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磁悬浮高速离心压缩机
Maglev High-speed Turbo Air Compressor

鑫华东
XINHUADONG

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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，成立于 2010 年，自 2007 从事于鼓风机业务，位于山东省济南市章丘区，注册资金一亿元，占地面积 60000 平方米，45000 平方米的标准厂房，100 余台数控加工中心设备。现拥有职工 200 余人，拥有二十人以上的博士、硕士研发团队。
主要产品：HMGB 磁悬浮高速电机、磁悬浮轴承及轴承控制系统、HMGB 磁悬浮高速离心鼓风机、HMGB 磁悬浮透平真空泵、HMC 磁悬浮空压机、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、HDGR、HDR 二叶系列罗茨鼓风机，HDSR、HDLH、HG 三叶系列罗茨鼓风机，HD 系列回转式鼓风机。
目前我单位已荣获“高新技术企业”“山东省专精特新企业”“山东省著名商标”“山东省知名品牌”“山东省知名产品”“山东省瞪羚企业”“山东省隐形冠军企业”“济南市瞪羚企业”“济南市绿色工厂”“济南市绿色低碳技术成果目录”“济南优势工业产品目录”“章丘质量奖组织奖”“章丘质量奖个人奖”“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”“消费者满意单位”“优秀企业家亩均税收贡献奖”“中国石化行业合格供应商”等多个荣誉称号，拥有 60 多项国家专利，公司产品已通过 ISO9001 国际质量管理体系认证、ISO24001 环境管理体系认证、ISO45001 职业健康安全管理体系认证、两化融合管理体系评定证书和欧盟 CE 认证，磁悬浮系列产品入选国家工业节能装备推荐目录和能效之星装备产品目录。

Shandong Huadong Blower Co., Ltd., established in 2010, has been engaged in blower business since 2007, located in Zhangqiu District, Jinan City, Shandong Province, with a registered capital of 100 million yuan, covering an area of 60,000 square meters, 45,000 square meters of standard workshop and more than 100 sets of CNC machining center equipment. We have been an integrated automated machinery enterprises with professional precision machinery manufacturing and excellent after-sales service, with more than 200 employees and more than 20 doctoral and master R&D teams.
Company product includes: HMGB maglev turbo blower, maglev bearing, maglev controller, HMGB high speed maglev centrifugal blower, HMGB maglev turbo vacuum pump,HMC Maglev High-speed Turbo Air Compressor, 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.
Up to now, our company has got " advanced technology enterprise", "Shandong Province professional-proficient-special-advanced enterprise", "Shandong Province famous logo", "Shandong Province famous brand", "Shandong Province famous product", " Shandong Province gazelle enterprise", "Ji'nan City gazelle enterprise", " Ji'nan City green factory", "ji'nan city green low-carbon technology achievements catalog", "Ji'nan advanced industrial product catalog", "Zhangqiu Quality Award Organization Award", "Zhang Qiu Quality Award Individual Award", "Advanced Party Branch", "Advanced Communist Party Member Operator", "Civilized and Honest Private Enterprise", "Top Ten Advanced Taxpayers", "Contract abiding and Credit worthy Enterprise", "Consumer Satisfaction Unit" and "Outstanding Entrepreneur Tax Contribution Award per mu", "Qualified Supplier of Sinopec Industry" and other honorary titles,With more than 60 national patents, the company's products have passed the ISO9001 international quality management system Certification, ISO24001 environmental management system certification, ISO45001 occupational health and safety management System certification, evaluation certificate of integration management system and EU CE certification, magnetic suspension series, The products have been selected into the national recommended catalogue of industrial energy-saving equipment and the catalogue of energy efficiency star equipment.

Key technology introduction
核心技术

磁悬浮高速离心空气压缩机是将磁悬浮轴承技术和高速电机技术融入传统压缩机之中所形成的一种高效节能环保的新型压缩机，具有无油、无摩擦、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，可广泛应用于制药、纺织、玻璃、电力、矿产、食品、发酵、造纸等行业，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.

Working theory
工作原理

磁悬浮高速离心空气压缩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。

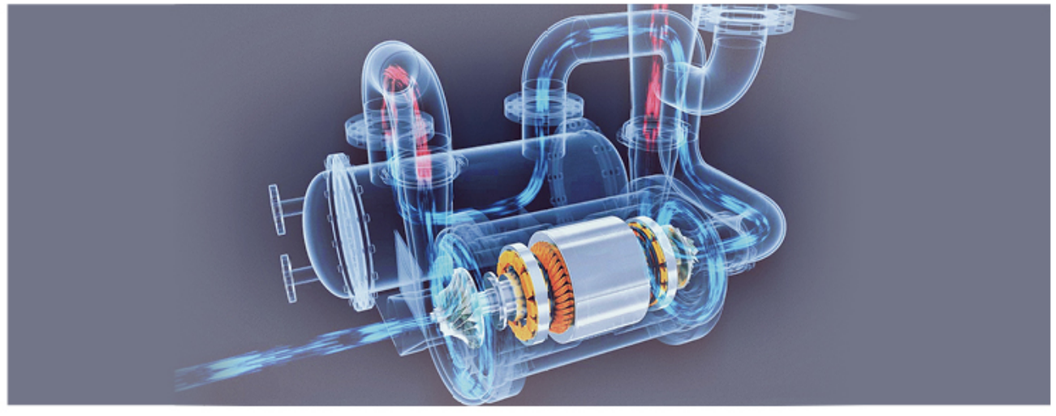
永磁同步电机的主要功能是驱动转子轴的旋转，它通过变频器产生频率可控的电流，将此电流输入电机定子产生的旋转磁场，带动转子轴高速旋转。

高效离心叶轮采用航空气动设计，由永磁同步电机直接驱动，高速旋转下的叶轮产生动能和压力势能，使气体进入一级压缩，经中间冷却器降温后进入二级压缩，从而提高机组效率，满足各种工况需求。

Maglev High-speed Turbo Air Compressor 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.

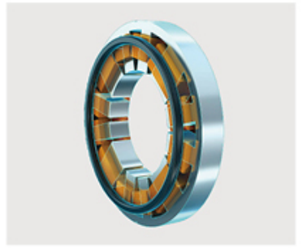
The blower's main function is to boosting air. The impeller, which whirling together with shaft, works on air. Air enters from the inlet collector of the volute, and the air becomes a gas with a certain flow rate and pressure under the guidance and pressurization of the volute, and finally blows out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



01 磁悬浮轴承 Magnetic bearing

●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。

●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.



02 大功率高速永磁同步电机 High power high speed permanent magnet synchronous motor

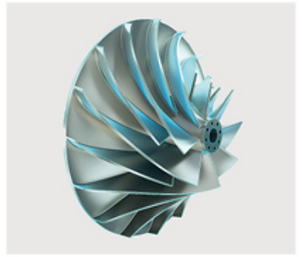
●采用高速大功率永磁同步电机。
●电机体积小，重量轻，功率密度高。
●电机转速高，最高可达 60000 转 / 分钟。
●可实现无级调速控制。
●电机转子和叶轮耦合，减少中间耗能，运行故障率低，传动效率高

●High 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.

03 高效离心叶轮 High-efficiency centrifugal impeller

●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，空压机的可调范围更宽。

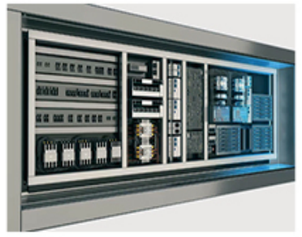
●Adopt ternary flow theory design and parameter optimization to maximize impeller efficiency and wide working area.
●Centrifugal impeller is made of high-strength forged aluminum or titanium alloy, which has strong resistance to deformation.
●Accurately processed by a five-axis CNC machining center, 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 air compressor.



04 智能控制系统 Intelligent control system

●公司自主研发的永磁同步电机专用高频率矢量控制变频器能够驱动 15-1000kW 功率范围电机高速稳定工作，并保持较高的工作效率。启动电流小，变频器效率大于 97%，转速控制精确。
●拥有多重检测传感技术和存储、记忆和远程采集控制功能，能够实时发送检测数据到指定手机或电脑，实现运行状态全过程实时远程监控。

●The high frequency vector control inverter for permanent magnet synchronous motor independently developed by the company can drive the 15-1000kW power range motor to work at high speed and stability, and maintain high working efficiency. Starting current is small, the frequency converter efficiency is greater than 97%, and the speed control is accurate.
●Has multiple detection and sensing technology and storage, memory and remote acquisition control functions, can send detection data to the designated mobile phone or computer, to realize real-time remote monitoring of the whole process of running state.



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。
●与传统压缩机相比效率可提升 30%。

High efficiency and profitability
●Self-designed high-efficiency centrifugal impeller + high-efficiency permanent magnet synchronous motor drive.
●30% higher efficiency than volumetric roots fans.

02
无润滑油、无机械保养
●由于采用先进的磁悬浮轴承技术，省却了传统压缩机所必需的复杂的齿轮变速箱及油性轴承，所以做到了 100% 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 100% 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
●磁悬浮高速离心空气压缩机重量轻、体积小、外观漂亮、触摸屏控制、操作简单。
●无润滑油，完全实现 100% 无油出风，减少后续处理设备的负担。

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

HMC 2.5 - 200 B

- B：产品版本 Product series
- 200：电机功率 Motor power
- 2.5：压力 Pressure
- HMC：华东磁悬浮空压机 Huadong Maglev Turbo Air Compressor

以 HMC2.5-200B 型号为例 -refer to Model：HMC2.5-200B

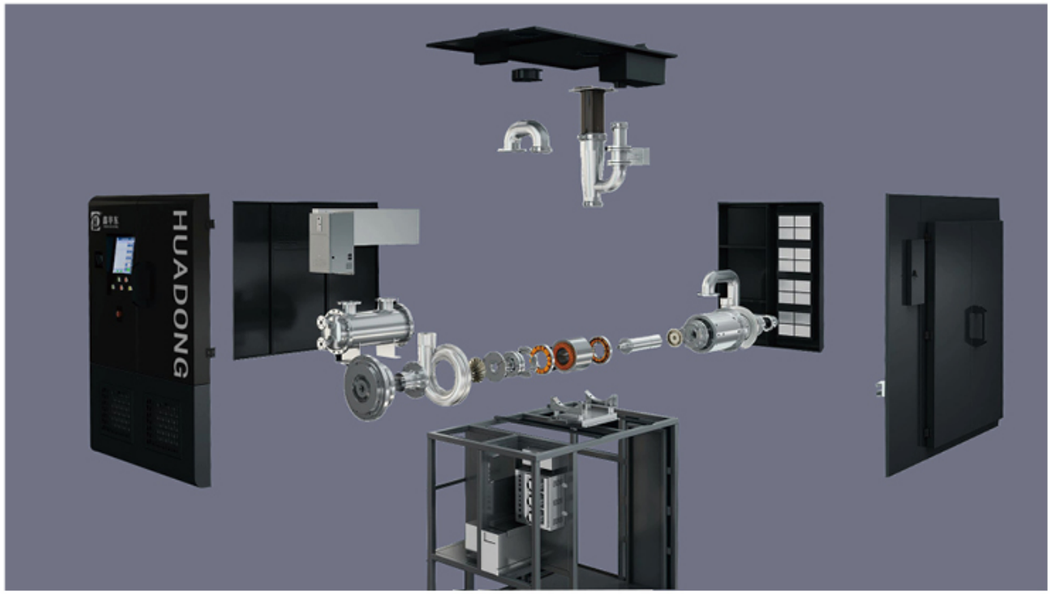
型号	HMC2.0-110	HMC3.0-110	HMC2.0-132	HMC2.0-160	HMC3.0-160
额定流量 m^3/min	43.2	33.2	42	60.3	46.3
额定压力 bar	2.0	3.0	2.0	2.0	3.0
压力范围 bar (G)	1.0-2.0	1.5-3.0	1.0-2.5	1.0-2.0	1.5-3.0
额定功率 kW	110	110	132	160	160

型号	HMC2.0-180	HMC3.0-180	HMC2.0-200	HMC2.0-200	HMC3.0-250
额定流量 m^3/min	60.8	47.9	65.2	52.8	56.2
额定压力 bar	2.0	3.0	2.0	3.0	5.0
压力范围 bar (G)	1.0-2.5	1.5-3.5	1.0-2.5	1.5-3.5	2.0-5.0
额定功率 kW	180	180	200	200	250

Technical performance comparison with traditional air compressor

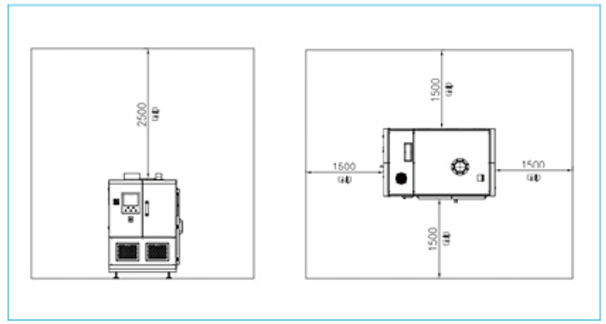
磁悬浮高速离心空气压缩机与传统空气压缩机的技术性能比较

类型 Type	活塞压缩机 Piston compressor	螺杆压缩机 Screw compressor	传统离心压缩机 Conventional centrifugal compressor	磁悬浮离心压缩机 Maglev centrifugal compressor
传动方式 Drive mode	活塞式 Piston	螺杆式 Screw	齿轮式 Gear	直联式 Direct connection
润滑油 Lubrication oil	有 Need	有 Need	有 Need	100% 无油 100% oil free
耐久性 / 寿命 Service life	需定期更换 Need to change regularly	需定期更换 Need to change regularly	需定期更换 Need to change regularly	大于 20 年 More than 20 years
维护保养 Maintenance	需定期检查 Need check regularly	需定期检查 Need check regularly	需定期检查 Need check regularly	无需维护保养 Don't need maintenance
噪音 Noise	> 90dB	> 90dB	> 90dB	⩽ 85dB
振动值 Vibration	震动大 Big	震动大 Big	震动大 Big	⩽ 1mm



Working environment and installation diagram of air compressor

空压机工作环境和安装示意图



空压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。请勿将空压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 磁悬浮离心式空气压缩机的推荐运行环境温度为 −10℃ ~ 45℃。如果环境温度始终低于 0℃，请在机房内增加供暖设备；如果环境温度始终高于 35℃，请务必加强机房的通风，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℃, 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 空压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 空压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.

Company view
企业实景

Application field
应用领域

产品主要应用于石化、矿山、电力、纺织、电子、食品、医药、造纸等行业。

Products are mainly used in petrochemical, mining, electric power, textile, electronics, food, medicine, paper and other industries.