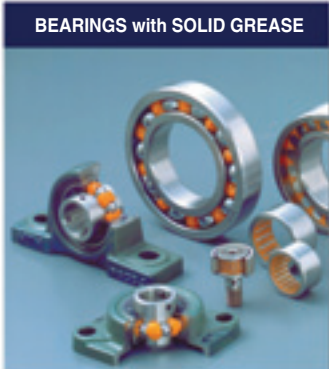
See page 5



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See page 12





Mining

Dragline
Excavator



Crushing

Ball Mill
Primary Jaw Crusher
Cone Crusher
Impact Crusher

Transfer

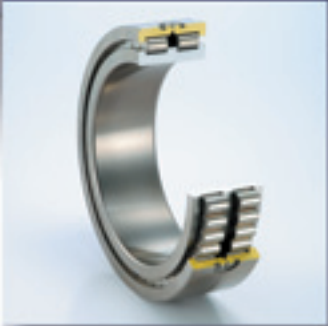
Trucks
Apron Feeder
Conveyor

Processing

Vibrating Feeder
Vibrating Screens



CYLINDRICAL ROLLER BEARINGS
SL-Type



See page **6**

LARGE SIZE TAPERED ROLLER BEARINGS
EA Type



See page **7**

LARGE SIZE DOUBLE ROW
TAPERED ROLLER BEARINGS



See page **8**

SPHERICAL PLAIN BEARINGS



See page **9**

TRIPLE-SEALED BEARINGS
for BEARING UNIT



See page **13**

NEEDLE ROLLER BEARINGS



See page **14**

INSULATED BEARINGS
MEGAOHM™ Series



See page **15**

CONSTANT VELOCITY JOINTS



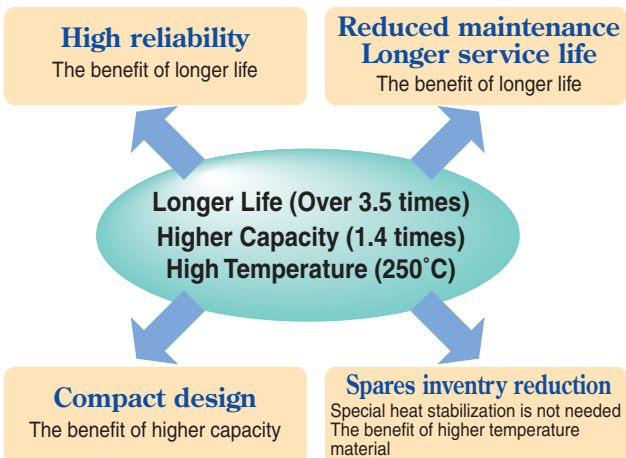
See page **16**

SPHERICAL ROLLER BEARINGS

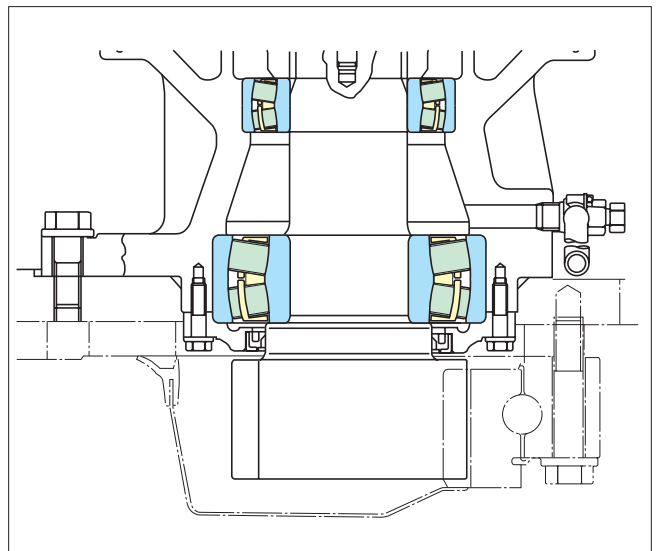


Features

The material NTN developed for LH series spherical roller bearings has gained considerable acceptance in the market. As a next step, NTN will launch the new series with a symmetrical roller design with LH material as a standard. For bearings with an OD over 420mm, both asymmetrical and symmetrical roller design are available.



Application Example



Bearings for swing machinery

SPHERICAL ROLLER BEARINGS UA Type

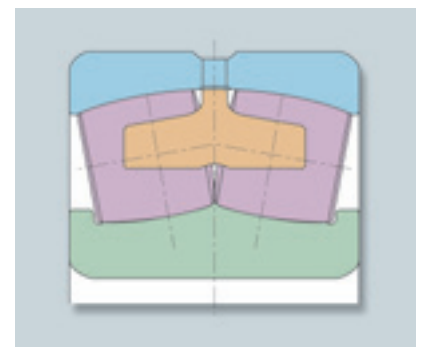


Features

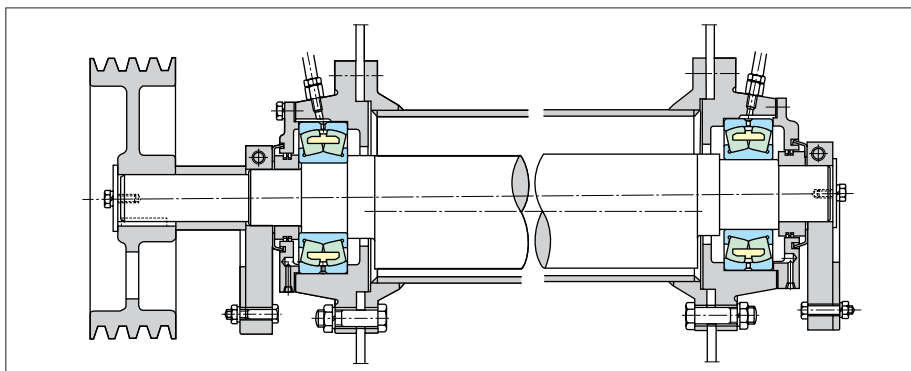
This design provides a bearing uniquely qualified for heavy, shock or vibratory type of radial loading.

Application Example

The type UA spherical roller bearing, with high dynamic capacity, is recommended for applications having heavy or shock type of radial loading such as vibrating screens and heavy load applications such as reduction gear units.



UA Type



Vibrating screen

CYLINDRICAL ROLLER BEARINGS E Type



Features

1. Longer life (1.5 times longer life than standard type)
2. Higher load rating than standard series via larger size rollers

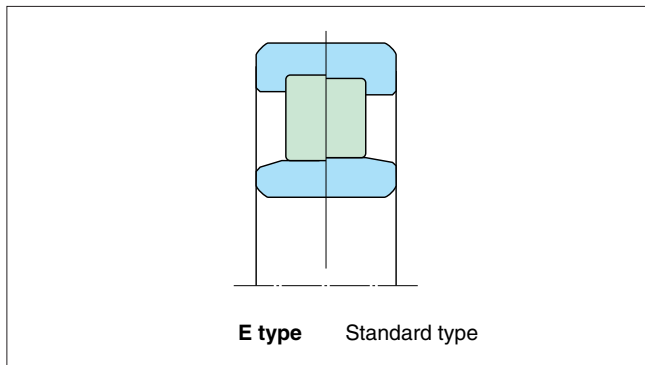


Fig.1 Comparison of internal design

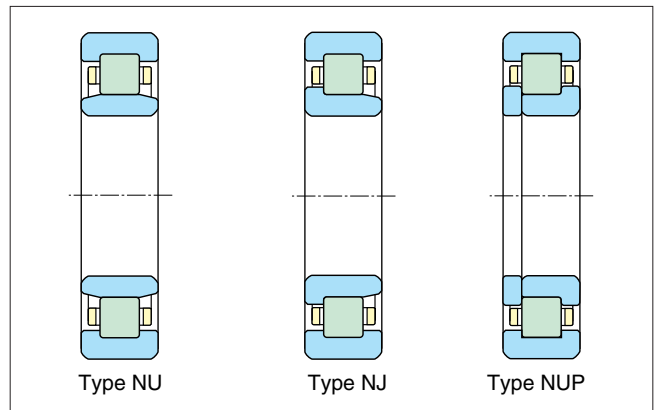


Fig.3 Type variation

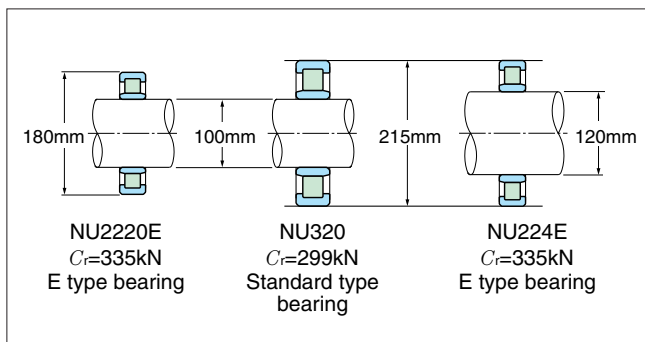


Fig.2

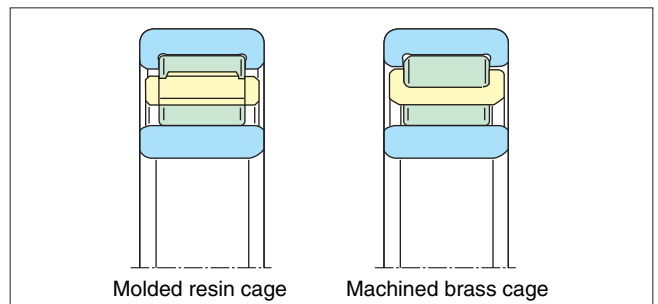
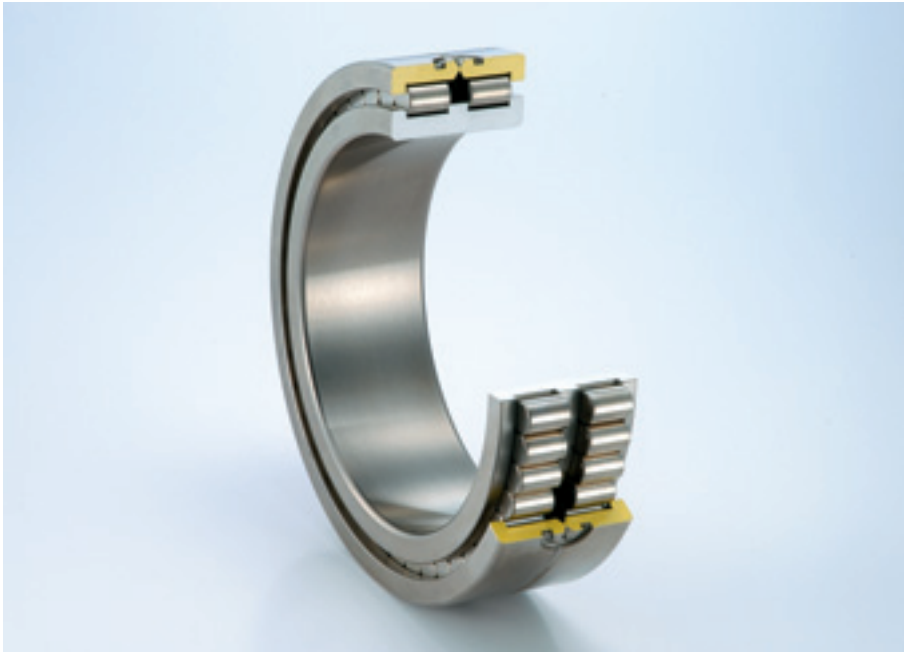


Fig.4 Cage type

CYLINDRICAL ROLLER BEARINGS SL Type



Cylindrical roller bearings SL01-Type (Open type)



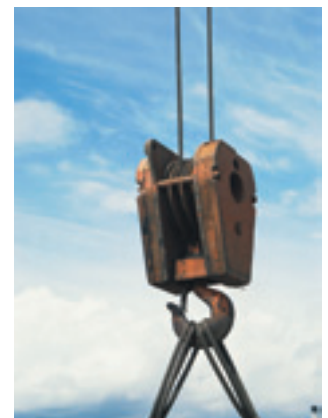
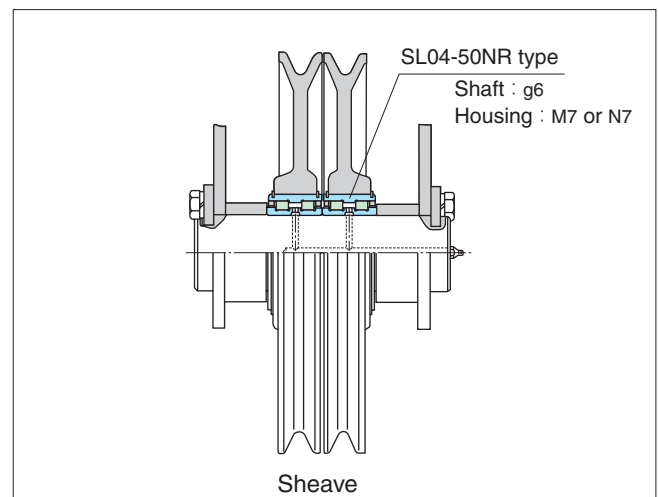
Cylindrical roller bearings SL04-Type for sheave (Sealed or Shielded type)

Features

SL type cylindrical roller bearings are double row, full complement cylindrical roller bearings, and are suitable for heavy duty application because of the high basic load ratings. Floating and locating SL bearings are available and both non-separable. Locating SL bearings can support radial load and axial loads in both directions. SL-04 type, which have snap rings on OD and seals or shields, mainly used in rope sheave applications. Thus easy handling and simple design are obtained by using SL-04 type.

Application Example

	<ul style="list-style-type: none"> ● General purpose sheave on land ● Greasing is from the shaft
	<ul style="list-style-type: none"> ● General purpose sheave on land for better sealing performance
	<ul style="list-style-type: none"> ● Crane sheave on the sea ● Deck crane



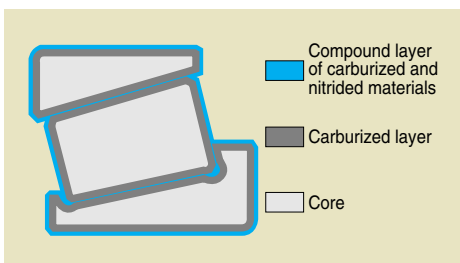
LARGE SIZE TAPERED ROLLER BEARINGS EA Type



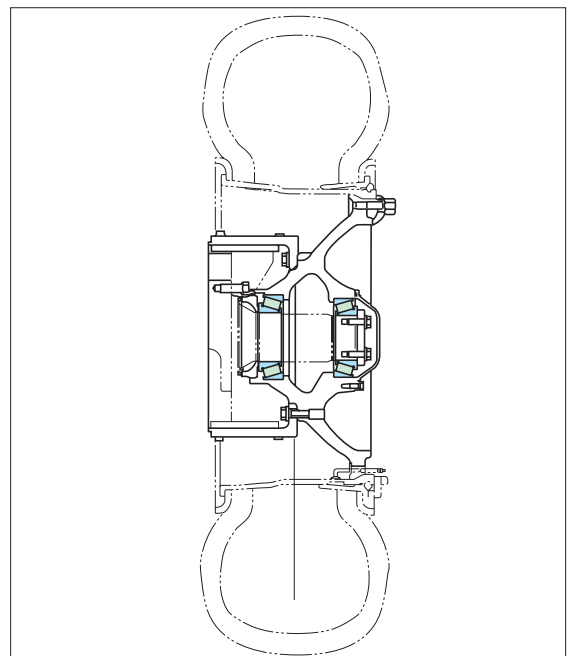
A newly developed special heat treatment allows these bearings to ensure longer operating life under severe operating conditions!!

Features

EA bearings have a particularly strong advantage by providing longer operating life due to their improved crack fatigue strength, wear strength and peeling resistance characteristics, especially when the lubricant is contaminated, but also under clean lubricant conditions. Accordingly, these bearings can be used in mining and ore processing applications where marginal lubrication, vibrations and impact loads often exist. The EA bearings provide advantages due to their compact design, longer operating life, and longer intervals between maintenance and inspections. EA material treatment can be offered in tapered roller, cylindrical roller and spherical roller bearings.



Application Example



Front wheel of dump truck

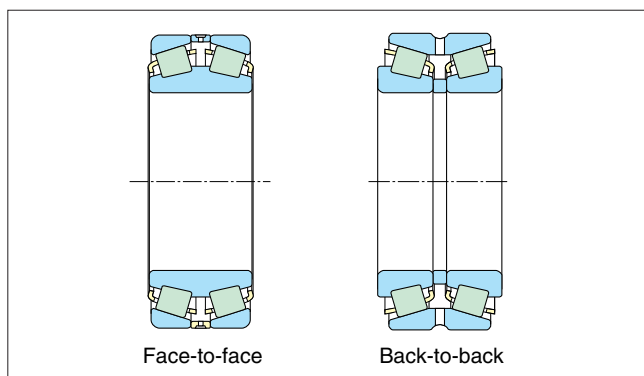
LARGE SIZE DOUBLE ROW TAPERED ROLLER BEARINGS



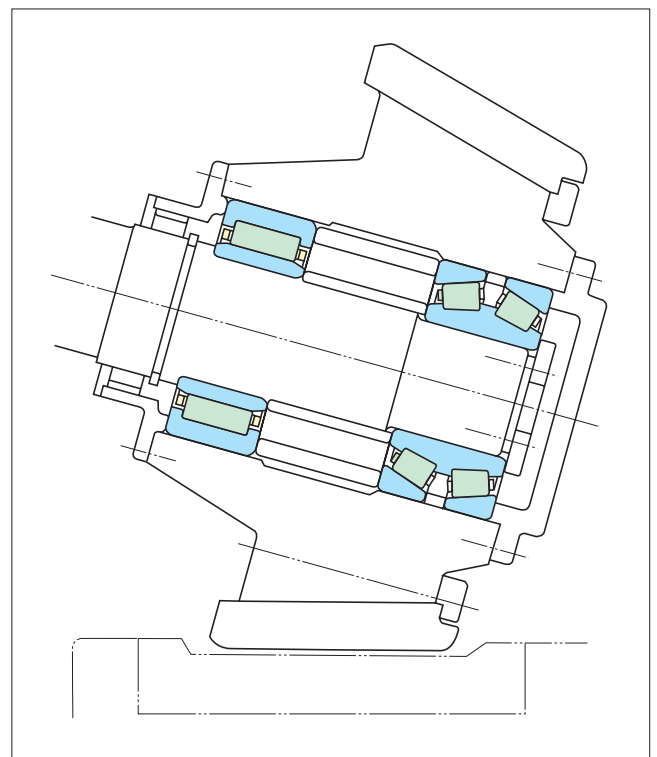
Features

Back to back arrangement and face to face arrangement are both available, and they have been adjusted so that each type's internal clearance is fixed. Pairs of duplex single row tapered roller bearings are also manufactured. For more details, contact NTN Engineering.

Face to face arrangement types are used for reducers and tyre rollers in vertical mills. Especially bearings for tyre rollers are designed to endure heavy loads and shock loads. Pin type cages are sometimes selected for maximum capacity. For heavy load and bi-rotational applications, NTN utilize pinned cages with pin seating bush for increased cage strength. This cage design has gained strong acceptance by equipment operators.



Application Example



The tyre roller of vertical mill

SPHERICAL PLAIN BEARINGS



Self-lubrication type



Lubrication type



Lubrication type thrust bushing

Features

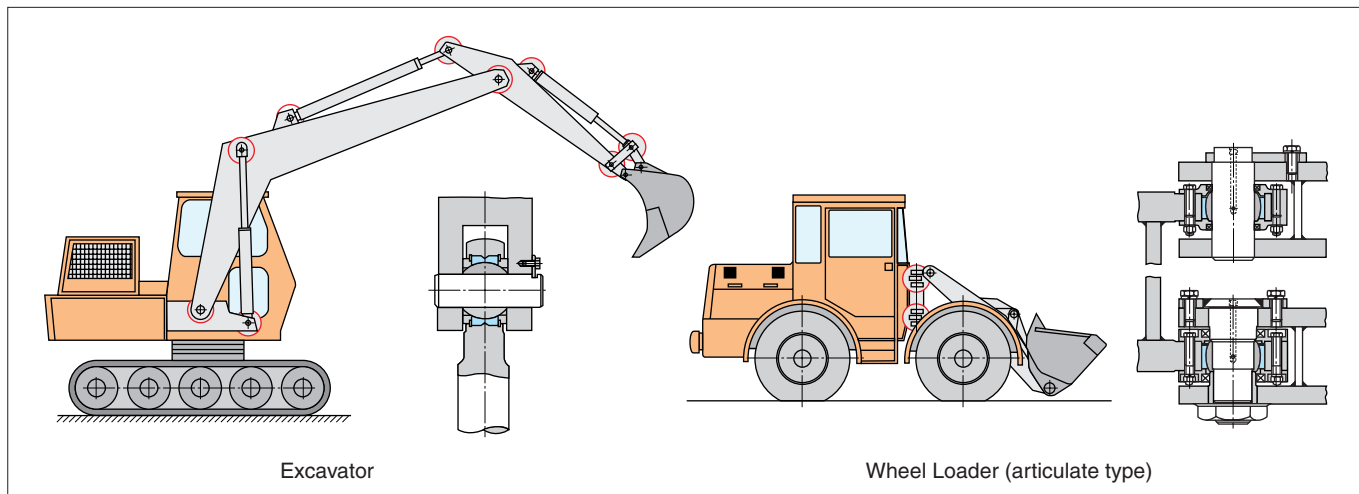
Self-lubricating type spherical plain bearings

Self-lubricating spherical plain bearings are primarily intended for situations where a long life, free from maintenance and lubrication requirements, is desired. They are also used for applications where lubrication is difficult.

Lubrication type spherical plain bearings

Lubrication type spherical plain bearings feature sliding surfaces where both the inner and outer rings are steel. : Fractured outer ring type and fitting groove type are available.

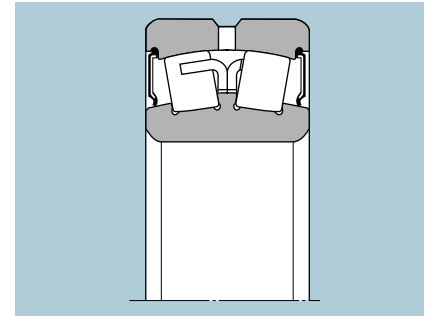
Application Example



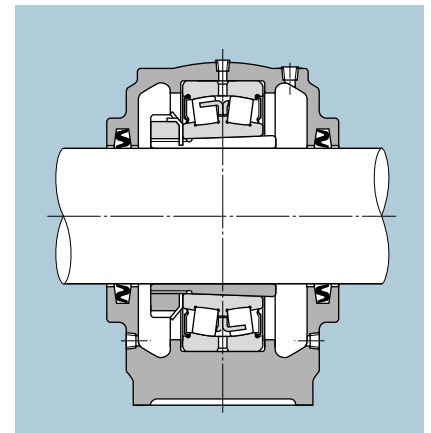
Excavator

Wheel Loader (articulate type)

SEALED SPHERICAL ROLLER BEARINGS WA type



Sealed spherical roller bearing



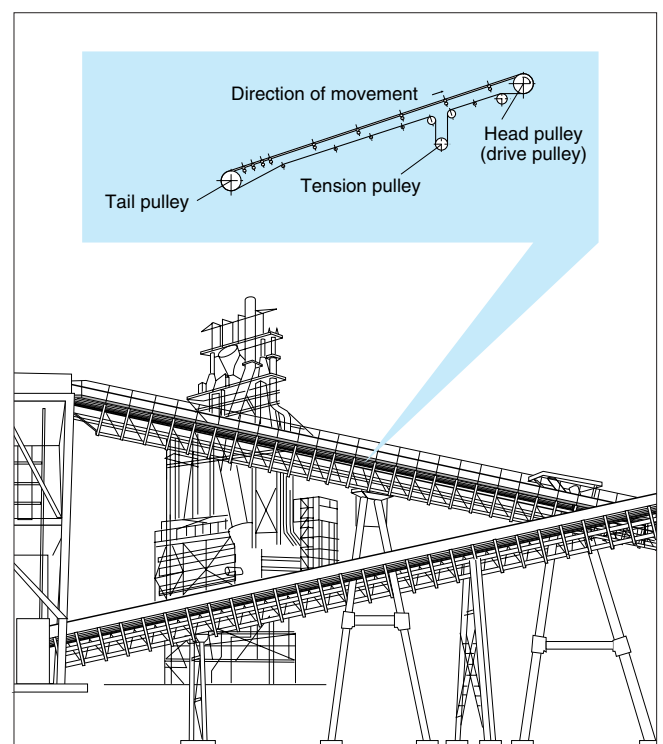
Cross section of plummer block unit

Features

The high load capacity of spherical roller bearings and their easy adaptability to a variety of applications has led to increased use in nearly every industry. Compact sealed spherical roller bearings have been developed by NTN specifically to address the need for longer operating life such as longer maintenance or relubrication.

- Excellent sealing performance against dusts, and slurry**
- Can be installed in the standard series plummer blocks**
- Re-grease without removal of seals**
- Uniform sealing capability under misaligned operating conditions**

Application Example



PLUMMER BLOCKS



Features

Tightening bolt

The bolt protects the plummer block against loosening due to vibration and impact.

Oil fill plug

For relubrication.

Seal

Excellent sealing performance.

Spherical roller bearing

Self-aligning ball or spherical roller bearing is built into plummer block.

Mounting bolt holes

Allow easy positioning and installation.

Adapter

Simplifies installation of the bearing.

Oil drain plug

For draining old lubricant.

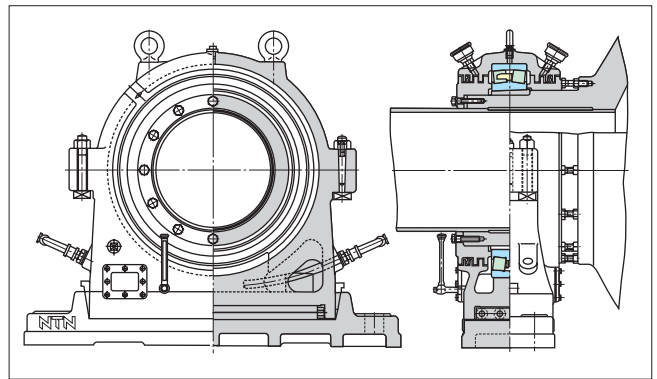
Plummer block unit

Designed for greater mechanical strength, and manufactured under strict quality control program. To suit the intended application, it can be made of either spheroidal graphite cast iron (ductile cast iron) or cast steel.

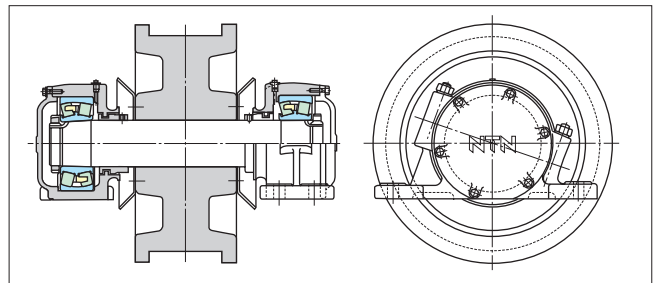
Dowel ball

The upper and lower housings can be assembled together at higher accuracy by ball-dowel system using steel ball. Also, the upper cover can be installed or removed easily.

Application Example



Trunnion bearing of ball tube mill



Supporting roller of tube mill

BEARINGS with SOLID GREASE



Features

"Solid grease" is a lubricant essentially composed of lubricating grease and ultra high-molecular-weight polyethylene. Solid grease has the same viscosity as ordinary grease at normal temperature, but as a result of a special heat treatment process, this grease solidifies retaining a large proportion of the lubricant in it. By this solidification, the grease does not easily leak from the bearing, even when the bearing is subjected to strong vibrations or centrifugal force.

1. Reduced lubricant leakage

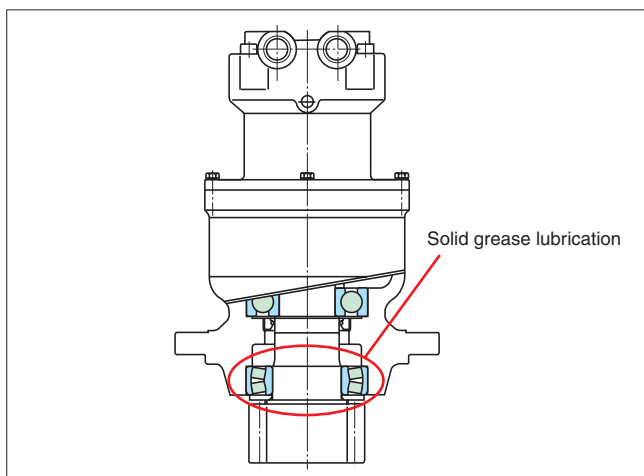
Because the base oil is retained in a solid form, it is less likely to leak out of the bearing. During operation, temperature rise and/or centrifugal force will cause a gradual release of the base oil into the rolling surfaces. Eliminating grease leakage from the bearing ensures a consistent supply of lubricant and prevents contamination of the surrounding environment.

2. Superior lubrication

Bearings with solid grease resist grease leakage prolonging bearing life in applications where high centrifugal force or vibration are present. The solid lubricant does not emulsify when exposed to water also extending both grease and bearing life.

3. Sealing effect

Though solid grease protects a bearing against ingress of foreign matters (water, dust, etc.), it is not an effective sealing device. Therefore, for applications that need reliable sealing performance, we recommend the use of contact type rubber seals (deep groove ball bearings, bearing units) or other seals (other bearing types).



Solid grease bearing for swing machinery

TRIPLE LIP SEALED BEARINGS for BEARING UNIT



Features

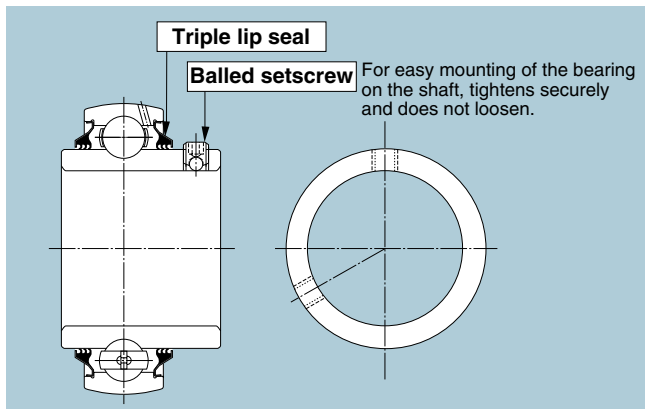


Fig.1 Triple lip sealed bearing

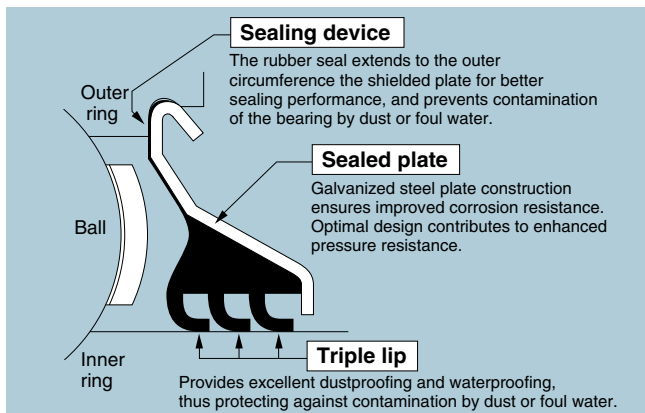


Fig.2 Triple seal

Application Example

Triple lip sealed bearing units are suitable for equipment used in locations subjected to splashing foul water and slurry, and heavy dust contamination, including mining conveyors, mixers, pumps and samplers.



A pillow unit (right) and a square flange unit (left) are used in a conveyor unit operating in an environment with heavy airborne dust.

NEEDLE ROLLER BEARINGS

PK Series needle roller and cage assemblies



Super high-capacity needle roller and pressed cage assemblies



PKJ Series needle roller and pressed cage assemblies



Features

PK Series needle roller and cage assemblies are widely used in construction machinery, agricultural machinery and hydraulic equipment . Often, numerous needle roller bearings are used in the planetary gear speed-reduction mechanism for mining and construction machinery.

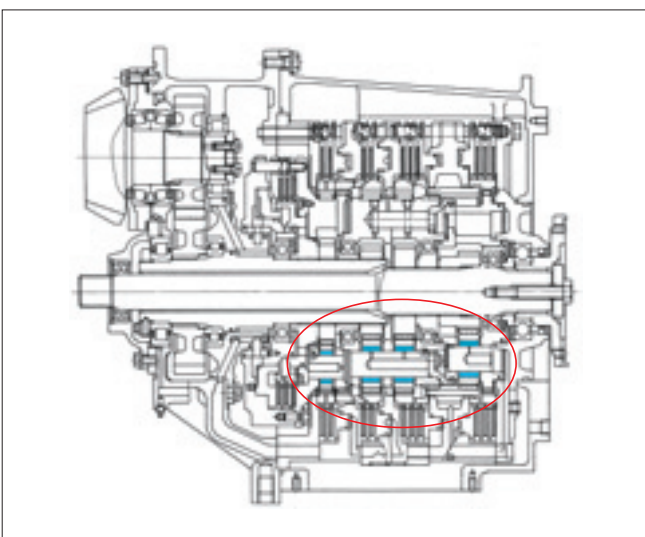
Features

In recent years, customers have required for bearings that have ever-increasing capacity. In response, NTN created a super high-capacity needle roller and pressed cage assemblies as the HWTJ Type. Compared to the standard design, the number of rollers is increased by 20 to 30% and basic load rating by 20 to 35%. This bearing series satisfies the requirements of large basic load rating, long life under severe operating conditions and high rigidity.

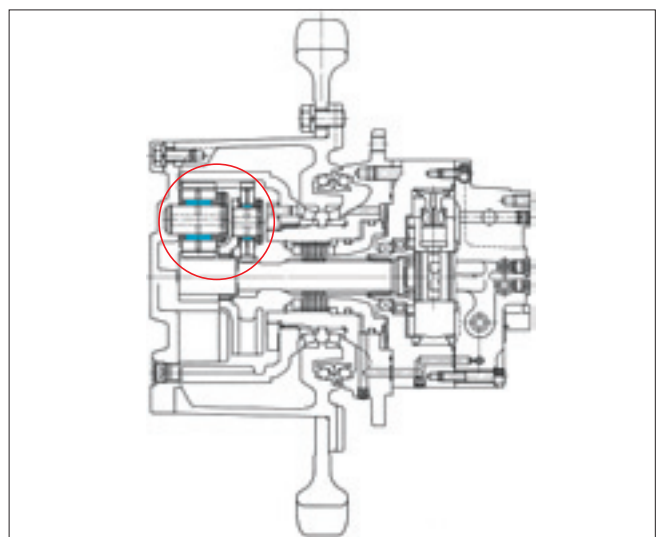
Features

PKJ Series needle roller and pressed cage assemblies were developed to deal with requirements of reduced cost coupled with high durability for tough applications. It features an outside diameter guided cage, with the same plate thickness and high rigidity as PK series.

Application Example



Transmission

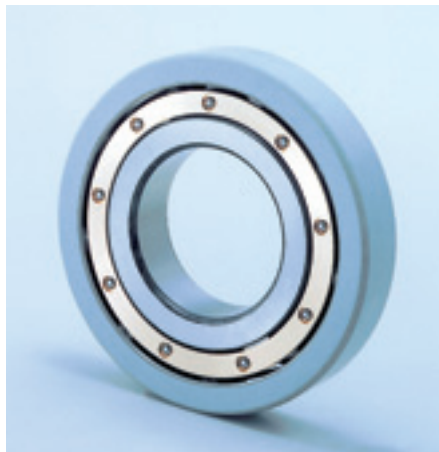


Planetary speed reducer

INSULATED BEARINGS MEGAOHM™ Series



Insulated Bearings for Generator

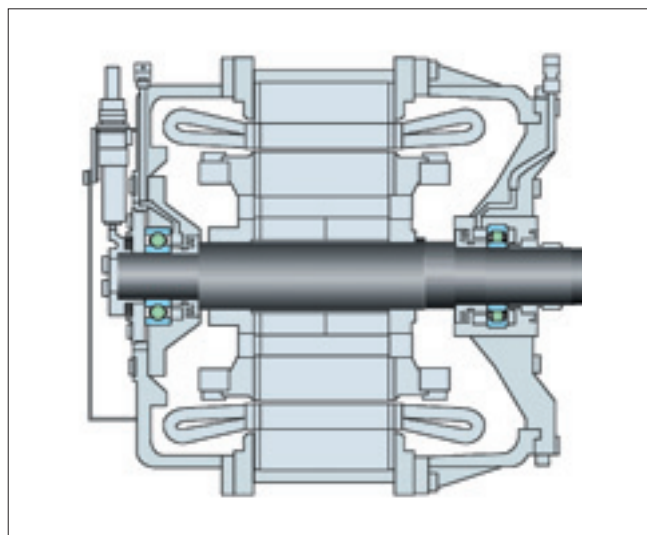


Features

Bearings used in electrical equipment such as DC and AC variable speed motors, generators etc, can exhibit electrical pitting resulting from current leakage. NTN's MEGAOHM™ Series of insulated bearings has been specifically designed to counteract electrical pitting. These bearings are available in both ceramic and resin types suited to a variety of applications. The MEGAOHM™ Series of insulated bearings offers the following unique advantages:

- Exhibits insulation resistance of at least 100 MΩ at 500 VDC.
- Available in a wide range of variants with various insulating layer materials, high voltage resistance and shock immunity that accommodate diverse user requirements.
- Compatible with ISO 492, DIN 620 and JIS 1514 standards.
- Available in bore diameters ranging from 50 to 160 mm.

Application



CONSTANT VELOCITY JOINTS



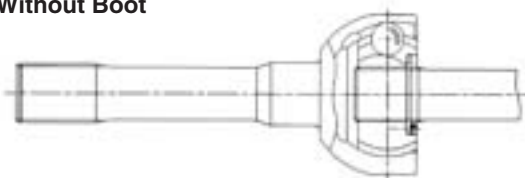
Features

The constant velocity joints are generally designed for drive axle. Maximum allowable alignment angle is 42°. They have a long re-lubrication interval, high reliability for long life, high efficiency and smooth rotation & low noise. Available part numbers are BJ125 ~ BJ300.

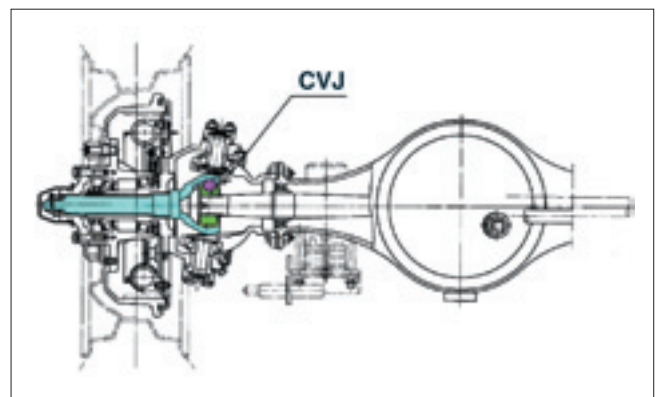
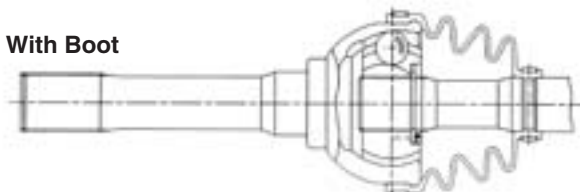
Application Example

- Dump trucks
- Wheel loaders
- Shuttle cars
- All terrain trucks and cranes
- Vibrating screens
- Crushers
- PTO for engine -auxiliary equipment or propeller shaft

Without Boot



With Boot



Drive Axle