Motor STAR 新四达

磨机设备

永磁直驱电机解决方案

GRINDING EQUIPMENT

PERMANENT MAGNET DIRECT DRIVE MOTOR SOLUTION

河北新四达电机股份有限公司，创建于2005年，总注册资金10631万，占地160余亩，是国内最早从事专业设计研发、生产、销售服务为一体的永磁直驱电机及特种重型电机于一体的高科技企业。创建以来始终专注于为工业用户提供高效节能的重型特种电机及控制系统成套解决方案。

Hebei Xinshida Motor Co., LTD., founded in 2005, with a total registered capital of 106.31 million, covers an area of more than 160 acres, is the first high-tech enterprise engaged in professional design, development, production, sales and service as one of the permanent magnet direct drive motor and special heavy motor in one. Since its establishment, it has always focused on providing industrial users with high-efficiency and energy-saving heavy-duty special motor and control system complete solutions.

30000 m^2

总注册资金10631万，30000m^2专生产面积

30000m^2 production area

200 +

各种专利及著作权200余项

Over 200 patents and copyrights of various kinds

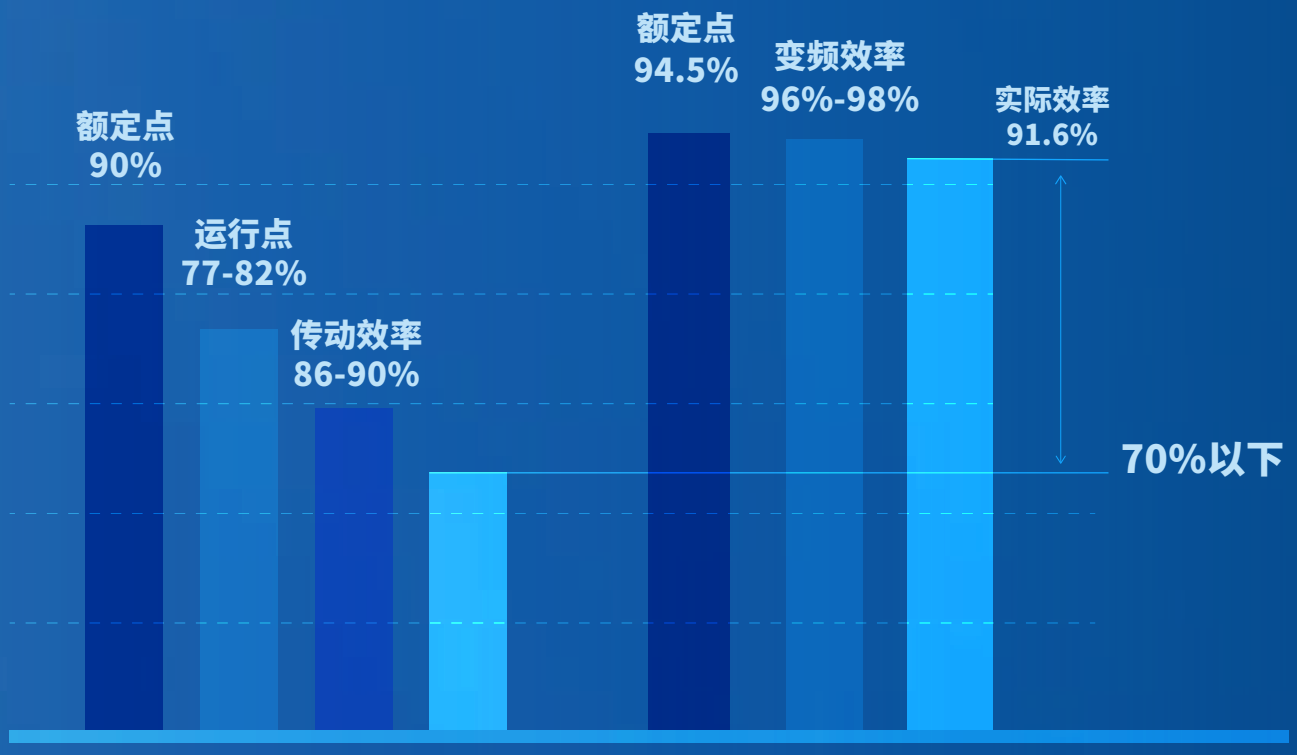
该系列是专为立式磨机研发的低速大扭矩永磁直驱电机
用于煤矿、水泥、电力等，如煤粉制备，矿物研磨等工况

This series is a low-speed high torque permanent magnet direct drive motor specially developed for vertical grinding machines
Used for grinding in the power industry, such as coal powder preparation, mineral grinding, and other working conditions

Motor STAR 新四达

TLFB

系列立式永磁直驱变频同步电机



系统效率对比图

System efficiency comparison diagram

永磁电机技术特点

Technicalcharacteristics of permanent magnet motor

节能

High efficiency and energy saving

具有高效率、高功率因数。在25-120%的负荷率范围内，可保持90%以上的运行效率。与传统的拖动方式相比，皮带机的整体效率大大提高。

With high efficiency, high power factor. In the range of 25-120% of the load rate, can maintain more than 90% of the operating efficiency. Compared with the traditional drag method, the overall efficiency of the belt machine is greatly improved.

智能管理

Intelligent management

随皮带机负载大小变化，以及永磁电机电压、电流温度等运行参数的反馈，通过智能变频控制，实现智能化管理。

With the change of the load size of the belt conveyor, as well as the feedback of the operating parameters of the permanent magnet motor such as voltage, current and temperature, intelligent management is realized through intelligent frequency conversion control.

大扭矩

Low speed, high torque

随皮带机负载大小变化，以及永磁电机电压、电流温度等运行参数的反馈，通过智能变频控制，实现智能化管理。

With the change of the load size of the belt conveyor, as well as the feedback of the operating parameters of the permanent magnet motor such as voltage, current and temperature, intelligent management is realized through intelligent frequency conversion control.

安全可靠

Safe and reliable

永磁同步电动机结构简单，材料性能稳定，过载倍数高;变频技术可靠成熟，应用广泛，矢量控制，保护齐全、安全可靠，基本免维护。

With the change of the load size of the belt conveyor, as well as the feedback of the operating parameters of the permanent magnet motor such as voltage, current and temperature, intelligent management is realized through intelligent frequency conversion control.

TLFB

系列立式永磁直驱变频同步电机

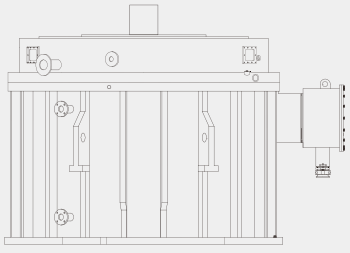
TLFB Series vertical permanent magnet direct drive variable frequency synchronous motor

产品介绍

Product introduction

该系列是专为立式磨机研发的低速大扭矩永磁直驱电机，其磁场由稀土永磁功能材料产生，因此其效率、功率因数与负载率的关系与异步电动机相比，具有明显的优势。
该产品的诞生可直接对原立磨系统进行改造。改造后，用低速大转矩永磁直驱立磨电机取代原来异步电机+减速机的驱动系统，永磁直驱电机可直接输出低转速大转矩。

This series is a low-speed high torque permanent magnet direct drive motor specially developed for vertical grinding machines. Its magnetic field is generated by rare earth permanent magnet functional materials, so its efficiency, power factor, and load rate have obvious advantages compared to asynchronous motors. The birth of this product can directly transform the original vertical grinding system. After the transformation, a low-speed high torque permanent magnet direct drive vertical grinding motor is used to replace the original asynchronous motor+reducer drive system. The permanent magnet direct drive motor can directly output low-speed high torque.



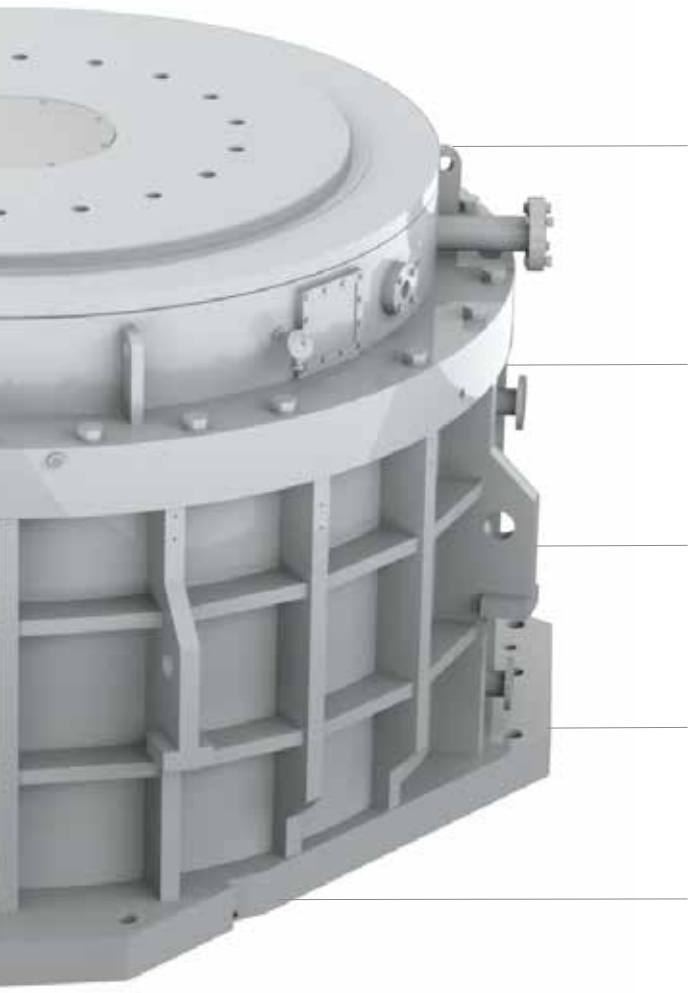
永磁电机参数

Permanent magnet machine parameter

额定电压 Rated voltage	：380V/690V/3.3kV/6kV/10kV		
额定功率 Rated power	：250~5500kW	冷却方式 Cooling mode	：水冷 water-cooling
额定转速 Rated speed	：0-36r/min	防护等级 Class of protection	：IP65
最大转矩 Maximum torque	：≤2.7	电机热分级 Thermal classification of machine	：H级 H Grade

永磁直驱系统优势

Advantages of permanent magnet direct drive system



符合煤粉制备环境防爆电气要求/符合一级安全标准化/
负荷电厂升负荷达标要求

Complies with explosion-proof electrical requirements for coal powder preparation environment/meets first level safety standardization/ Requirements for Load Boosting in Power Plants to Meet Standards

可自动检测煤粉颗粒细度与设备转速相匹配

Can automatically detect the fineness of coal powder particles and match the equipment speed

纯直驱设计，无需外接油站系统

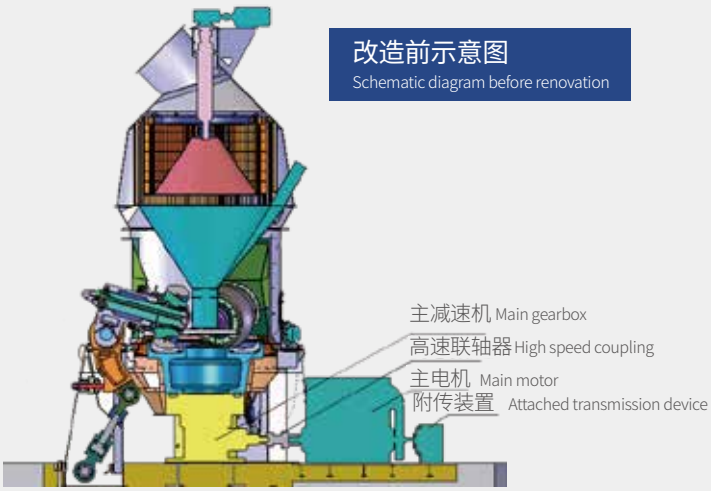
Pure direct drive design, no need for external oil station system

带料启动性能优越，重载柔性启停

Superior start performance with material, heavy load flexible start and stop

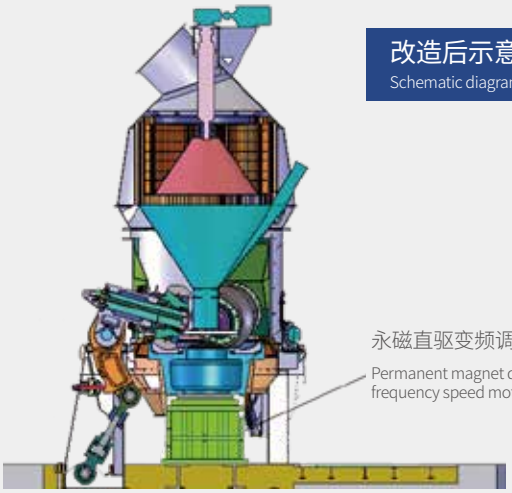
节能效率高 能效提升10%-20%

Energy saving efficiency and high energy efficiency increase by 10% -20%



改造前示意图

Schematic diagram before renovation



改造后示意图

Schematic diagram after renovation

技术优势

Technological advantage

高强度
加强筋

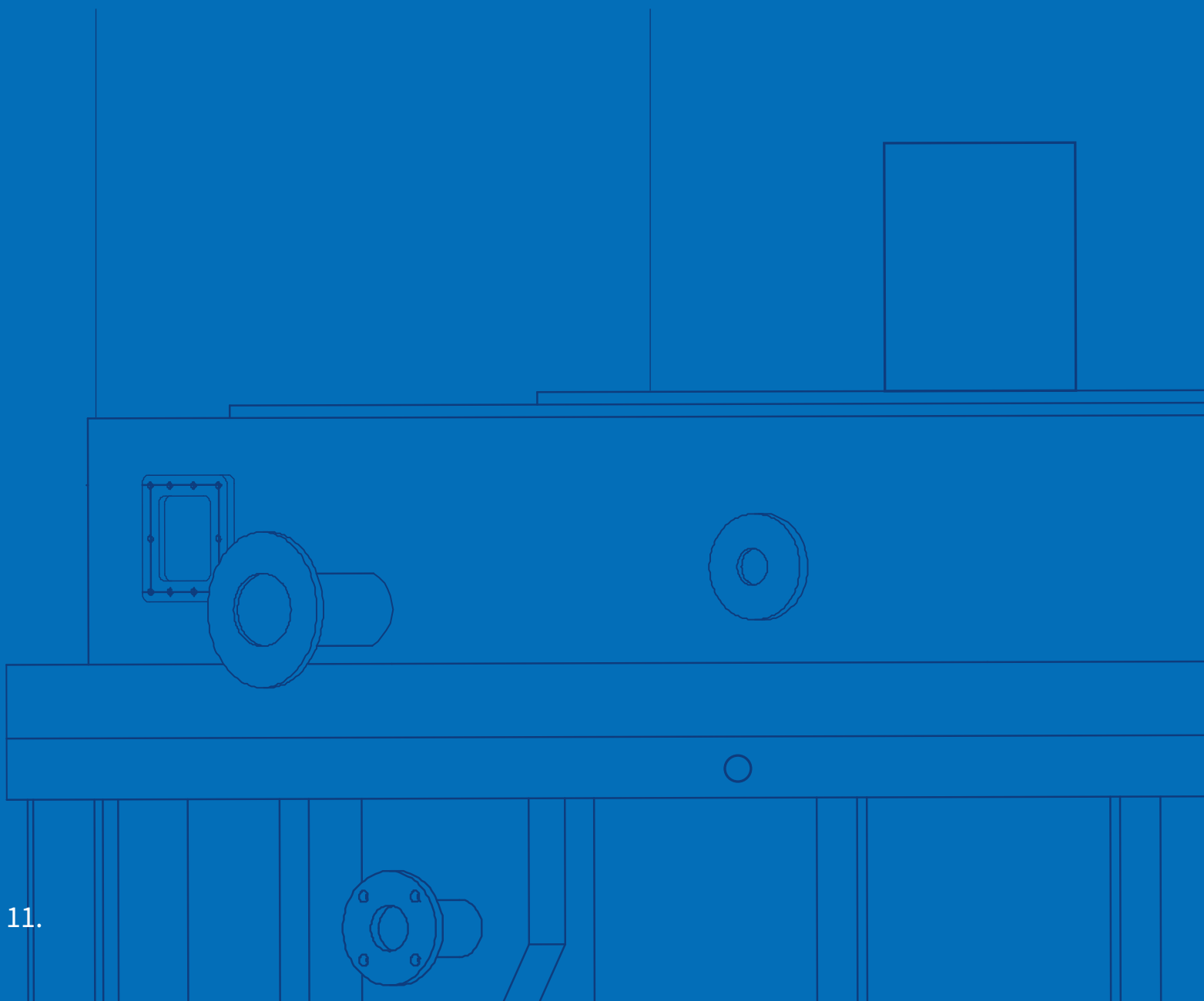
在电机的两侧端板与机壳壳体之间设置
了多条加强筋，保证了机壳的强度；

A number of reinforcing bars are arranged between the two end plates of the motor and the shell to ensure the strength of the shell.

优化转子
结构设计

采用转子模块设计，磨具制作周期短，成本低；
同时，顶部尖角设计形成不均匀气隙，优化了气隙磁场的波形。

The project adopts rotor module design, short abrasive production cycle and low cost; At the same time, the top Angle design forms an uneven air gap and optimizes the waveform of the air gap magnetic field.



气隙磁场
波形优化

采用了分布式短距绕组，大幅降低谐波。
转子外圆不均匀设计，使气隙波形接近于正弦波。

Distributed short-distance winding is adopted to greatly reduce harmonics. The non-uniform design of rotor outer circle makes the air gap waveform close to sine wave.

优化散热
水道设计

采用螺旋水道设计，在机壳外边面设置了多条
宽水道加强散热冷却效果、降低结垢造成的阻塞风险。

A spiral channel design is adopted, and a number of wide channels are arranged on the outer surface of the housing to enhance the cooling effect and reduce the risk of fouling.

设备选型表

TYFB系列粉尘防爆永磁直驱同步变频电机
Equipment selection table

规格型号	额定功率（kW）	电压（kV）	额定转速（r/min）	额定转矩（N.m）	最大转矩（倍数）	效率（%）
TLFB250	250	0.38/0.69	≤25-36	66319	≤2.7	≥94
TLFB315	315	0.38/0.69	≤25-36	83563	≤2.7	≥94
TLFB355	355	3.3	≤25-36	94174	≤2.7	≥94
TLFB400	400	3.3	≤25-36	106111	≤2.7	≥94
TLFB450	450	3.3	≤25-36	119375	≤2.7	≥94
TLFB500	500	3.3/6/10	≤25-36	132639	≤2.7	≥95
TLFB560	560	3.3/6/10	≤25-36	148556	≤2.7	≥95
TLFB630	630	3.3/6/10	≤25-36	167125	≤2.7	≥95
TLFB710	710	3.3/6/10	≤25-36	188347	≤2.7	≥95
TLFB800	800	3.3/6/10	≤25-36	212222	≤2.7	≥95
TLFB900	900	3.3/6/10	≤25-36	238750	≤2.7	≥95
TLFB1000	1000	3.3/6/10	≤25-36	265278	≤2.7	≥95
TLFB1120	1120	3.3/6/10	≤25-36	297111	≤2.7	≥95
TLFB1250	1250	3.3/6/10	≤25-36	331597	≤2.7	≥95
TLFB1600	1600	3.3/6/10	≤25-36	424444	≤2.7	≥95
TLFB1800	1800	3.3/6/10	≤25-36	477500	≤2.7	≥95
TLFB2000	2000	3.3/6/10	≤25-36	530556	≤2.7	≥95
TLFB2250	2250	6/10	≤25-36	596875	≤2.7	≥95
TLFB2500	2500	6/10	≤25-36	663194	≤2.7	≥95
TLFB3000	3000	6/10	≤25-36	795833	≤2.7	≥95
TLFB3150	3150	6/10	≤25-36	835625	≤2.7	≥95
TLFB3550	3550	6/10	≤25-36	941736	≤2.7	≥95
TLFB4000	4000	6/10	≤25-36	1061111	≤2.7	≥95
TLFB4500	4500	6/10	≤25-36	1193750	≤2.7	≥95
TLFB5000	5000	6/10	≤25-36	1326389	≤2.7	≥95
TLFB5500	5500	6/10	≤25-36	1459028	≤2.7	≥95

用户现场改造案例

User on-site renovation case

某电厂中速煤立磨现场应用

On site application of medium speed coal vertical mill in a power plant

改造现场 Renovation site

改造现场 Renovation site

用户现场改造案例

User on-site renovation case

国内某发电煤立磨现场应用

On site application of Lanxi power generation coal vertical mill

改造现场 Renovation site

改造现场 Renovation site

用户现场改造案例

User on-site renovation case

630kw煤立磨用户现场

User site of 630kw coal vertical mill in a certain power plant

改造现场 Renovation site

改造现场 Renovation site

TYFB

系列粉尘防爆永磁直驱同步变频电机

TYFB Series dust explosion-proof permanent magnet direct drive synchronous variable frequency motor

产品介绍

Product introduction

本产品是我公司针对低速、重载设备粉尘环境下使用需求开发的新型永磁直驱动同步电动机，转子采用永磁材料励磁，实现了低速大扭矩动力传送，采用变频器控制模式。在工信部发布的国家工业节能技术装备推荐目录2019其中，新四达电机的“TYFB系列新型球墨机直驱永磁同步电动机系统”被纳入“重点用能设备系统节能技术”。

This product is a new type of permanent magnet direct drive synchronous motor developed by our company for the use of low-speed and heavy-duty equipment in dusty environments. The rotor is excited by permanent magnet materials, achieving low-speed high torque power transmission and using frequency converter control mode. In the National Catalogue of Recommended Industrial Energy saving Technology and Equipment 2019 released by the Ministry of Industry and Information Technology, the "TYFB Series New Ductile Ink Machine Direct Drive Permanent Magnet Synchronous Motor System" of New Sida Electric has been included in the "Key Energy consuming Equipment System Energy saving Technology".

永磁电机参数

Permanent magnet machine parameter

按照方式 According to the method	：IMB3	冷却方式	Cooling method ：水冷
电压等级 Voltage level	：380V/6000V/10000V	智能检测	Intelligent detection ：温控保护、震动保护
防护等级 Protection level	：Ex tb A21 IP65 T135°C	功率因数	power factor ：≥0.97
效率 efficiency	：≥95%		

永磁直驱系统优势

Advantages of permanent magnet direct drive system

符合煤粉制备环境防爆电气要求/符合一级安全标准化审查要求缩小设备占地面积；

Meet the explosion-proof electrical requirements for coal powder preparation environment/comply with the first level safety standardization review requirements, and reduce the equipment footprint;

设备可靠性提高，根治漏油等因减速机、液耦故障带来的停机困扰

The shutdown caused by the failure of the reducer and the hydraulic coupling is completely solved

消除减速机自身传动效率损失效率下降问题

Eliminate the reducer's own transmission efficiency loss efficiency reduction problem

带料启动性能优越，重载柔性启停

Superior start performance with material, heavy load flexible start and stop

优化结构，获得更好的防水性能

Optimized structure for better water resistance

案例简析

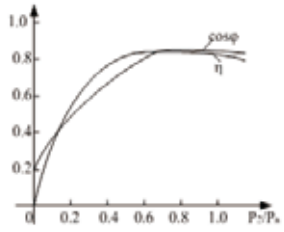
Case analysis

本次对宣化热电的石粉560kW球磨机进行改造升级。为了提高传动环节的效率，本次改造采用低速大转矩永磁同步电动机直接驱动小齿轮，带动大齿轮转动。

This time, the 560kW stone powder ball mill of Xuanhua Thermal Power will be renovated and upgraded. In order to improve the efficiency of the transmission process, this renovation adopts a low-speed high torque permanent magnet synchronous motor to directly drive the small gear and drive the large gear to rotate.

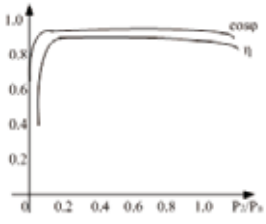
永磁直驱系统的主要性能优势

project background



异步电机效率
功率因数与负载率关系

Efficiency of asynchronous motor
Relationship between power factor
and load factor



永磁电机效率
功率因数与负载率关系

Efficiency of permanent magnet motor
Relationship between power factor
and load factor

永磁电机效率和功率因数高，节能。永磁电机与异步电动机效率与功率因数与负载率之间的特性相比，具有明显的优越性。

去齿轮化，改了原来机械装备的传动模式。将永磁电动机与机械负载直接相连，消除了低速大转矩传动系统中的电机与机械负载之间的减速传动环节，大幅度简化了机械装备的传动链。

噪音小，无污染，免维护。取消了减速机械装置，节省了日常维护费用、润滑费用及所耽搁的工作时间。

Permanent magnet motors have high efficiency and power factor, and are energy-saving. Compared with asynchronous motors, permanent magnet motors have significant advantages in terms of efficiency, power factor, and load rate, eliminating intermediate links in mechanical equipment and improving transmission chain efficiency.
De geared and changed the transmission mode of the original mechanical equipment. Directly connecting permanent magnet motors to mechanical loads eliminates the deceleration transmission link between the motor and the mechanical load in low-speed high torque transmission systems, greatly simplifying the transmission chain of mechanical equipment.
Low noise, pollution-free, and maintenance free. Cancelled the deceleration mechanism, saving daily maintenance costs, lubrication costs, and delayed work time.

改造性能对比

Comparison of Modification Performance

名称 name	永磁直驱电机 Permanent magnet direct drive motor	异步机-减速机 asynchronous motors Reducer
电机功率（kW）	560	560
电机效率（Motor Efficiency）	94%	85%左右
联轴器效率（Coupling efficiency）	99%	99%*99%
减速机效率（Efficiency of gearbox）		90%左右
功率因数（Power factor）	> 0.95	≤0.8
维护频率（Maintenance frequency）	低或无	高
系统效率（system efficiency）	93.10%	75%左右
节能率（Energy saving rate）	18.1%左右	
一年节电量（kW·h）	548648.4	
年节省电费（元）Annual energy-saving electricity bill (RMB)	274324.2	
年维护费用（元）Annual maintenance cost (RMB)	2万	
电机价格（万元）Motor price (RMB)（Ten thousand yuan）	94.5	
回收期（年）Payback period year)	3.2	

（注：节能量按照额定负荷的70%计算，电费按0.4元/度，每天运转24h，一年运转330天计算）

(Note: The energy saving is calculated at 70% of the rated load, and the electricity fee is 0.4 yuan/kWh. It operates for 24 hours a day and operates for 330 days a year.)

设备选型表

TYFB系列粉尘防爆永磁直驱同步变频电机
Equipment selection table

规格型号	额定功率（kW）	电压（kV）	额定转速（r/min）	额定转矩（N.m）	最大转矩（倍数）	效率（%）
TYFB630	630	6/10	≤200	30083	≥2	≥95
TYFB710	710	6/10	≤200	33903	≥2	≥95
TYFB800	800	6/10	≤200	38200	≥2	≥95
TYFB900	900	6/10	≤200	42975	≥2	≥95
TYFB1120	1120	6/10	≤200	53480	≥2	≥95
TYFB1250	1250	6/10	≤200	59688	≥2	≥95
TYFB1400	1400	6/10	≤200	66850	≥2	≥95
TYFB1600	1600	6/10	≤200	76400	≥2	≥95
TYFB1800	1800	6/10	≤200	85950	≥2	≥95
TYFB2000	2000	6/10	≤200	95500	≥2	≥95
TYFB2240	2240	6/10	≤200	106960	≥2	≥95
TYFB2500	2500	6/10	≤200	119375	≥2	≥95
TYFB2800	2800	6/10	≤200	133700	≥2	≥95
TYFB3150	3150	6/10	≤200	150413	≥2	≥95
TYFB3550	3550	6/10	≤200	169513	≥2	≥95
TYFB4000	4000	6/10	≤200	191000	≥2	≥95
TYFB4500	4500	6/10	≤200	214875	≥2	≥95
TYFB5000	5000	6/10	≤200	238750	≥2	≥95
TYFB2500	2500	6/10	≤200	119375	≥2	≥95
TYFB2800	2800	6/10	≤200	133700	≥2	≥95
TYFB3150	3150	6/10	≤200	150413	≥2	≥95
TYFB3550	3550	6/10	≤200	169513	≥2	≥95

（绝缘等级：H，工作制：S1，防护等级：IP65，电压：6000V/10000V，安装方式：卧式，功率因数：0.97）

(Insulation level: H, working system: S1, protection level: IP65, voltage: 6000V/10000V, installation method: horizontal, power factor: 0.97)

全国统一服务热线：
400-088-6583

Motor STAR 新四达

河北新四达电机股份有限公司

地址：河北省石家庄市藁城区机场北路张家庄镇工业区综合园
网址：www.xsdmotor.com
邮箱：XSDDJ@xsdmotor.com
售后服务：400-088 6583
邮编：052164

抖音平台

微信平台

版次：2024年9月第一版
编号：XSD-TLFB-1