Decision version of energy conservation and troubleshooting of bearings

世界初

A D B ®

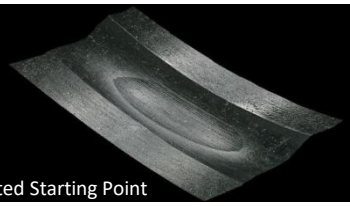
Autonomous Decentralized Bearing

Problems such as torque, friction, wear, environment resistance, rust, etc. It was the cage that made the solution difficult.

Lubrication improvement to reduce friction with the cage was a traditional approach.

ADB is a completely new bearing that makes balls noncontact with no cage,

Because it is non-contact, we offer a dramatic solution that does not rely on lubrication.



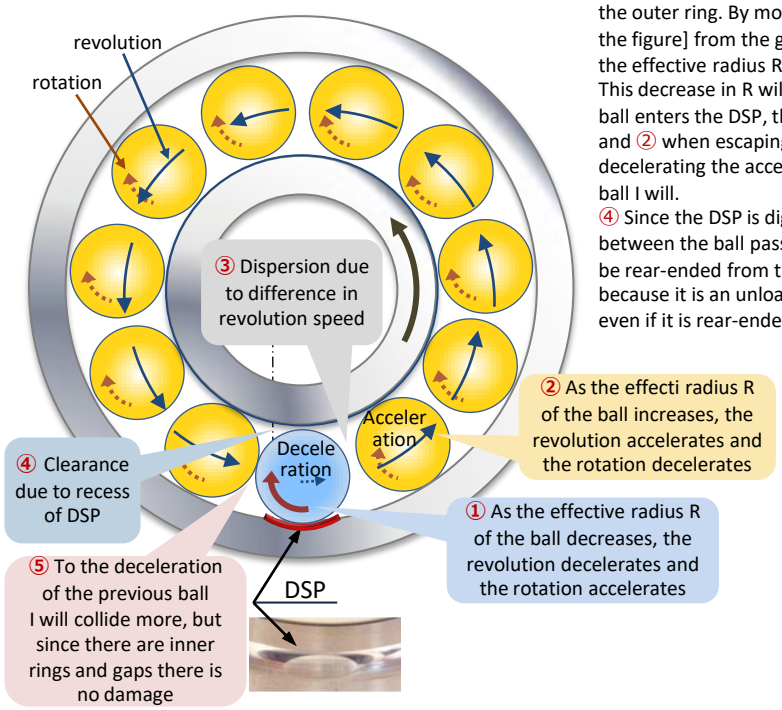
Distributed Starting Point

Coo Space CO., Ltd.
http://www.coo-space.com

A D B Autonomous Decentralized Bearing

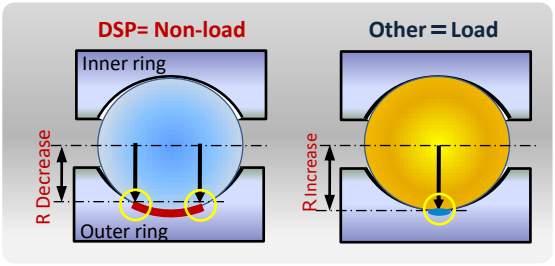
Energy saving · High speed	•Device differentiation by basic performance
Prevent damage	•Bearings to fundamentally solve problems

How it works



In place of the cage, ADB has one to several Dispersion Starting Points (DSP recesses) on the outer ring. By moving the contact point between the ball and the outer ring [○ in the figure] from the groove bottom of the outer ring to the two recesses of the recess, the effective radius R of the ball is decreased (see the figure below).
This decrease in R will change the ratio of ball self-revolution (left figure). ① When a ball enters the DSP, the revolution of the ball decelerates and the rotation accelerates, and ② when escaping from this point, the revolution accelerates instead of decelerating the accelerated rotation, and ③ disperses the ball with the succeeding ball I will.
④ Since the DSP is digging down the groove bottom of the outer ring, there is a gap between the ball passing through here and the inner ring. ⑤ The ball of the DSP may be rear-ended from the succeeding ball due to the deceleration of the revolution, but because it is an unloaded ball by ④, it will not be damaged because it is easily extruded even if it is rear-ended.

cross section



Effect

1. Energy saving
~ Eliminate sliding friction between ball and cage

Traditionally balls of bearings generate sliding friction with the cage due to rotation, so oil slip was indispensable. On the other hand, the lubricating oil was agitated with a ball, so it consumed energy.

Since ADBs are not in contact with each other, lubrication to this part is unnecessary, and energy consumption is reduced to a maximum of 1/14 each.

2. Prevention of damage
~ Ball clogging (sliding friction of balls and orbit) cancellation

Jamming may occur due to variations in the revolution speed of the ball. This will cause wear of the cage and premature damage as the ball slides on the track.
(It was the reason to prohibit high precision mounting provision and water contamination)

Since the ball of ADB is independent, it does not resist the variation of the revolution speed. Therefore, balls do not slide on the track, even water contributes to lubrication.

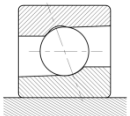
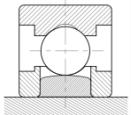
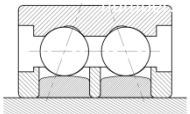
3. There is no constraint by the cage

1) There is no temperature constraint (fluororesin Max 200 ° C)
2) Number of balls, permissible load greatly increased *
3) There is no inner and outer ring separation due to breakage of the cage
4) It is easy to produce small quantity without mold retainer

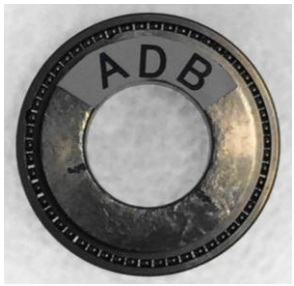
* Deep groove ball bearing, double row angular contact ball bearing

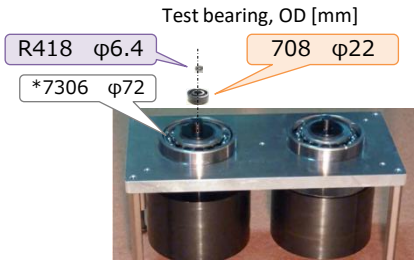
variation

Please refer to the dimension table of attached sheet for the call

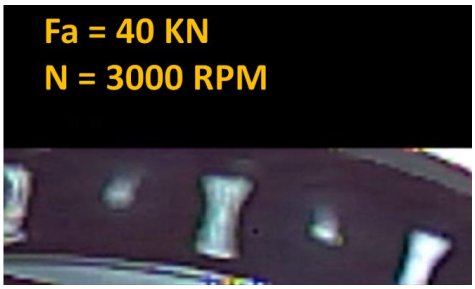
Type	Angular contact ball bearing	Deep groove ball bearing	Double row angular contact ball bearing
			
Feature	· Supports radial load and axial load in one direction. · 2 pieces also support moment. · It is a simple structure ADB	· Supports radial load and axial load in both directions. · The number of balls is about 1.5 times that of the same type.	· Supports radial load, axial load in both directions, and moment. · The number of balls is about 1.5 times that of the same type.
Standard	Sample on sale	Not compatible	
Individual compatible	Sale		

The data created by distributed balls is the true performance of rolling

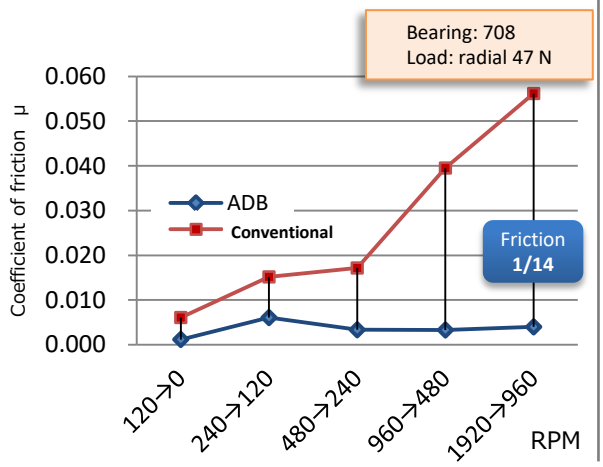




•The data of 7306 is a technical report Please refer to.

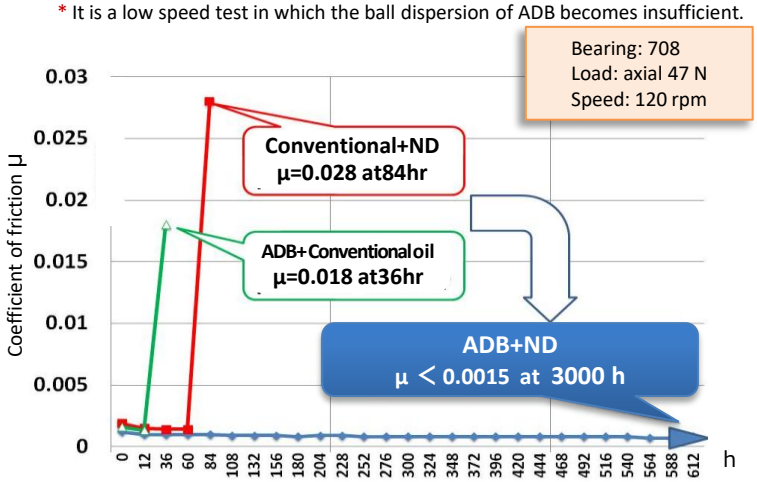


Speed and coefficient of friction

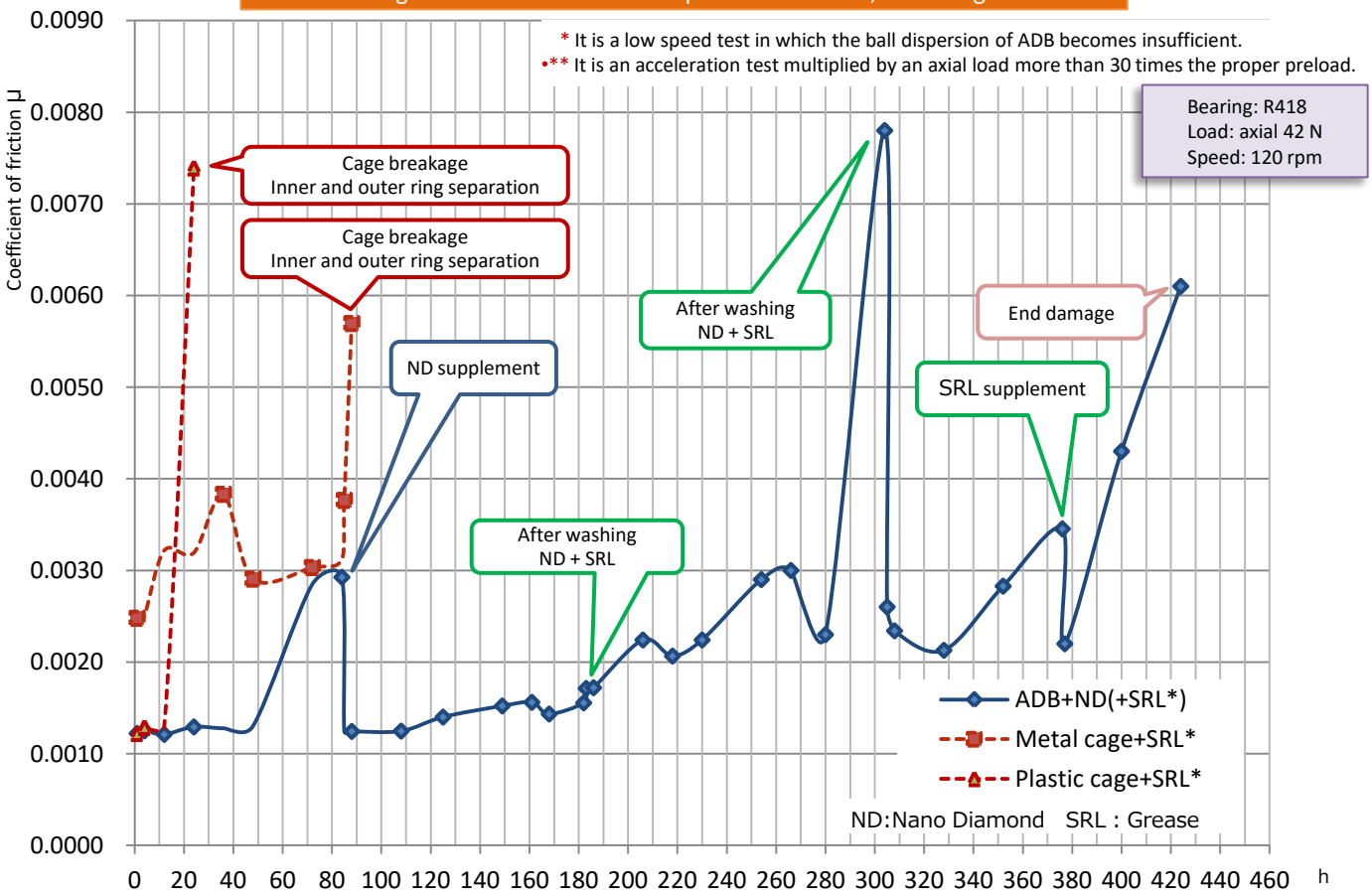


Meaningful test * Low speed, lubrication life

* It is a low speed test in which the ball dispersion of ADB becomes insufficient.

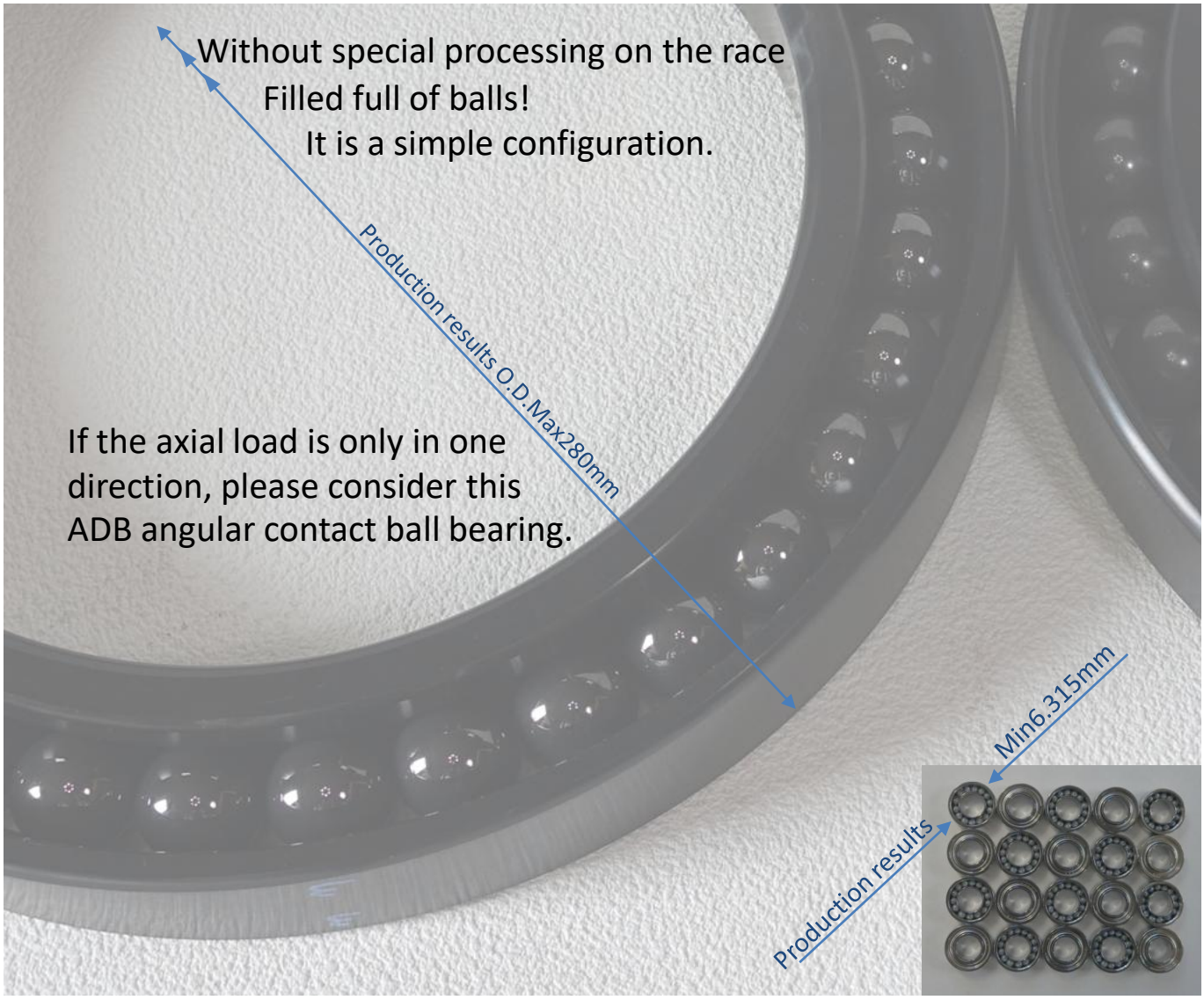


Meaningful test * Lifetime of low speed vertical axis, under high load **

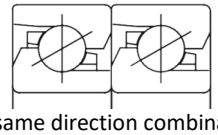


ADB Angular contact ball bearing

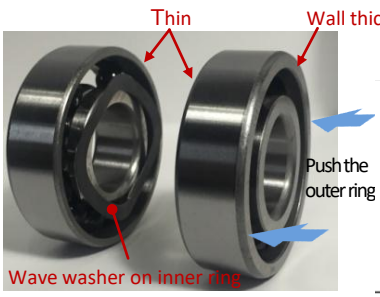
Please refer to the dimension table of attached sheet for the call number.

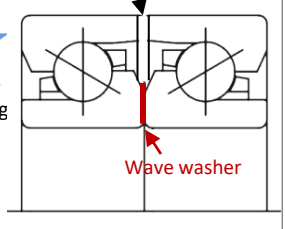


[Warning]
Angular bearings have only one axial load, there is a front and back.
Please beware that if the mounting direction is wrong, the inner and outer rings may separate.

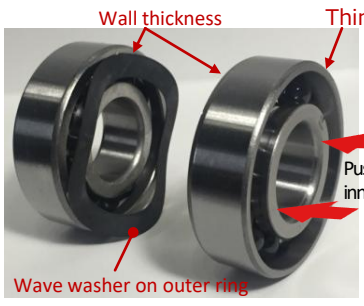


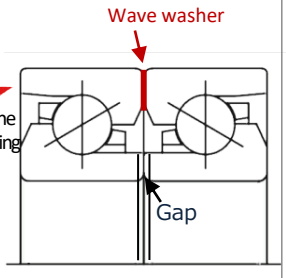
✕ The same direction combination
Prohibited with bidirectional axial load





O Arrangement, DF : High alignment





O Arrangement, DB : High moment of resistance

It is recommended to use spring preload by wave washer as shown in the figure. A slight preload sufficient to prevent the ball from falling by its own weight is sufficient.

ADB deep groove ball bearing
ADB double row angular contact ball bearing

Please refer to the dimension table of attached sheet for the call number.

Feature

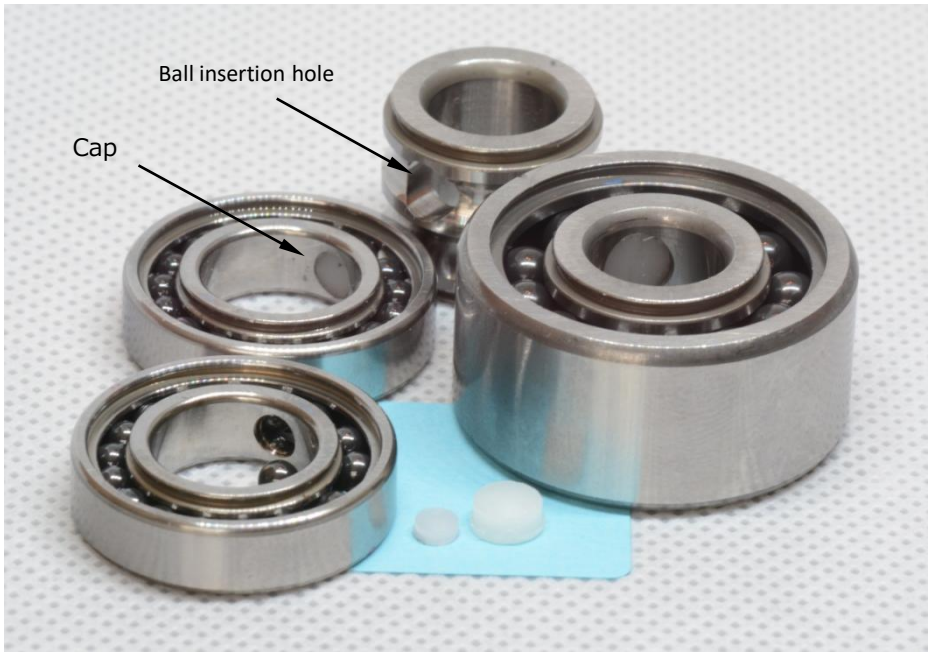
1. It can receive radial load and axial load in both directions.
2. Shield, with nanowire coat (standard item).
3. There are no front and back (mounting direction) like angular ball bearings.
4. Even during wear and failure, the structure that balls fall off and inner and outer ring separation hardly occurs.

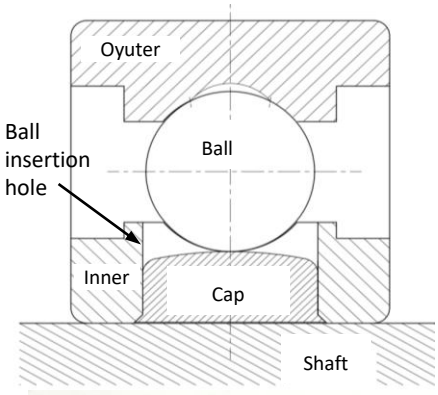
Traditionally, when removing the cage of this type of bearing,
the ball was filled only about half the circumference of the track. →

Conventional full ball bearings with filling slots had to
have the filling slots facing up to prevent the ball from falling off.
Also because of the slots it was impossible to seal. →

In order to solve this problem, a ball is filled from the ball insertion hole provided in the inner ring, and the cap is closed with a cap
We developed the structure * to be installed in ADB.
By installing the bearing on the shaft, the ball and cap will not be able to fall off.

＊The configuration of the ball entry hole is difficult with conventional bearings because balls may push the cap of the inner ring due to ball clogging, but ADB is not in contact with the cap due to centrifugal force because the balls are dispersed.





Inner ring and Cap

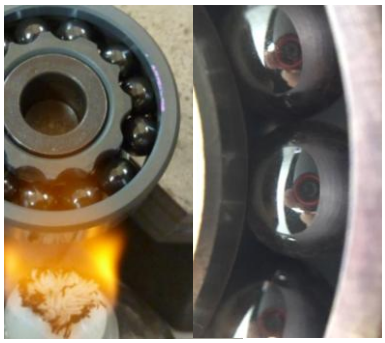
Application example
We offer a dramatic solution that does not rely on lubrication.

火 Fire

· Rotary kiln bearing damage countermeasures
· Measures against noise of chain conveyor bearings
· Energy saving of blower

Material: inner and outer rings / ball: SUS 440C / Si3N4
Lubrication: no lubrication / (Tungsten disulfide)

Rotary kiln



Under non-lubricating performance is decided at high temperature.

地 Earth

· Friction reduction ⇒ Low torque
· Damage prevention of tensioner bearings
· Compact and lightweight pillow block
· Simplified bearing mounting (accuracy relaxation)

Tensioner

Conventional
Grease
500h NG

A D B
Nano-Diamond
700h OK

High basic performance with no lubrication lives.

風 Wind

· Efficiency of wind power generation UP
· Damage countermeasures for low speed applications
· Rust prevention measures for bearings

Wind power generation

Cage was difficult due to new design It enables short delivery times and cost reduction of large bearings.

水 water

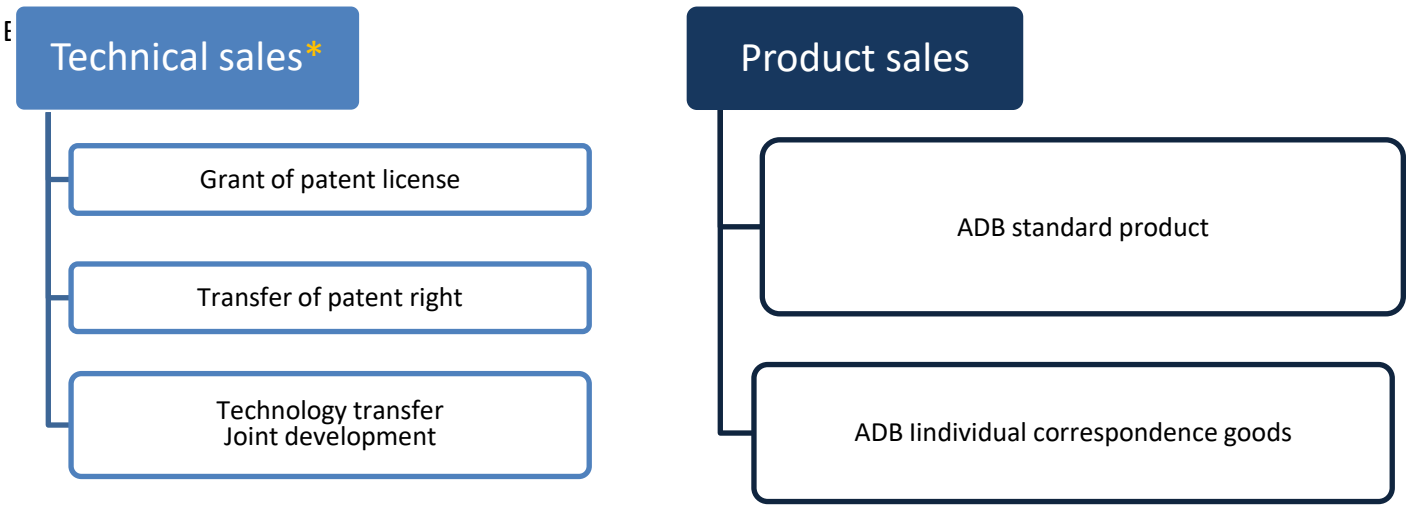
· Damage countermeasure and Energy saving of water-lubricated plain bearings
· Facilities such as sterilization
· Hydraulic power, wave power bearing

sterilizable drive

We will reduce the first rolling bearing and maintenance that water lubrication is possible.

Company Profile

Company	Coo Space CO., Ltd.	Establishment	14/9/2006
C.E.O.	Sosuke Kawashima	Capital	JPY 5,000,000
Address	3-4-26, Higashi-cho, koganei-shi Tokyo JAPAN	U R L	http://www.coo-space.com/
		E-Mail	brg@coo-space.com



* We are looking for manufacturing and sales partner of ADB. Please inquire. Mail:kawashima@coo-space.com

Main patent

JP3964926 US8052330
Basic patent on ADB's "Autonomous Decentralize". US has almost the same contents.
Ball bearing and ball screws are the main focus.

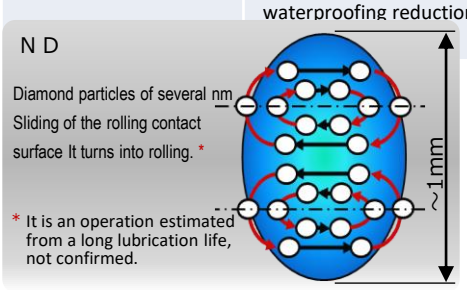
JP5320547 US8783958 CN ZL200880015918.6
Basic patent on ADB's "Autonomous Decentralize". US and CN has almost the same contents.
Roller bearing is the main focus.

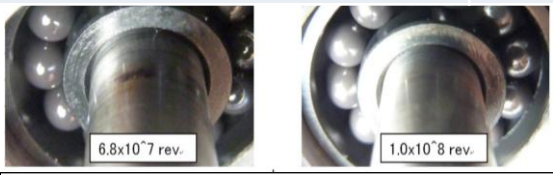
JP6106830
In ADB of the roller bearing type, maintainability is improved by becoming a preload bearing during operation and becoming a skimmer bearing during stoppage.

JP 2014-40927A
Apply nanowire lubrication with a coefficient of friction greater than ADB to make nanowire exclusively micro slip in the rolling contact surface.

Selection of lubricant

lubricant	Feature	Remarks
Non-lubrication	Non-lubrication realizes super low friction operation at light loads outside the common sense of rolling bearings.	Rust preventive treatment is required for steel bearings. (It will rust with hand grease)
Nano Diamond coat [ND] (Dispersed in machine oil)	Semi-dry lubricating oil which made use of ADB's characteristics, balanced low friction and long service life in a high level.	The amount is about 1/100 of the conventional amount, the extent to present the iris is a standard. 【Bottom view】
Grease	-Add a small amount to Nano Diamond at heavy load. -To make maintenance free, there is also a way to continuously supply grease separation oil to the orbit. 【Bottom right】	Applying grease to the rolling parts with medium and light load increases the torque.
Water etc.	It can be examined in areas where oil can not be used, oil seal waterproofing reduction and abolition, substitution for underwater sliding	The kinematic viscosity of water is 1 close to high speed spindle oil.



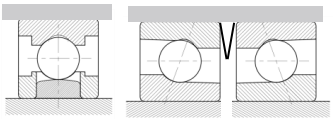


Nano-diecoat lubrication OK　Nano-diy coat supply timing
Approximate Supply: When the torque is twice the initial value, or when the ball gloss decreases.

Grease retention on the back of the seal without contact with the ball

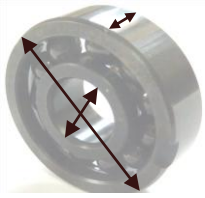
Inquiry sheet

To Coo Space CO., Ltd.　　Mail　brg@coo-space.com



1 piece / multiple use

Direction of use
Horizontal axis / vertical axis



Dimensions or Brg number

Radia load

Axial load

Moment

Rotating inner / outer
Speed　　rpm
Temp　　℃
Lube　Non / Discretion

About seal of remodeling source bearing

It is limited to seal that can be reattached (left and center in the photo).
Caulking attachment (right photo) can not be installed on ADB.