



一種新型被動式垂直軸磁懸浮系統(APMBS) A Novel Vertical Axial Passive Magnetic Bearing System (APMBS)

一種低振動、低摩擦和低維修成本的垂直軸向支撐科技
A low vibration dampening, low friction and low maintenance cost technology for vertical axial bearings

專利申請編號及國家: 201110327717.3(中國)

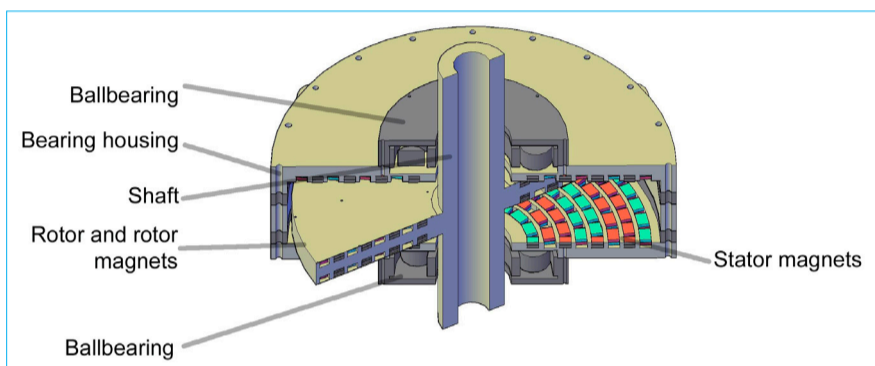
特色與優點

該新型磁懸浮軸承能給任何需要垂直軸的機械提供垂直軸向的支撐，并具有低摩擦和低維修成本的特點。

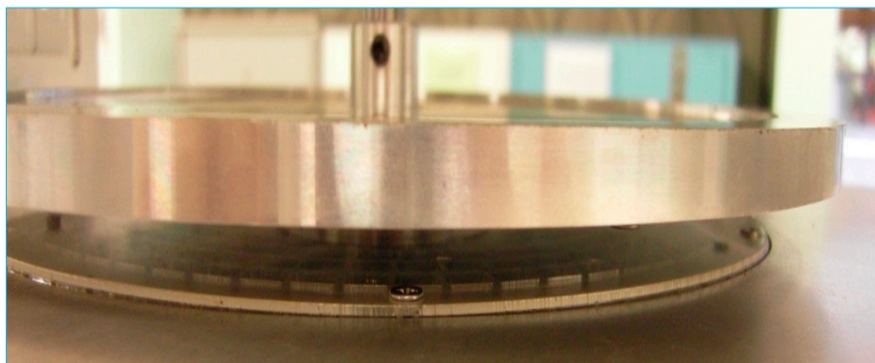
應用

本新型軸承系統不僅可以應用於垂直軸風力發電機(VAWTs)中，還能應用於其他旋轉設備如飛輪中。這些設備將從本系統的應用中受益匪淺。

本發明涉及一種被動式垂直軸磁懸浮系統(APMBS)。由於該系統具有低振動、低摩擦和低維修成本的特性，它最適合於應用在城市垂直軸風力發電機(VAWTs)中。本創新發明乃特別為將傳導到建築中的振動減少到最小而設計。在達到相同高可靠性垂直支撐的前提下，該發明所使用的永磁體軸承比傳統懸浮系統更加簡單和低廉。許多現有的懸浮系統採用環形磁體來提供懸浮力。但是，由於這種磁體很難產生均勻的磁場，環形磁體的大小就受到限制。然而，本新型系統由排列於軸承旋轉方向的小方塊磁體組成。連同所使用的金屬薄片，本發明引進了一種獨特的磁體排列位置，從而使本磁懸浮系統成為一種嶄新的先進產品。該產品能使磁場均勻化並增強磁場，它也能防止磁體的老化。



磁力軸承截面圖
Section view of the magnetic bearing



磁懸浮軸承支撐下定子與轉子之間的空氣層
The air gap between the rotor and the stator due to magnetic bearing support

This novel vertical axial passive magnetic bearing system is best suited for vertical axis wind turbines (VAWTs) at inner city locations due to its vibration dampening character, low friction and low maintenance cost. This special Axial Passive Magnetic Bearing System (APMBS) was developed specifically to minimize the transmission of vibrations to buildings. This permanent magnetic bearing is much cheaper and simpler than traditional magnetic bearing systems for achieving highly reliable vertical supporting functions. Many current magnetic bearing systems adopt ring magnets to supply magnetic levitation force, but the size of the ring magnets is limited because of the difficulty for charging the magnet evenly to produce a uniform magnetic field. However, this new system consists of small cuboidal magnets aligned along the rotation path of the bearing. Introducing a unique configuration of the locations of the magnets, in conjunction with a thin mild steel sheet, has made this novel magnetic bearing an advanced new product, which was able to unify and strengthen the magnetic field and protect the magnets from aging.

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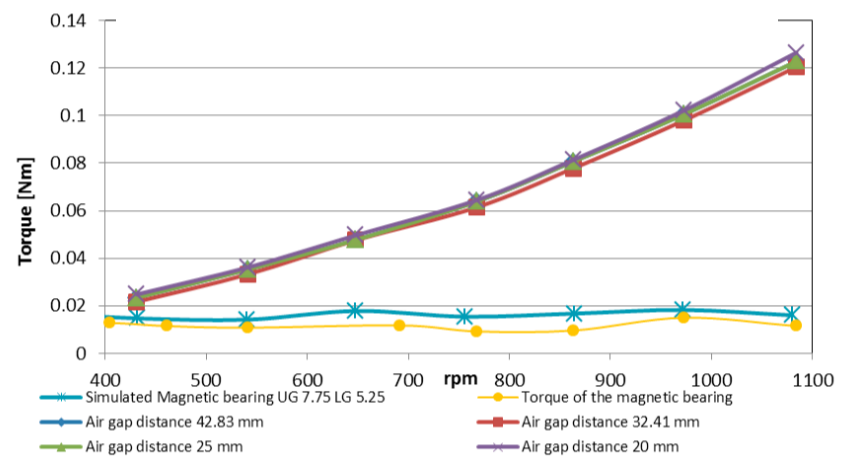
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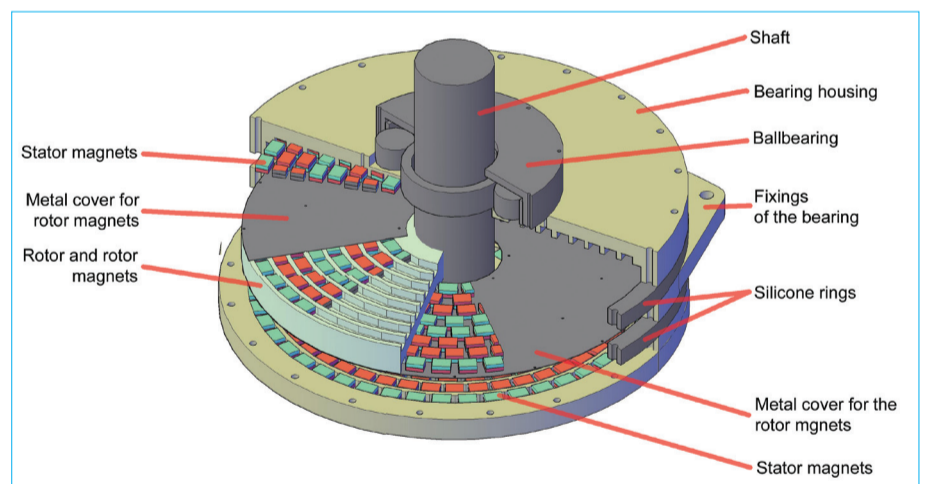
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在不同氣穴下測得的磁力軸承的扭矩
Measured torque of the magnetic bearings at different air-gaps



新型磁力軸承示意圖
Explanatory drawing of the novel magnetic bearing

Patent Application No.: 201110327717.3(China)

Special Feature and Advantage

This novel magnetic bearing can provide vertical axial support with low vibration dampening, low friction and low maintenance cost for higher efficiency of any machine which needs vertical axial bearings.

Application

This innovative bearing system can not only be applied to the vertical axis wind turbines (VAWTs), but also to other rotating devices like flywheels, which can benefit greatly from such a bearing system.



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