

For New Technology Network

NTN®

The New Generation of NTN Bearings for Wind Turbine



新世代風車用軸受



CAT. No. 8404- II /JE

Technology for earth-friendly recyclable green energy

地球に優しい再生可能エネルギー

Wind turbine technology continues to progress for increased efficiency, reliability and longer service life of equipment. Innovative bearing designs from **NTN** are instrumental in these improvements and spreading the use of wind technology for electrical power generation. Our products are built with three concepts in mind: harmony with natural environments, improved energy conservation, and contribution to international society.

風力発電に関わる技術は、不断の進化を続けています。

NTNは「自然環境との調和」「エネルギー（地球温暖化）問題の解決」「国際社会への貢献」を実現するために商品の提供を通じて、地球に優しい風力発電機の普及に役立つよう要素技術の創造に取り組んでいます。

Rotor shaft bearings



主軸用軸受

Yaw gearbox bearings



減速機用軸受

Gearbox bearings



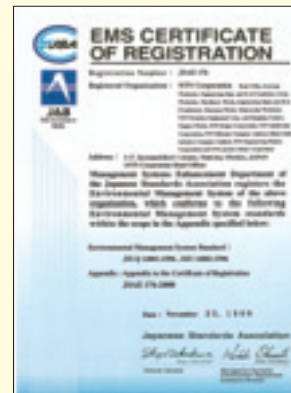
増速機用軸受

Generator bearings
"MEGAOHM Series"



発電機軸受
「メガオームシリーズ」

ISO 14001 Certification
ISO 14001の認証取得



NTN obtained ISO 14001 certification, the international standard of the environmental management system.
当社は環境マネジメントシステムの国際規格であるISO 14001の認証を取得しました。

The new generation of NTN bearings possess higher 長寿命で信頼性の高いNTN新世代軸受

NACELLE

Rotor shaft 主軸

温度上昇が低い軸受

The rotor shaft bearings run at much lower operating temperatures.



Spherical Roller Bearings for Main Shaft
主軸用自動調心ころ軸受

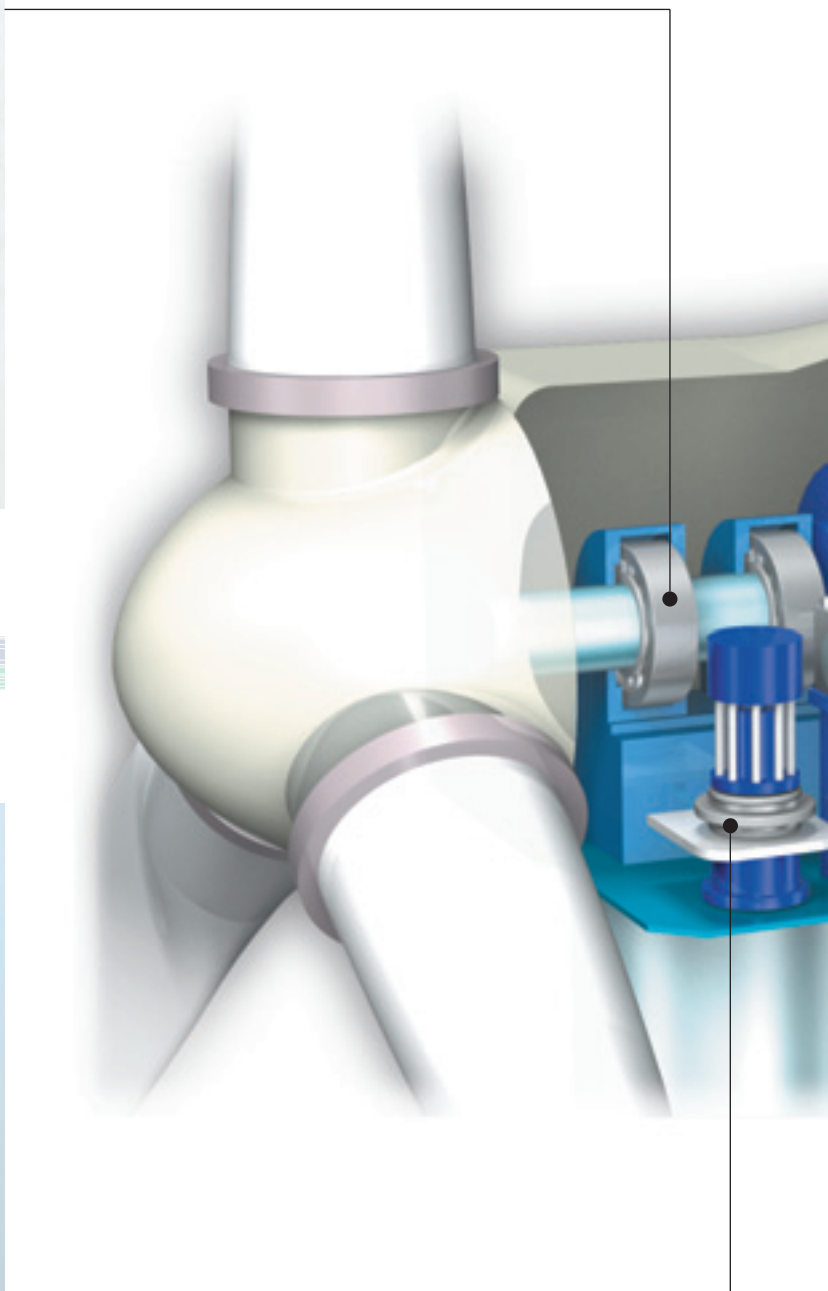
Yaw gearbox 減速機

新設計：高荷重、繰り返しに強い軸受

New design: The yaw gearbox bearings are designed for higher capacity to endure repetitive loading.

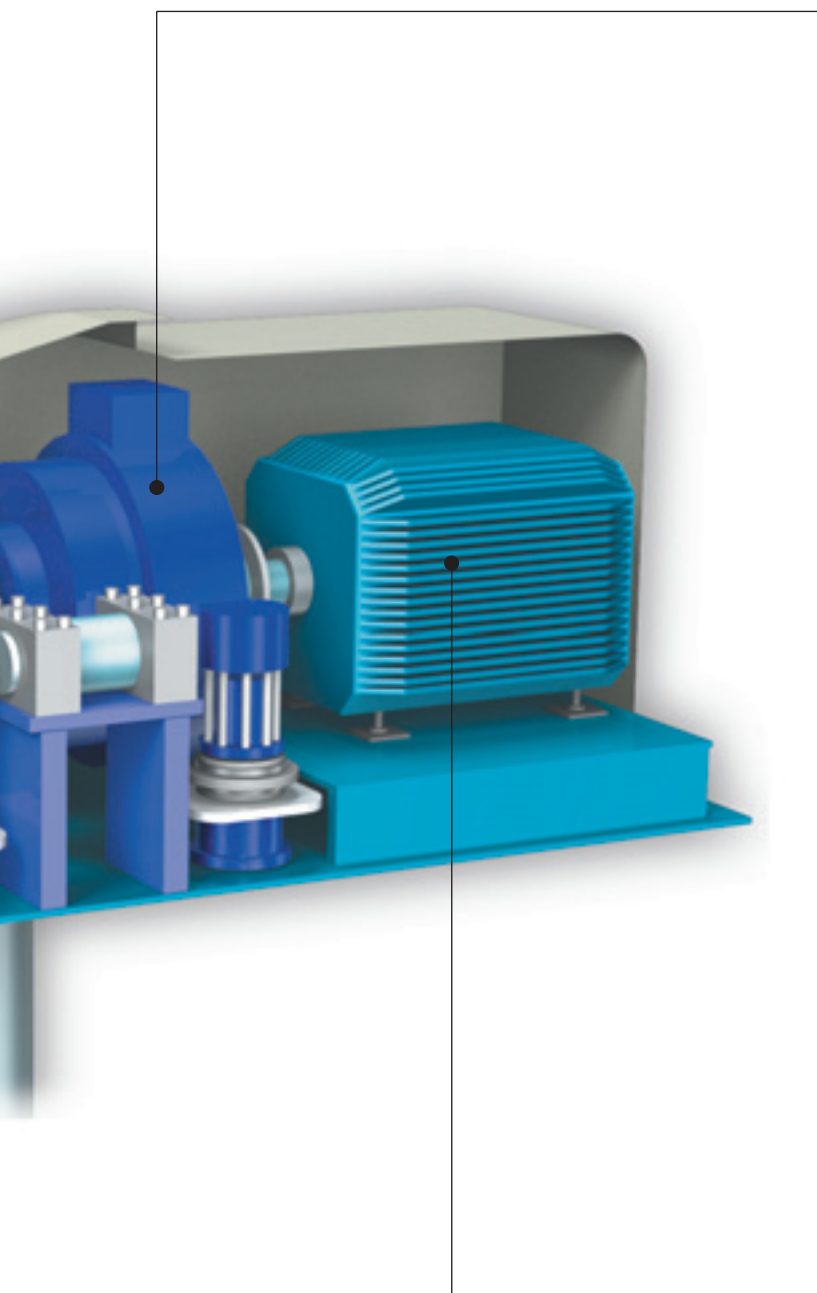


Angular Contact Ball Bearings for Yaw Gearbox
減速機用アンギュラ玉軸受



levels of reliability and long service life

ナセル



Gearbox 増速機

新設計：高剛性、滑りの少ない軸受

New design: The gearbox bearings offer higher rigidity and lower friction through reduced rolling element slippage.

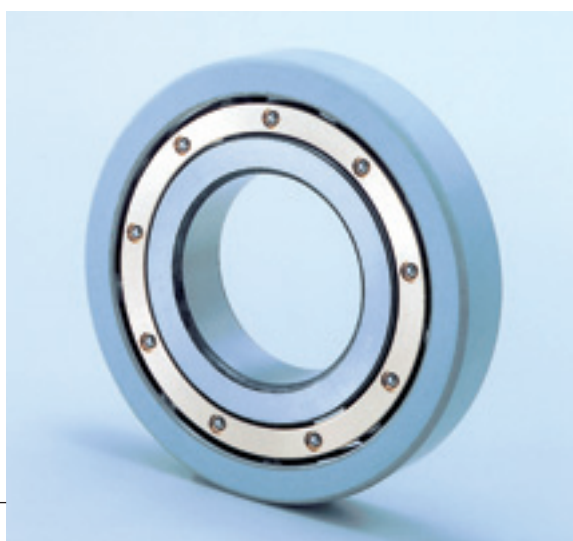


Cylindrical Roller Bearings for Gearbox
増速機用円筒ころ軸受

Generator 発電機

新開発：高い絶縁能力

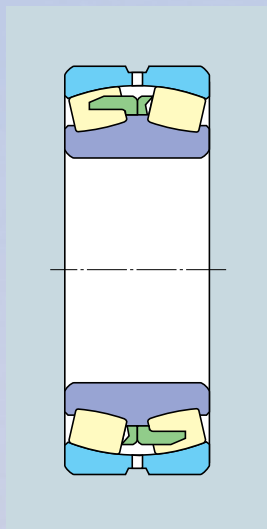
Newly-developed technique: The generator bearings are well insulated against electrical currents.



"MEGAOHM Series" メガオームシリーズ
Insulated Bearings for Generator
発電機用絶縁軸受

BEARINGS CHARACTERISTICS

Rotor shaft bearings 主軸用軸受



Recommended Bearing Type

Spherical roller bearings, Double row tapered roller bearings, Cylindrical roller bearings

Advantage of NTN Bearings

Rotor shaft bearings maintain excellent temperature stability by minimizing roller skew under variable load and speed conditions present in wind turbine applications.

1. Improved torque stability
2. Reduced fretting corrosion
3. Higher reliability and longer service life

NTN推奨軸受

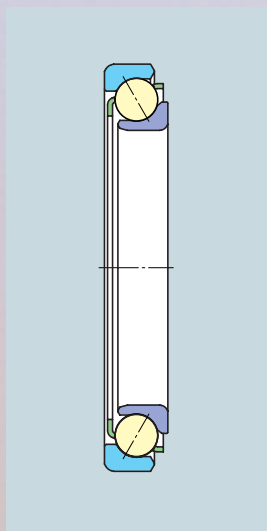
自動調心ころ軸受、複列円すいころ軸受、円筒ころ軸受が用いられます。

NTN軸受の特長

常に変動する風によって軸受の荷重と回転速度が変動する。このような変動状態でもころのスキューやチルトが少なく安定したころの動きにより温度上昇が低い軸受。

1. 安定したトルク性能
2. 耐フレット性能が良好
3. 長寿命で信頼性が高い軸受

Bearings for yaw gearbox 減速機用軸受



Recommended Bearing Type

Angular contact ball bearings, Tapered roller bearings, Needle roller bearings

Advantage of NTN Bearings

The yaw gearbox bearings are designed for higher capacity to endure repetitive loading.

1. Higher bearing capacity
2. Higher bearing rigidity
3. Compact design

NTN推奨軸受

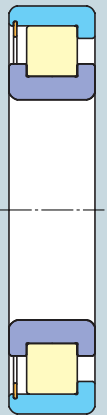
アンギュラ玉軸受、円すいころ軸受、ニードル軸受等が用いられます。

NTN軸受の特長

ヨー駆動用やピッチ駆動用軸受は、耐高荷重と繰り返し運転に強い設計を実現。

1. 高負荷容量の軸受
2. 高剛性軸受
3. コンパクトな設計

Bearings for gearbox 増速機用軸受



Recommended Bearing Type

Cylindrical roller bearings including full complement, Spherical roller bearings, Tapered roller bearings

Advantage of NTN Bearings

Higher bearing rigidity and reduced roller slippage results in lower bearing temperature over wide speed range.

New material and improved heat treatments increase bearing service life.

1. Optimum load distribution increases service life for planet bearings.
2. Reduced rolling element slippage at higher speeds results in lower friction.
3. Higher capacity and higher rigidity design for low speed applications.

NTN推奨軸受

円筒ころ軸受、総ころ軸受、自動調心ころ軸受、円すいころ軸受等が用いられます。

NTN軸受の特長

低速運転から高速運転まで軸受の温度上昇が低く、高剛性かつ軽荷重で滑りを生じにくい新設計を実現。また、材料と特殊処理により長寿命化を実現。

1. 最適荷重分布と長寿命な遊星軸受 (図1)
2. 滑りにくい高速軸用軸受
3. 高剛性、高負荷容量の低速軸用軸受

Operating life when lubricant mixed with foreign matter is used.

Figure shows the effect of foreign particles on the life of a small tapered roller bearing.

EA bearings display a life span of more than 5 times higher than standard carburized bearings at all test conditions.

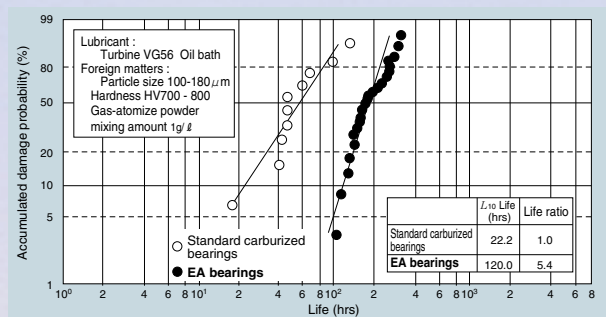
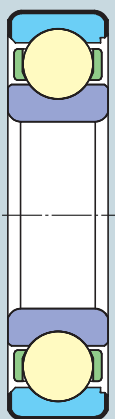


Fig.1

Bearings for generator 発電機用軸受



Recommended Bearing Type

Ball bearings, Cylindrical roller bearings

Advantage of NTN Bearings

The newly developed "MEGAOHM Series" bearings prevent electrolytic corrosion.

This bearing has special ceramic coating on the outer surface and side faces of the outer ring to protect the bearing from external stray currents.

1. Higher insulation against electrical currents
2. Insulation Resistance $\geq 100M\Omega$, Dielectric Breakdown Voltage $\geq 2kV$
3. Possible seal or shield with bearings

NTN推奨軸受

ボールベアリング、円筒ころ軸受等が用いられます。

NTN軸受の特長

軸受内部の電流通過によるスパーク現象 (電食) を生じにくいセラミックをコーティングした「メガオームシリーズ」絶縁軸受を開発。

1. 高い絶縁性能
2. 絶縁抵抗値: $100M\Omega$ 以上、絶縁破壊電圧: $2kV$ 以上
3. シール、シールド対応可能