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磁悬浮高速离心鼓风机

Magnetic levitation
High speed centrifugal blower

山东华东风机有限公司
SHANDONG HUADONG BLOWER CO.,LTD.

Company introduction
企业简介

山东华东风机有限公司，位于风景秀丽的章丘市绣惠太平工业园。南靠胶济铁路章丘站，北临济青高速章丘出口仅 600 米，占地面积 40000 平方米，是一家集专业精密机械制造及优秀售后服务于一体的自动化机械企业。

公司最早成立于二十世纪九十年代末，企业发展至今，以现代化科学管理模式，依托国内风机行业知名专家及名牌大学，引用精益求精的工艺技术，配以先进的生产设备及严格的检测手段，坚持“视质量为企业生存之本”的创业思想作为博得市场的先决条件，全面赢得客户的一致好评和良好的社会信誉。目前公司已荣获“高新技术企业”“山东省隐形冠军培育企业”“章丘质量奖”“山东省专精特新企业”“先进党支部”“先进共产党员经营户”“文明诚信私营企业”“纳税十强先进单位”“守合同重信用企业”“山东省著名商标”“消费者满意单位”等多个荣誉称号，公司产品已通过 ISO9001 国际质量管理体系认证和欧盟 CE 认证。

公司主要产品：HMGB 磁悬浮高速电机、磁悬浮轴承、磁悬浮控制器、HMGB 磁悬浮高速离心鼓风机、HMGB 磁悬浮透平真空泵、HKB 系列空气悬浮高速电机、空气悬浮轴承、空气悬浮鼓风机、MVR 蒸汽压缩机、HDL、HDR（RR）二叶系列罗茨鼓风机、真空泵，HDSR、HDLH、HG 三叶系列罗茨鼓风机、真空泵。服务于环保电力、冶金、石油、化工、钢铁、水泥、矿山、隧道、风洞、水处理等行业。

公司奉行“顾客至上、质量第一”的销售服务宗旨，紧跟国家“一带一路”的伟大战略，助力中国梦。积极开拓国内外市场业务，给客户带去高效回报和优质服务，让客户认同，使客户满意。

Shandong Huadong Blower Co., Ltd locates at Taiping Industrial park, Xiuhui town, Zhangqiu City, Shandong Province, China, which is covering 40,000 square meters, close to Zhangqiu station of Jiaoji railway in the South and 600 meters away from Jiqing highway in the North. We have been an integrated automated machinery enterprises with professional precision machinery manufacturing and excellent aftersales service system.

Founded in the late 1990s, company develop so far, relying on the scientific management, cooperating with famous experts in blower industry and prestious university, equipped with latest manufacturering technology and strict inspection, insist the enterpreneurship culture of " quality is the basic of one enterprise", our company have won great reputation from our customers and society. Up to now, we have won many honors, like: "high-tech enterprise", "invisible champion cultivation enterprise of Shandong Province", " Zhangqiu Quality Praise", "Professional precision special advanced enterprise of Shandong Province", " advanced party branch", " advanced communist party operators", " civilized and intefrity private enterprise", "top 10 taxpayers", "keeping the contract and credit enterprise", " famous brand of Shandong Province", "customer satisfaction enterprise", and so on. Company has get ISO9001 international quality management system and CE certification.

Company product includes: HMGB maglev turbo blower, maglev bearing, maglev controller, HMGB high speed maglev centrifugal blower, HMGB maglev turbo vacuum pump, HKB series air suspension high speed motor, Air suspension bearing, Air suspension blower,MVR steam compressor, HDL/HDR(RR) two lobe roots blower & vacuum pump, HDSR/HDLH/HG series three lobe roots blower & vacuum pump. They serve for many industries, like environmental friendly electric power, metallurgy, oil, chemical, cement, mining, tunnel, wind tunnel, water treatment etc.

Pursuit of “Customer Supreme, Quality First" and following the "belt and road" in exploring the market both at home and abroad, we have brought customer superior returns and high quality service, which get the customer recognized and satisfied.

Key technology introduction
核心技术

磁悬浮高速离心鼓风机是将磁悬浮轴承技术和高速电机技术融入传统风机之中所形成的一种高效节能环保的新型鼓风机，具有结构简单、高效智能、一体化、操作维护简单、运行费用低的显著优点，可广泛应用于污水处理（市政、工业及其他）、物料输送、食品医药、纺织印染、皮革造纸、玻璃制造、钢铁冶金、烟气脱硫等项目中，节能效果显著。

High speed magnetic levitation centrifugal blower is one new type blower using magnetic levitation bearing technology and high speed motor technology on the basic of traditional blower. It is in simple blower structure, high efficiency, intelligent, integration, easily operation and maintenance, low operation cost. It could be widely used in waste water treatment(municipla, industrial and others), pneumatic conveying, food, medicine, textile, printing, leather paper, glass production, steel metallurgy, gas desulfurization, and so on, better performance in energy saving.

磁悬浮轴承

- 无磨损 / 无需润滑，可实现高速运转。
- 可监控转子状态，可监控轴承状态。
- 无需润滑，减少外壳尺寸和重量。
- 半永久性寿命，无需维护。
- 采用 5 自由度主动磁悬浮轴承技术，利用电磁力实现转子悬浮。

Magnetic bearing

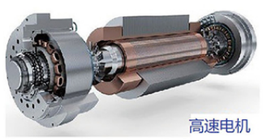
- No wear / lubrication for high speed operation.
- Monitor rotor status and bearing status.
- No lubrication required, reducing case size and weight.
- Semi-permanent life without maintenance.
- Adopt 5 DOF active magnetic levitation bearing technology to realize rotor suspension by electromagnetic force.

大功率高速永磁同步电机

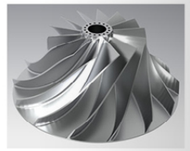
- 采用高速大功率永磁同步电机。
- 电机体积小，重量轻，功率密度高。
- 电机转速高，最高可达 60000 转 / 分钟。
- 可实现无级调速控制。
- 电机转子和叶轮耦合，减少中间耗能，运行故障率低，传动效率高。

High power high speed permanent magnet synchronous motor

- High speed and high power permanent magnet synchronous motor.
- Small motor size, light weight and high power density.
- High motor rotary speed, up to 60,000 rpm.
- Can achieve stepless speed control.
- Motor rotor and impeller are coupled, reducing intermediate energy consumption, low operating failure rate and high transmission efficiency.



高速电机



高效离心叶轮

- 采用三元流动理论设计及参数优化，使叶轮效率最大化，工作区域广。
- 离心叶轮材质采用高强度锻铝或钛合金，抗变形能力强。
- 经五轴数控加工中心精密加工而成，防腐性能好。
- 我们设计的每一个型号的叶轮都经过长期的台架实验，确保其气动性能高效可靠，叶轮多变效率可达 85%，并通过 115% 超速试验测试，采用变频调节方式，取消了导叶片调节，启动电流更小，鼓风机的可调范围更宽。

High-efficiency centrifugal impeller

- Adopt ternary flow theory design and parameter optimization to maximize impeller efficiency and wide working area.
- Centrifugal impeller is made of high-strength forged aluminum or titanium alloy, which has strong resistance to deformation.
- Accurately processed by a five-axis CNC machining center, with good corrosion resistance.
- The impeller of each model we designed has undergone long-term bench tests to ensure that its aerodynamic performance is efficient and reliable. The variable efficiency of the impeller can reach 85%, and it has passed 115% overspeed test. It adopts variable frequency adjustment to eliminate the guide blade adjustment , Smaller starting current, wider adjustable range of blower

Working theory
工作原理

磁悬浮高速离心鼓风机采用了高速永磁同步电机的直驱结构，将离心叶轮和电机驱动一体化集成设计，它通过内置的位移传感器实时检测转子轴的振动及空间间隙，将得到的信号送入磁悬浮轴承控制器进行调理、解析、运算，产生控制电流，再将该电流输入磁轴承绕转线圈，产生电磁力，从而实现转子轴的悬浮。

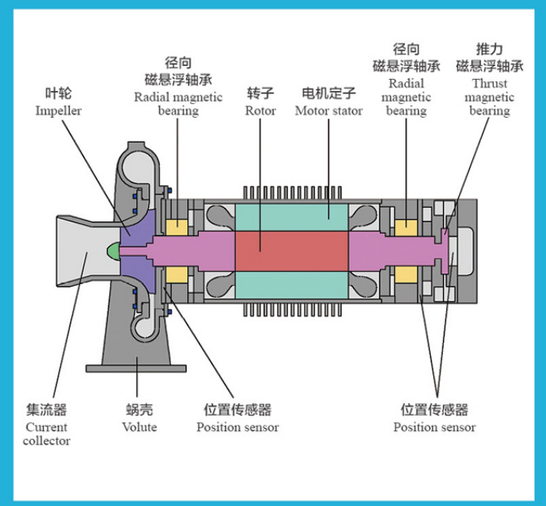
永磁同步电机的主要功能是驱动转子轴的旋转，它通过变频器产生频率可控的电流，将此电流输入电机定子产生的旋转磁场，带动转子轴高速旋转。

风机的主要功能是实现鼓风，随转子轴一同做高速旋转的叶轮带动空气，对空气做功，空气从蜗壳的进气口集流器进入，空气在蜗壳的导向与增压作用下成为具有一定流速与压力的气体，最后从蜗壳的出气口鼓出，实现一定压力和流量气体的输送。

Magnetive levitation centrifugal blower uses the dirct driving structure of high rotary speed permanent magnet motor, designed together with centrifugal impeller and motor driving. It monitors the vibration of shaft and space gap by the motion detector inside. Then it would transfer the signal to the magnetive levitation bearing controlor to adjust, parsing, calculation, and producing controlling current, to transport the current into the magnetive bearing winding coil, and producing electromagnetic force, then realize the levitation of shaft.

The main function of permanent magnet synchronous motor is to driving the rotary of shaft. It produce the frequency controllable currennt, and transport the current into the rotary magnetic field of motor stator, to drive the shaft rotary in a higher speed.

The blower's main function is to boosting air. The impeller, which whirling together with shaft, works on air. Air enters from the inlet collector of the volute, and the air becomes a gas with a certain flow rate and pressure under the guidance and pressurization of the volute, and finally blows out from the air outlet of the volute, to realize a gas delivery process with certain pressure and flow rate.



Performance features
性能特点

01

高效益与收益率

●采用自主设计的高效离心叶轮＋高效永磁同步电机驱动。
●与容积式罗茨风机相比效率可提升 30%。
●与多级离心鼓风机相比效率可提升 20%。
●与齿轮增速单级离心鼓风机相比效率可提升 15%。

High efficiency and profitability

●Self-designed high-efficiency centrifugal impeller + high-efficiency permanent magnet synchronous motor drive.
●30% higher efficiency than volumetric roots fans.
●20% more efficient than multi-stage centrifugal blowers.
●15% higher efficiency compared to gear-speed single-stage centrifugal blowers.

02

无润滑油、无机械保养

●由于采用先进的磁悬浮轴承技术，省却了传统风机所必需的复杂的齿轮变速箱及油性轴承，所以做到了无润滑油、无机械保养，减少了废油等污染物排放降低使用成本，在各种生产工况下提高整个系统稳定性、可靠性。

No needs of lubricantion and mechanical maintenance

●Due to the use of advanced magnetic levitation bearing technology, the complicated gearboxes and oily bearings necessary for traditional fans are eliminated, so there is no lubricant, no mechanical maintenance, reduced emissions of waste oil and other pollutants, and reduced operating costs. Improve the stability and reliability of the entire system under production conditions

03

低振动、低噪音

●由于采用先进的磁悬浮轴承系统及一体式隔音罩，转动部件与机械系统无接触，无机械摩擦，运转稳定，振动很小，整机噪音低于 85 分贝。高效、宁静、环保、安装灵活且简便。

Low vibration and noise level

●Due to the use of an advanced magnetic suspension bearing system and an integrated soundproof cover, the rotating parts have no contact with the mechanical system, no mechanical friction, stable operation, low vibration, and the whole machine noise is less than 85 decibels. Efficient, quiet, environmentally friendly, flexible and easy to install.

04

易安装、易维护

●磁悬浮高速离心鼓风机重量轻、体积小、外观漂亮、触摸屏控制、操作简单。
●日常维护仅需要更换空气过滤器，方便简单，节约了设备维护成本。

Easy to installation and maintenance

●Magnetic levitation high-speed centrifugal blower is light weight, small size, beautiful appearance, touch screen control, easy operation.
●Routine maintenance only needs to replace the air filter, which is convenient and simple, saving equipment maintenance costs.

Product series & specifications
产品系列及参数

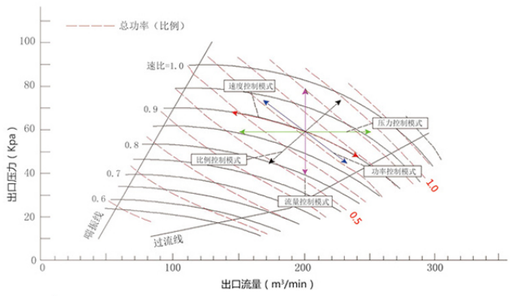
HMGB 200 - 200 L / B

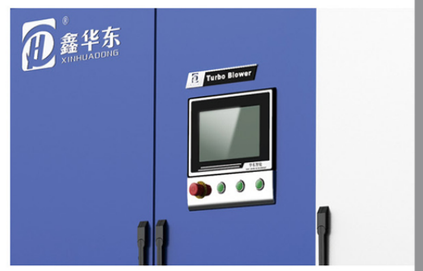
- 产品版本 Product series
- 叶轮型号 Impeller size
- 入口流量 Inlet flow rate
- 电机功率 Motor power
- 华东磁悬浮鼓风机 Huadong Magnetive levitation blower

以 HMGB200-200L/B 型号为例 -refer to Model: HMGB200-200L/B

型号 Model	流量 Suction Flow(m^3/min)	压力 pressure (Kpa)	功率 Motor Power(kW)
HMGB55	28~19	30~50	55
HMGB75	70~30	40~120	75
HMGB90	100~40	40~120	90
HMGB132	120~45	40~120	132
HMGB150	150~57	40~120	150
HMGB200	220~84	40~120	200
HMGB300	270~138	50~120	300
HMGB350	310~105	50~120	350
HMGB400	350~130	50~120	400

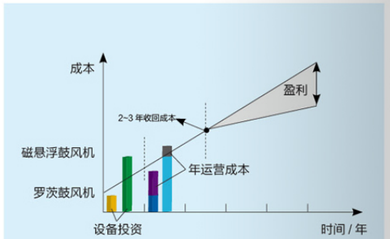
Blower operation mode
鼓风机运转模式





Comparisa magnetic levitation high speed centrifugal blower and roots blower
磁悬浮高速离心鼓风机与罗茨鼓风机的比较

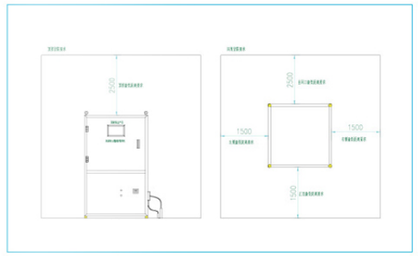
比较项 Compare item	磁悬浮离心鼓风机 Magnetive levitation centrifugal blower	罗茨鼓风机 Roots blower
风机输入功率 Blower input power	75kW	150kW
整机效率 Whole set efficiency	85%	55%
每日运行时间 Daily operation time	24h	24h
每年功率耗费 Power cost per year	648000kW/h	1296000kW/h
单台磁悬浮鼓风机预计每年可节约 30 万度电		

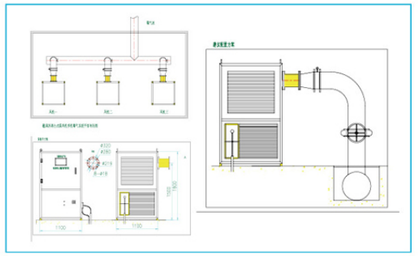


Technical performance Comparisa magnetic levitation centrifugal blower and geared centrifugal blower
磁悬浮高速离心鼓风机与齿轮增速离心鼓风机的技术性能比较

比较项 Comparison item	磁悬浮高速离心鼓风机 Magnetic levitation high-speed centrifugal blower	齿轮增速离心鼓风机 Gear increasing centrifugal blower
轴承类型 Bearing type	磁悬浮轴承 Magnetic bearing	润滑油轴承 Lubricant bearings
齿轮增速器 Gear booster	无 no	有 Have
润滑油循环系统 Lube oil circulation system	无需 No need	需要，维护成本高，产生危害物排放 Required, high maintenance costs, and hazardous emissions
轴承寿命 Bearing life	永久性 Permanent	十年 Ten years
机械损失 Mechanical loss	小于 1% 1%less than 1%	动力输送，10%-12% 与总功率成正比 Power transmission, 10% -12% is proportional to total power
电机 Motor	永磁同步电机（15000-40000rpm） Permanent magnet synchronous motor	交流感应电机（3000-4000rpm） AC induction motor
变频技术 Frequency conversion technology	采用 use	无 no
启动电流 Starting current	软启动，无冲击电流 Soft start, no inrush current	启动负荷高，启动电流为满负荷工作电流的 6-10 倍 Start up high, starting current is 6-10 times of full load working current
系统总绝对效率 Total system absolute efficiency	67%-75%	58%-69%
风量控制 Air volume control	由变频器控制电机转速 Motor speed controlled by inverter	机械方式带动调节进出口导叶开度 Mechanically driven adjustment of guide vane opening
噪声 Noise	80-85 分贝	85-120 分贝
维护 Maintain	定期更换空气过滤器 Change the air filter regularly	每三年检查维护轴承、润滑油循环系统及冷却系统等 Inspection and maintenance of bearings, lubricant circulation systems and cooling systems every three years

Blower working environment and installation diagram
鼓风机工作环境和安装示意图





鼓风机安装于一个相对干净和干燥的室内区域，并留有足够的空间来确保空气流通。请勿将鼓风机安装于室外或暴露在雨、雪和潮湿的环境中。若不具 备上述条件，请在安装前咨询我公司。

The blower is installed in a relatively clean and dry indoor area with sufficient space to ensure air circulation. Do not install the blower outdoors or exposed to rain, snow, and humidity. If the above conditions are not available, please consult our company before installation.

01 磁悬浮离心式鼓风机的推荐运行环境温度为 -10℃ ~ 45℃。 如果环境温度始终低于 0℃，请在鼓风机房增加供暖设备；如果环境 温度始终高于 35℃，请务必加强鼓风机房的通风，保证室内热量的散发；

The recommended operating ambient temperature of the magnetic levitation centrifugal blower is -10 ℃ ~ 45 ℃ . If the ambient temperature is always lower than 0 ℃ , please add heating equipment in the blower room; if the ambient temperature is always higher than 35 ° C, be sure to strengthen the ventilation of the blower room to ensure the indoor heat dissipation;

02 受制于电子元器件及流体部件性能，推荐将鼓风机安装于海拔小于 1000 米的地区。如果不得不安装于海拔大于 1000 米的区域，请在安装前咨询我公司工程师；

Subject to the performance of electronic components and fluid components, it is recommended to install the blower at an altitude of less than 1000 meters. If you have to install in an area with an altitude of more than 1000 meters, please consult our engineers before installation;

03 为保证鼓风机可靠工作及安装、维护与保养的方便性，鼓风机四周应有一 定的空间，推荐最小的预留空间范围见图 ，建议在此基础上适当的增加鼓 风机房的面积，可降低房间回声

In order to ensure the reliable operation of the blower and the convenience of installation and maintenance, there should be a certain amount of space around the blower. The recommended minimum reserved space is shown in the figure. It is recommended that the area of the blower room be appropriately increased to reduce Room echo.

04 鼓风机应尽量安装在洁净的场所，灰尘多会缩短入口过滤器的使用寿命， 导致电机发热严重或过滤器频繁更换

The blower should be installed in a place as clean as possible. The dust will shorten the service life of the inlet filter, which will cause the motor to generate severe heat or the filter to be replaced frequently

05 鼓风机应安装在湿度低的场所，湿度大将会增加电子元器件发生故障的概率；

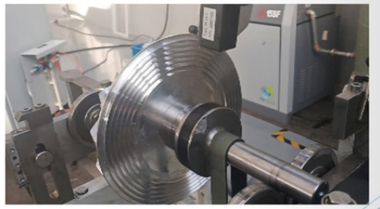
The blower should be installed in a place with low humidity. High humidity will increase the probability of failure of electronic components.

Processing and testing equipment
加工检测设备



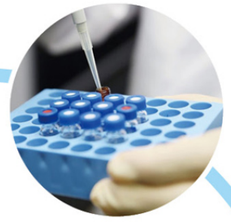






Application field
应用领域

污水处理厂
Waste water treatment



生物医药业
Biomedicine

污水，石油、冶金、制药、煤炭、化工、纺织、印染、食品、水泥、电力行业。

waste water treatment, oil, metallurgy, medicine, coal, chemical, textile, printing, food, cement, electric power.

广泛用于各个行业的曝气，增压，气体输送，烘干、萃取、净化、真空包装、溶液回收、气相分离等工艺。

widely used in differrent industries, for aeration, pressure rising, pneumatic conveying, drying, Extraction and purification, vacuum pressure package, Solution recovery, gas phase separation and other processes.

玻璃制造业
Glass producing

热电行业
Thermal power

纺织印染业
Textile

钢铁冶金
Steel metallurgy