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JLM系列立磨减速机

JLM SERIES VERTICAL MILL REDUCER

CSSC

重庆齿轮箱有限责任公司
CHONGQING GEARBOX CO.,LTD



Brief Introductions

▶ 公司简介

重庆齿轮箱有限责任公司隶属于中国船舶集团有限公司(简称“重齿”),位于重庆市江津区,员工总数2300余人。公司原名为国营永进机械厂,始建于1966年,1982年更名为四川齿轮箱厂,1997年改制为重庆齿轮箱有限责任公司。

重齿公司以硬齿面齿轮传动装置及其机、电、液传动系统研制为核心业务,产品广泛应用于船舶、海工、水泥建材、金属冶炼、传统能源、分布式清洁能源、轨道交通、工程机械、油气开采、固体废物处理等行业,是船舶系统内唯一生产舰船齿轮箱、联轴节、减振器的重点军工企业,是我国海军舰船后传动装置的研制基地、国内最大的硬齿面齿轮研发制造基地之一。

Chongqing Gearbox Co., Ltd. (“Chongchi”), located in Jiangjin District of Chongqing, China, is owned by China State Shipbuilding Corporation Limited (CSSC) and has more than 2300 employees. It was founded in 1966 and changed its name from Yongjin Machinery Plant to Sichuan Gearbox Plant in 1982, and then to its current name in 1997.

The company is specialized in the R&D and production of case-hardened gears and gearboxes, driving trains combining mechanical, electrical and hydraulic components. With products widely applied to various industries such as shipbuilding, offshore engineering, cement building material, metallurgy, traditional energy, distributed clean energy, railway transportation, engineering machinery, gas mining, solid waste treatment etc., the company is the only supplier in CSSC for production of gearboxes, couplings and dampers for naval ship purpose. The company is not only one of the largest R&D bases domestically for case-hardened gears, but also the research and production base for rear transmission equipments in the naval propulsion system.



JLM系列立磨减速机是我公司研发的第五代煤磨减速机,主要用于立式辊磨系统,配套国内外主机厂家,具有传递扭矩大、功率密度高、可靠性高等特点,功率范围200kW-1200kW。

As the fifth generation coal mill reducer developed by our company, the JLM series vertical mill reducer is mainly used for the vertical roller mill system. Used with main units manufactured by leading domestic and foreign leading companies, the vertical mill reducer features such advantages as high transmission torque, high power density and high reliability, with power ranging from 200kW to 1,200kW.

B Overview

概述

JLM系列立式磨减速机主要用于火电厂的煤粉生产线立式中高速磨和建材行业水泥生产线立式磨,也可用于其他行业。

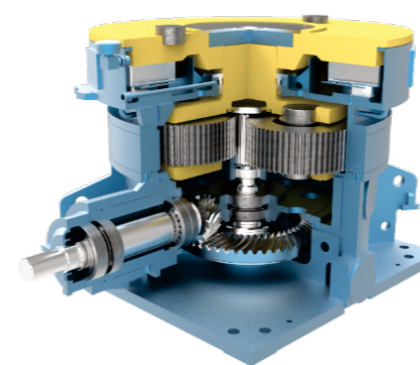
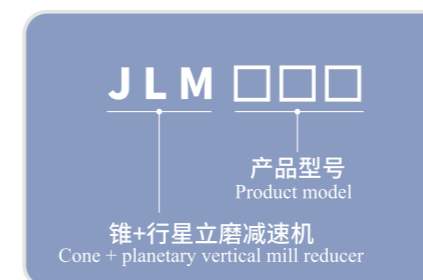
立磨减速机由电动机驱动,用于传递扭矩给磨机磨盘,通过速比调整,将磨盘调整到需要的转速。立磨减速机用于支撑磨机磨盘,并承受磨机系统研磨物料时的垂直载荷。

立磨减速机配有独立的润滑油站进行润滑和冷却。

The JLM series vertical mill reducer is mainly used for pulverized coal production lines of thermal power plants and vertical mills in cement production lines of building materials industries, and can also be used in other industries.

Driven by a motor, the vertical mill reducer is used to transfer torque to the grinding disc and adjust the speed ratio of the grinding disc to the required speed by adjusting the speed ratio.

The vertical mill reducer is used to support the grinding disc of the mill and withstand the vertical load of the mill system when materials are ground.



数字组合采用扭矩方式 ($P/n2 \times 9550/1000 \approx P/n2 \times 10$) kN。

Torque is adopted for models based on combinations of numbers ($P/n2 \times 9550/1000 \approx P/n2 \times 10$) kN.

P——磨机所需(轴)功率 (Shaft) power required by the mill

n2——磨机所需转速 Speed required by the mill

字母组合为各大主机厂拼音缩写,目的是区别不同主机厂相同扭矩外形、重量差别较大,便于市场报价与合同执行,在后加主机厂拼音缩写两位以示区别。

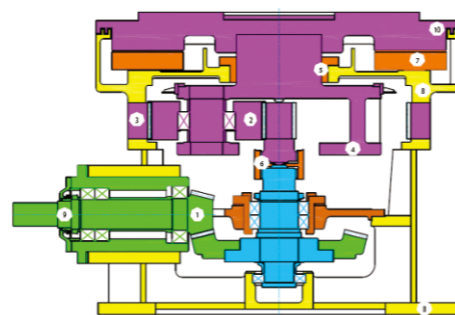
The letters on the model consist of the initials of the Pinyin abbreviations of the main unit manufacturers, to distinguish reducers with the same torque or shape but large weight difference, which are made by different main unit manufacturers, to facilitate quotation and contract implementation. The first two letters of the pinyin abbreviations of the main unit manufacturers are added in the latter part of the model.

- | | |
|------------------|---|
| 长春发电设备有限公司——CF | Changchun Generating Equipment Group |
| 北京电力设备总厂——BD | Beijing Power Equipment Group Co., Ltd. |
| 北方重工集团(原沈重)——BZ | Northern Heavy Industry Group Co., Ltd
(the original Shenyang Heavy Machinery Group Co., Ltd.) |
| 上海重型机械设备有限公司——SZ | Shanghai Heavy Machinery Plant Company Limited |

C Technical features

▶ 技术特点

- ◆ 螺旋伞齿轮采用克林根贝尔齿制, 选用优质合金钢进行渗碳淬火, 采用磨削对研加工, 传动平稳, 承载能力高;
- ◆ 行星轮、太阳轮选用优质合金钢, 采用渗碳淬火磨齿工艺, 结合齿面修形, 提高分流均载性;
- ◆ 内齿圈采用高合金淬火调质钢, 采用磨齿工艺, 性能优异, 精度高;
- ◆ 行星架采用高强度球磨铸铁整体铸造, 强度高, 减振性能高;
- ◆ 一级行星可通过可浮动行星架提高行星级分流均载;
- ◆ 太阳轮可通过双鼓双浮动联轴器实现浮动, 提高行星级分流均载性能;
- ◆ 综合使用载荷、外形尺寸及润滑系统等情况, 推力瓦可灵活选取动静压润滑, 静压润滑及动压润滑三种型式。
- ◆ 箱体采用结构钢及铸钢件焊接或球磨铸铁铸造, 焊后去应力处理, 结合优异的结构设计, 可直接将磨机载荷传递至地基;
- ◆ 输入轴密封均用非接触式机械密封, 兼顾防尘效果, 终身免更换维护;
- ◆ 输出轴密封采用非接触式机械密封, 兼顾防尘效果, 终身免更换维护;



JLM立磨减速机结构简图



a. 锥齿轮副

b. 行星级

立磨减速机相关齿轮副

- Klingelnberg gears are used for spiral bevel gears. High-quality alloy steel is selected for carburizing and quenching. Gears are ground to ensure smooth transmission and high bearing capacity;
- Planetary gear and sun gears are made of high-quality alloy steel with the carburizing, quenching and grinding process. These processes coupled with tooth surface modification improve even load distribution.
- The inner gear ring is made of quenched and tempered high-alloy steel with the gear grinding process, providing excellent performance and high precision;
- The planet carrier is integrally cast with high-strength ductile cast iron, with high strength and high vibration damping performance;
- Via the floating planet carrier, the first stage planetary gear can improve even load distribution of planetary-stage;
- The sun gear can realize floating with the double-drum double floating coupling, which improves the planetary-stage even load distribution;
- Based on the load, dimensions, and the lubrication system used, thrust pads that are subject to dynamic-static lubrication, static lubrication and dynamic lubrication can be selected flexibly.
- The box is welded with structural steel and steel castings or cast with ductile iron, with stress relief treatment after welding. Such process coupled with excellent structural design can transfer the mill load directly to the ground;
- Non-contact mechanical seals are used for input shafts, ensuring dust protection and requiring no replacement or maintenance throughout their life cycles;
- Non-contact mechanical seals are used for output shafts, ensuring dust protection and requiring no replacement or maintenance throughout their life cycles;

D Selection guide

▶ 选型指南

选型说明

Instructions for selection

★ 样本符号说明 Description of sample symbol

符号 Symbol	说明 Description
P	齿轮箱额定输入功率 (kW) Rated input power of gearbox (kW)
P'	齿轮箱修正输入功率 (kW) Corrected input power of gearbox (kW)
n1	输入转速 (rpm) Input speed (rpm)
n2	输出转速 (rpm) Output speed (rpm)
i	额定传动速比 Rated transmission speed ratio
Fstat	磨机垂直静载荷 (KN) Vertical static load of mill (kN)
c	功率修正系数 Power correction factor

- ★ 立磨减速机系列产品为立式辊磨专用齿轮箱, 根据额定输入功率P, 按AGMA服务系数2.5进行设计校核, 以保证齿轮箱具有足够的强度和安全性。如果需要达到其他服务系数, 可按示例进行修正计算或向重庆齿轮箱有限责任公司咨询。

The vertical mill reducer series products are special gearboxes for vertical roller mills, for which design check is performed based on an AGMA service coefficient of 2.5 according to the rated input power P, to ensure that the gear boxes have sufficient strength, safety and reliability. If it is required to achieve other service coefficients, correction computation can be performed by following the example or consult Chongqing Gearbox Co., Ltd.

- ★ 立磨减速机规格参数图表中的速比范围和规格尺寸可根据用户需要定制, 具体可向重庆齿轮箱有限责任公司咨询。

The speed ratio range and size in the specification chart of the vertical mill reducer can be customized as required by the user. Please consult Chongqing Gearbox Co., Ltd. for details.

选型示例

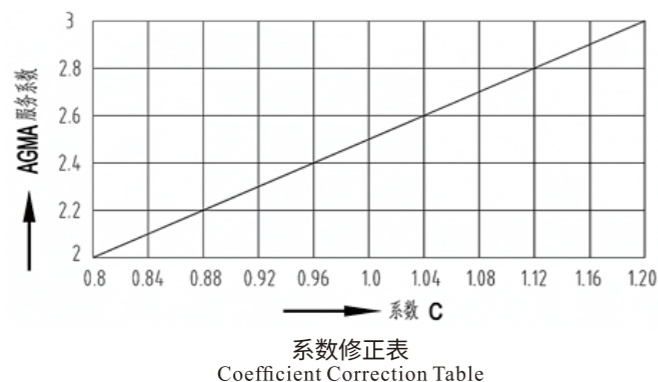
Example of selection

选用JLM系列立磨减速机, 根据磨机转速及所需功率按【图表1】进行选型。所选具体型号所允许的最大速比及轴向静载荷见规格参数表。如用户所需AGMA服务系数大于或小于2.5时按【系数修正表】选取修正系数, 按式(1)进行校核。

The JLM series vertical mill reducer is selected based on the mill speed and required power stated in [Table 1]. The maximum allowable speed ratio and axial static load of the specific model selected are shown in the specification chart. If the AGMA service coefficient required by the user is greater than or less than 2.5, select the correction coefficient according to the [Coefficient Correction Table], and check it according to Formula (1).

$$P' = C \times P \text{ 磨机额定功率} \dots \dots \dots (1)$$

Rated power of mill



例 1

(Sample 1)

一水泥厂立式磨机需用减速器, 要求传递功率为400kW, 电动机驱动, 电动机转速 $n_1 = 996 \text{ r/min}$, $n_2 = 34.2 \text{ r/min}$, AGMA服务系数为2.5。计算 $P/n_2 = 11.7$, 根据规格参数表, 根据结构, 外形及价格综合选取合适型号JLM125。

A vertical mill in a cement plant requires a reducer, which requires a transmission power of 400kW and is driven by a motor. The motor speed $n_1 = 996 \text{ r/min}$, $n_2 = 34.2 \text{ r/min}$, and the AGMA service coefficient is 2.5. It is known by calculation that $P/n_2 = 11.7$. Therefore, JLM125 is selected as the appropriate model according to the specification chart after taking the structure, shape and price into overall consideration.

例 2

(Sample 2)

一水泥厂立式磨机需用减速器, 要求传递功率为421kW, 电动机驱动, 电动机转速 $n_1 = 990 \text{ r/min}$, $n_2 = 31.97 \text{ r/min}$, AGMA服务系数为2.3。计算 $P' = C \times P = 0.92 \times 421 = 388 \text{ kW}$, $P/n_2 = 12.14$, 根据规格参数表, 根据结构, 外形及价格综合选取合适型号JLM125。

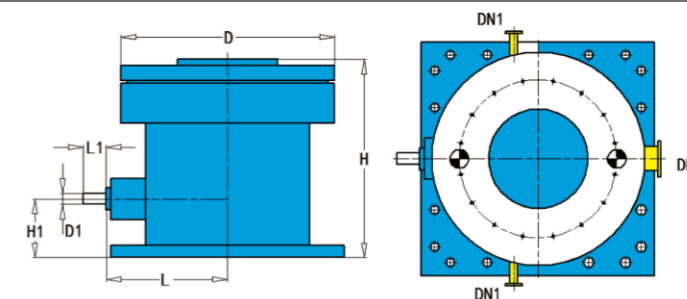
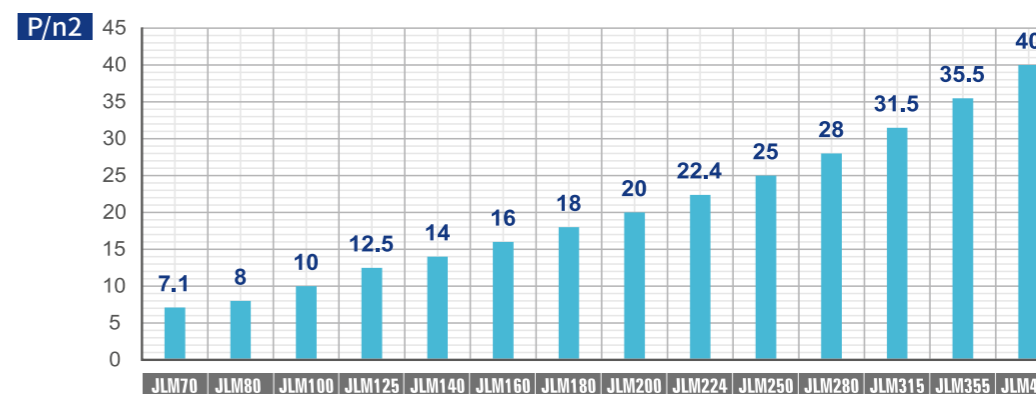
A vertical mill in a cement plant requires a reducer, which requires a transmission power of 421kW and is driven by a motor. The motor speed $n_1 = 990 \text{ r/min}$, $n_2 = 31.97 \text{ r/min}$, and the AGMA service coefficient is 2.3. It is known by calculation that $P' = C \times P = 0.92 \times 421 = 388 \text{ kW}$ and $P/n_2 = 12.14$. Therefore, JLM125 is selected as the appropriate model according to the specification chart after taking the structure, shape and price into overall consideration.

Specifications

系列规格

JLM系列立式磨减速机规格参数图表

Specification chart of JLM series vertical mill reducers



型号	速比 i	Fstat(KN)	D (mm)	D1 (mm)	L1 (mm)	L (mm)	H (mm)	H1 (mm)	DN1 ⁽¹⁾ (mm)	DN2 ⁽²⁾ (mm)
JLM71	25-40	800	1480	90	140	905	1265	450	40	65
JLM80	25-40	980	1580	100	140	960	1290	450	50	100
JLM100	25-40	1200	1690	110	190	920	1300	450	50	100
JLM125	25-40	1500	1800	110	210	1090	1480	450	50	100
JLM140	25-40	1800	1890	110	210	1175	1550	500	50	100
JLM160	25-40	1820	1950	110	210	1125	1590	500	50	100
JLM180	25-40	1850	1980	110	210	1125	1625	535	50	100
JLM200	25-40	2000	2100	120	210	1220	1630	535	65	125
JLM224	25-40	2100	2140	130	210	1290	1680	560	65	125
JLM250	25-40	2200	2170	130	210	1390	1725	560	65	125
JLM280	25-40	2400	2250	140	250	1430	1775	630	65	125
JLM315	25-40	2600	2300	140	250	1430	1815	630	65	125
JLM355	25-40	3100	2300	140	250	1470	1845	630	65	150
JLM400	25-40	3500	2450	140	250	1500	1925	630	65	150

•DN1 表示减速机进油法兰直径, 以下同。 DN1 represents the diameter of the oil inlet flange of the reducer, the same as below.
 •DN2 表示减速机回油法兰直径, 以下同。 DN2 represents the diameter of the oil return flange of the reducer, the same as below.



CG-master

▶ 在线智能诊断监测

重齿公司利用在齿轮传动行业深耕多年的行业资源和经验,从振动、温度、转速、压力等多维度对齿轮箱运行状态进行统一管理和智能诊断,并设计开发基于多传感器信息融合的数据采集与远程监测的重齿在线监测系统。该系统可对设备故障部位进行精准监测和定位,根据齿轮箱运行状态分析,可有计划性地对设备进行维保,降低事故性停机和非计划性停机的概率,提高用户生产效率和经济效益。

重齿在线监测系统可利用监测数据进行预处理和分析,凭借专家诊断库信息,从时域、频域、轴心轨迹、波德图、包络解调谱图等方面,对设备进行一个整体的评估,实现故障早期诊断。

Based on the industry resources and experience obtained by deeply delving into the gear transmission industry for years, Chongqing Gearbox Co., Ltd. conducts unified management and intelligent diagnosis on the running state of the gearbox from multiple dimensions such as vibration, temperature, speed and pressure, and designs and develops our own on-line monitoring system based on data acquisition and remote monitoring that fuses information of multiple sensors. The system can accurately monitor and locate the fault parts of the equipment, and maintain the equipment in a planned way based on the analysis of the running state of the gearbox, thus reducing the probability of emergency shutdown and unplanned shutdown, and improving the production efficiency and economic benefits of users.

The Chongqing gearbox on-line monitoring system can be used to preprocess and analyze the monitoring data, and evaluates the equipment as a whole, based on the information from the expert diagnostic database, from the aspects of time domain, frequency domain, axis trajectory, Bode diagram and envelope demodulation spectrogram, to diagnose faults early.



立磨减速机状态实时状态监测
Real-time monitoring of state of vertical mill reducer

状态监测智能云中心
Intelligent cloud center for state monitoring

重齿公司煤立磨减速机的研制经历了VBS、JLX、JLXM、JLZX型等几代发展,到如今JLM系列已是第五代煤磨减速机,其中多数型号属中国首创。产品性能达到国内一流、国际先进水平,荣获多项专利和奖励。

目前生产数量超过3000余台,广泛用于国内300多家电厂,国外五十多个国家近100家电厂,超过600台机组,广受用户好评。

The development of vertical mill reducers for coal mills in Chongqing Gearbox Co., Ltd. has experienced several generations, including VBS, JLX, JLXM and JLZX. Up to now, JLM series is the fifth generation coal mill reducer, most of which are first of its kind in China. The products have reached the domestic first-class and international advanced level, and won many patents and awards.

At present, more than 3,000 equipment have been manufactured, which are widely used in over 600 units in more than 300 power plants in China and nearly 100 power plants in more than 50 countries abroad, being high praised by users.



• 列表中仅为部分客户,排名不分先后
The list only includes some customers, with no specific ranking.