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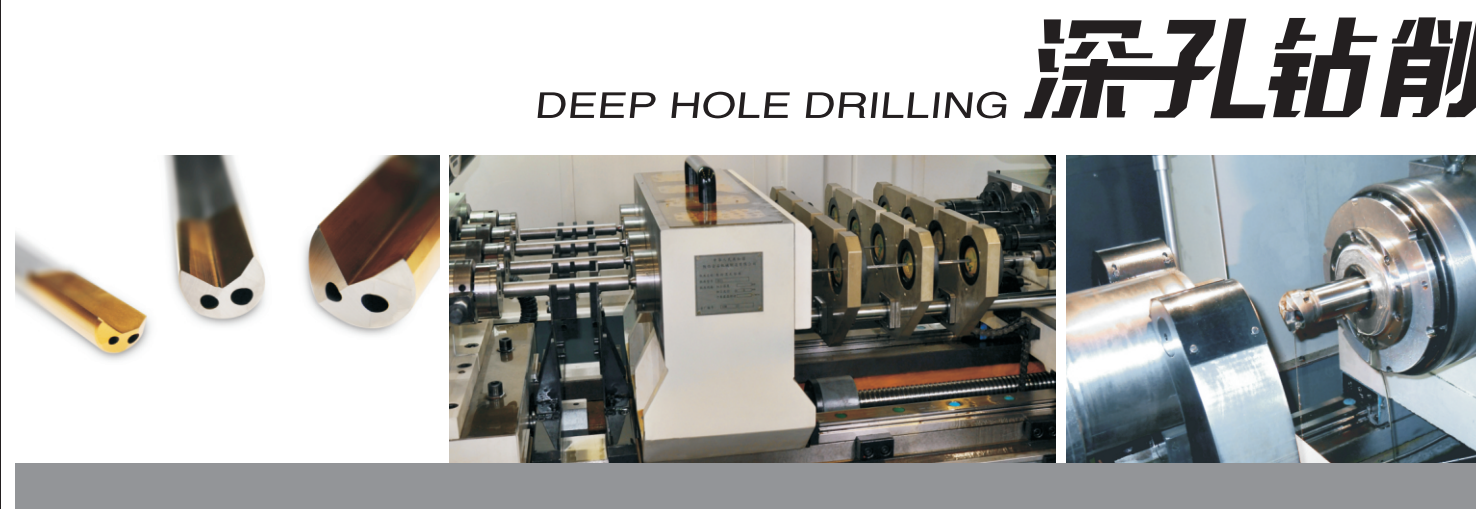
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因为深孔钻机床应用领域和加工实际的专业性和用户需求的特殊性，所以本样册只是对通用性较强的深孔钻设备做的概括性描述，并不涵盖公司所有机型。
因特殊需求的专门定制请与就近的陕西金石机械制造有限公司办事处联系，或直接致电本公司。
欢迎访问我们的网站www.sxgsm.com，您将获得更多更新的信息和服务。



陕西金石机械制造有限公司

GOLDEN STONE MACHINERY MANUFACTURING CO.,LTD.

数控深孔钻机床&枪钻刀具

CNC Deep Hole Drilling Machines & Gun Drills

ISO9001质量体系认证

ISO9001 Quality System Certification

高新技术企业

High-tech Enterprise

中国·西安
XI'AN CHINA



陕西金石机械制造有限公司

金石机械成立于2004年，前身是拥有50余年金属切削机床、30余年深孔钻机床设计制造历史的西安机床厂。经过十年长足的发展，陕西金石机械制造有限公司目前已成为集数控深孔钻削机床、深孔刀具及加工辅具的研发、制造、销售为一体的现代化装备企业。

陕西金石机械制造有限公司，是西安市“金属材料深孔加工技术及应用工程实验室”及国家级的“高新技术企业”，ISO9001: 2008质量管理体系认证单位，国家创新基金扶持单位。

悠久的历史传承与深厚的技术积累，完备的生产质量管理体系，专业的技术及销售人员和对您需求的持续关注，必将能够为您提供最适宜的深孔钻削解决方案和装备精品。

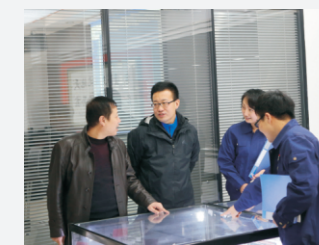
优质产品已被广泛应用于军事工业、汽车制造、模具工业、航空航天、医疗器械、煤矿石油机械、化工等众多领域。

Shaanxi Golden Stone Machinery Manufacturing Co., Ltd.

Shaanxi Golden Stone Machinery Manufacturing Co., Ltd., established in 2004, is formerly known as the Xi'an Machine Tool Factory which has a 50-year history of metal cutting machine tools and more than 30 years of deep hole drilling machine design and manufacture in Xi'an. Over 10 years development, GSM has become a modern equipment company specially engaged in development, manufacturing and marketing of CNC deep hole drilling machine, deep hole machining tools and auxiliary tools.

GSM is certificated as the "Metal Material Deep Hole Drilling Technology and Application Engineering Laboratory", "National High-tech Enterprise", the ISO9001: 2008 Quality Management System Certification Company, and the National Innovation Funded Enterprise in Xi'an. With fifty years of design and manufacture of machine tools, accumulated technologies, specialized sales force and continuous focus on your needs, we promise to provide you with optimum solutions and best quality equipments.

GSM's customers are widely found in fields of military industry, automobile manufacturing, mold industry, aerospace, medical equipment, coal oil machinery, chemicals etc.



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金石资质荣誉 Honors



Quality is Built in Your Trust!
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ZK21系列
ZK21 Series

ZK21系列钻机概述

ZK21系列机床，设计为水平卧式布局，刀具采用枪钻。主要用于大批量中小型回转轴类零件同轴心孔的加工。多主轴、多工位设计，可同时钻削多支工件。工件装夹方式设计多样化，并配置工件辅助支撑机构，装夹便捷快速，加工效率极高。基础部件HT300精密铸造，滚动导轨、滚珠丝杆。冷却油流量变频调整，配置自动油温冷却机、自动排屑系统。

Introduction to ZK21 Series

ZK21 series machine is designed with horizontally layout and gun drilling method. The machine with multiple spindles and fixture designs is mainly applied to the concentric holes processing on large quantity of medium and small size rotary shaft parts and can process multiple workpieces at the same time. It has various workpiece clamping designs and is equipped with workpiece auxiliary supporting mechanism to realize convenient clamping and efficient machining. The basic parts of machine are HT300 precision casing, such as ball screw and rolling guide. The cooling oil flow is frequency adjusted. Automatic oil temperature cooler and chip removal system are equipped on the machine.

ZK21系列适宜加工工件
Application Parts

- 1、柱塞套

2、齿轮轴

3、油轨

4、喷油咀

5、锁骨螺钉

6、凸轮轴
1. Plunger Sleeve

2. Gear Shaft

3. Oil Rail

4. Injector

5. Screw Clavicle

6. Camshaft



ZK21系列专用附件
Accessories



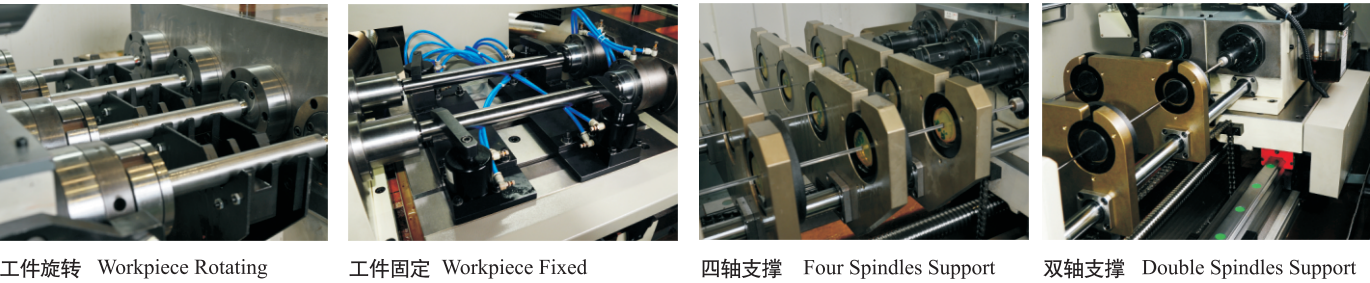
ZK21系列钻机技术规格
Specifications for ZK21 Series

机床型号 Model		ZK2108	ZK2115	ZK2120	ZK2125	ZK2130	ZK2115 × 4C
项目 Item	数控系统 CNC System	FANUC Oi Mate TC / GSK980TDC					
	主轴数量 Number of Main Spindle	1; 2; 4	1; 2; 4	1; 2; 4	1; 2; 4	1; 2	2 (左 Left) +2 (右 Right)
	钻孔直径(mm) Hole Diameter (mm)	Φ 1.5 ~ Φ 8.0	Φ 3.0 ~ Φ 15.0	Φ 5.0 ~ Φ 20.0	Φ 5.0 ~ Φ 25.0	Φ 10.0 ~ Φ 30.0	Φ 3.0 ~ Φ 15.0
	钻孔深度(mm) Hole Depth (mm)	500	500 1000 1500	500 1000 1500	500 1000 1500	500 1000 1500	500 1000
	钻杆最高转速 (rpm) Max Rotation Speed of Drill Stem (rpm)	15000	7500	5000	5000	2500	7500
	工件转速 (rpm) Rotation Speed of Workpiece (rpm)	0 /500	0 /500	0 /500	0 /500	0 /500	0
	冷却油压力 (MPa) Working Pressure of Cooling Oil (Mpa)	16MPa	14MPa	10MPa	10MPa	10MPa	14MPa

ZK21系列液压系统
ZK21 Series Hydraulic System



ZK21系列工件装夹与钻杆
ZK21 Series Workpiece Clamping & Drill Stem



ZK21系列
ZK21 Series

四轴枪钻机床. ZK2108 × 4B /500

钻 杆: 高速机械主轴, 变频调速, 旋转且进给
工 件: 定速旋转或固定
装夹方式: 气缸驱动, 两内锥顶盘顶紧工件

Four Coordinates Gun Drill Machine Tool ZK2108 × 4B /500

Drill Stem: Mechanical spindle, frequency speed adjustment, rotating and feeding

Workpiece: Rotating at preset speed or fixed

Clamping: Cylinder drive, two clamping cones top tight the workpiece



双轴枪钻机床. ZK2115 × 2B /1000

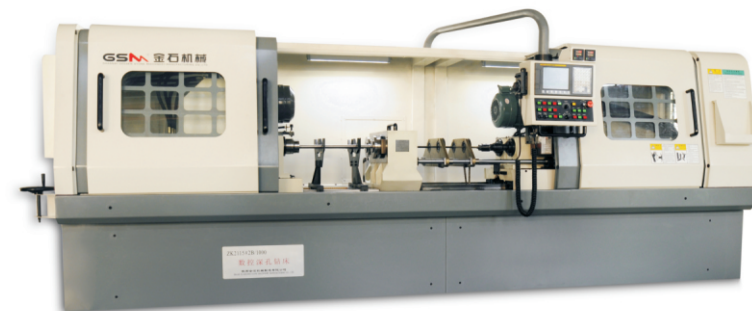
钻杆: 变频调速, 旋转且进给
工件: 定速旋转或固定
工件装夹: 油缸驱动, 内锥顶盘顶紧工件

Two Coordinates Gun Drill Machine Tool ZK2115 × 2B/1000

Drill Stem: Frequency speed adjustment, rotating and feeding

Workpiece: Rotating at preset speed or fixed

Clamping: Oil cylinder drive, two clamping cones top tight the workpiece



四轴枪钻机床. ZK2115 × 4B /500

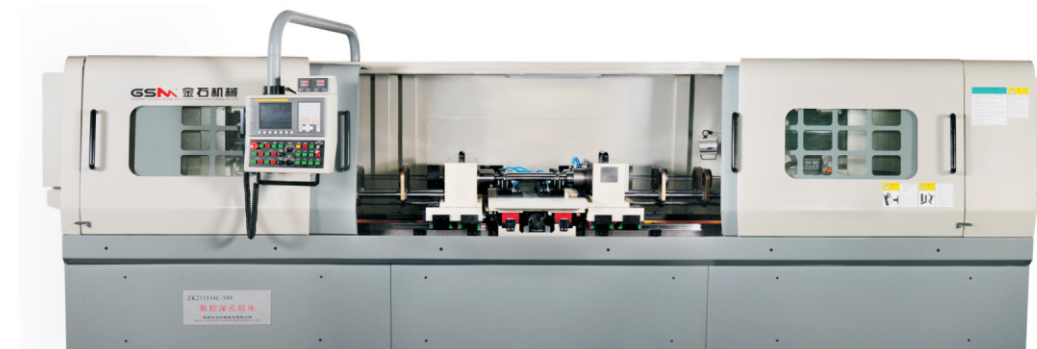
钻杆: 变频调速, 旋转且进给
工件: 定速旋转或固定
工件装夹: 油缸驱动, 内锥顶盘顶紧工件

Four Coordinates Gun Drill Machine Tool ZK2115 × 4B/500

Drill Stem: Frequency speed adjustment, rotating and feeding

Workpiece: Rotating at preset speed or fixed

Clamping: Oil cylinder drive, two clamping cones top tight the workpiece



Oppositely Drill Gun Drilling Machine Tool ZK2115 × 4C/500

Range of Worktable Traverse: 50mm

Worktable Size: 580 × 495mm

Drill Stem: 2 gun drills on each side, frequency speed adjustment, rotating and feeding

Workpiece: Supported by V-shaped iron on the worktable, and automatically pressed by hydraulic rotary platen

对钻式枪钻机床. ZK2115 × 4C /500

工作台横移范围: 50mm

工作台尺寸: 580 × 495mm

钻杆: 左右两侧各2支钻杆, 变频调速, 旋转且进给

工件: 用“V”型铁支撑在工作台上, 液压旋转压板自动压紧



四轴枪钻机床. ZK2120 × 4B /500

钻杆: 变频调速, 旋转且进给
工件: 定速旋转或者固定
工件装夹: 油缸驱动, 内锥顶盘顶紧工件

Four Coordinates Gun Drill Machine Tool ZK2120 × 4B/500

Drill Stem: Frequency speed adjustment, rotating and feeding

Workpiece: Rotating at preset speed or fixed

Clamping: Oil cylinder drive, two clamping cones top tight the workpiece

四轴枪钻机床. ZK2125 × 4 /A/500

钻杆: 变频调速, 旋转且进给
工件: 工件固定, 不旋转
工件装夹: 油缸驱动, 内锥顶盘顶紧工件。
自动上料机构: 气缸驱动, 通过料架的横移及升降, 实现工件装夹自动化。工件装卸不再占用切削时间, 大大提高生产效率。

Four Coordinates Gun Drill Machine Tool Zk2125 × 4/A/500

Drill Stem: Frequency speed adjustment, rotating and feeding

Workpiece: Fixed without rotation

Clamping: Oil cylinder drive, clamping cone top tight the workpiece

Automatic Loading Mechanism: Automatic workpiece clamping is realized by cylinder driving and rack lifting and traversing so that the loading and unloading of workpiece will be convenient and production Efficiency can be greatly improved.



ZK21C系列机床简介

ZK21C系列机床，为水平卧式布局，配置有横移工作台。刀具采用枪钻。横移工作台上设计有“V”型铁工装，或者双卡盘，用于加工轴类零件的同心孔、偏心孔。工作台的移动可选择数控或数显两种方式。基础部件HT300精密铸造，钻杆进给采用滚动导轨、滚珠丝杆。冷却油流量变频调整，配置自动油温冷却机、自动排屑系统。

Introduction to ZK21C Series

ZK21C series machines, horizontally arranged, are designed with gun drill and laterally travelling worktable.The V-shaped clamping mechanism is designed on the laterally travelling worktable to process concentric holes and eccentric holes of shaft components. For worktable travel, you can select numerical control or digital display. The basic parts of machine are HT300 precision casing. The feeding of drill stem adopts ball screw and rolling guide. The cooling oil flow is adjusted through frequency control. The machine is designed with oil temperature cooler and automatic chip cleaning system.

ZK21C系列钻机技术规格 Specifications for ZK21C Series

机床型号 Model		ZK2120C	ZK2125C	ZK2130C
项目 Item	数控系统 CNC System	FANUC Oi Mate TC / GSK980TDC		
	主轴数量 Number of Main Spindle	1; 2	1; 2	1
	钻孔直径(mm) Hole Diameter (mm)	Φ5.0 ~ Φ20.0	Φ5.0 ~ Φ25.0	Φ5.0 ~ Φ30.0
	钻孔深度(mm) Hole Depth (mm)	1000; 1500		1500
	工件最大外径 (mm) Max Outer Diameter of Workpiece (mm)	Φ210		
	工作台面积 (mm) Worktable Size (mm)	1600 (Z) × 600(X)	1800 (Z) × 600(X)	2000 (Z) × 600(X)
	工作台横移距离(mm) Worktable Laterally Movement (mm)	200 (X)		
	钻杆最高转速 (rpm) Max Rotation Speed of Drill Stem (rpm)	5500		
	工件装夹 Workpiece Clamping	双“V”形铁支撑，液压旋转压板压紧 Double V-shaped irons supported, hydraulic rotating platen closely pressed		双卡盘装夹 Dual-chuck clamping
	冷却油工作压力 (MPa) Working Pressure of Cooling Oil (Mpa)	12MPa		



单轴枪钻机床. ZK2130 × C/1500

工作台: 整体工作台可以横向移动
钻 杆: 变频调速，旋转且进给
工件装夹: 双卡盘夹持
导向套: 气动驱动，左右伸缩，贴紧工件

Single Coordinate Gun Drill Machine Tool ZK2130 × C/1500

Worktable: Laterally travelling
Drill Stem: Frequency speed adjustment, rotating and feeding
Workpiece Clamping: Dual chuck clamping
Drill Bush: Pneumatic drive, two sides stretching, closely aligning to the workpiece

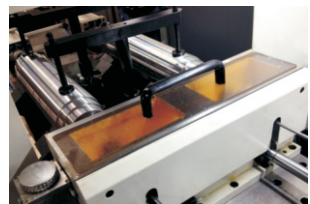


双轴枪钻机床. ZK2125 × 2C/1500

工作台: 整体工作台伺服驱动，可做横向移动
钻 杆: 变频调速，旋转且进给
导向套: 液压驱动，轴向定位及贴紧工件
工件装夹: 轴类零件，“V”型铁上置半圆套，液液压板压紧；板类零件，安装在工作台上，压板压紧
适宜加工工件: 轴类零件同心孔及偏心孔的加工；板类零件的深孔加工。

Two Coordinates Gun Drill Machine Tool ZK2125 × 2C/1500

Worktable: Laterally travelling, servo motors drive
Drill Stem: Frequency speed adjustment, rotating and feeding
Drill Bush: Hydraulic drive, axially positioned and closely aligning to the workpiece
Workpiece Clamping: For shaft parts, use V-shaped iron fixture on which semicircle sleeve is set and hydraulic platen pressed; plate parts are positioned on the worktable and Pressed by the platen.
Applications: Concentric holes and eccentric holes of shaft parts; deep hole drilling of plate parts



双轴枪钻机床. ZK2120 × 2C/1000

工作台: 整体工作台可做横向移动
钻 杆: 变频调速，旋转且进给
导向套: 液压驱动，轴向定位及贴紧工件
工件装夹: 轴类零件，“V”型铁上置半圆套，液液压板压紧；板类零件，安装在工作台上，压板压紧
适宜加工工件: 轴类零件同心孔及偏心孔的加工板类零件的深孔加工

Two Coordinates Gun Drill Machine Tool ZK2120 × 2C/1000

Worktable: Laterally travelling
Drill Stem: Frequency speed adjustment, rotating and feeding
Drill Bush: Hydraulic drive, axially positioned and closely aligning to the workpiece
Workpiece Clamping: For shaft parts, use V-shaped iron fixture on which semicircle sleeve is set and hydraulic platen pressed; plate parts are positioned on the worktable and pressed by the platen.
Applications: Concentric holes and eccentric holes of shaft parts; deep hole drilling of plate parts
ZK2120 × 2C-1000



工件装夹
Clamping

ZK21E系列机床简介

机床设计为水平卧式布局。机床主机床身分为工件装夹与钻杆进给系统左右两体，其端面用螺钉和定位销连接。工件装夹采用液压卡盘、液压中心架夹持。基础部件HT300精密铸造，钻杆进给采用滚动导轨、滚珠丝杆。

机床主要特点：1.工件横移机构；2.工件主轴具备旋转及数控分度功能。

主要用于大型长轴类零件的加工。除同轴心孔外，还可通过相应的横移机构和数控分度来加工偏心孔、分度孔等。一次装夹，能完成多孔位的加工。加工同轴心孔时，工件主轴可以旋转，以提高加工孔的偏斜度。加工偏心孔时，工件主轴用电磁离合器锁定。加工同一分度圆上的多个孔时，通过工件主轴数控分度，准确定位孔位置。

液压系统与机床主机平行放置，整体结构紧凑，操作方便。配有自动排屑，过滤装置（磁性、纸带、网式、磁棒过滤）及油温冷却机，过滤精度可达20um。

Introduction to ZK21E Series

ZK21E series are designed to be horizontally arranged. The host body is divided into the left part as workpeiece clamping and the right part as drill stem feeding system. The end face is coupled with the screws and pins. Hydraulic chuck and hydraulic center frame are used to clamp workpiece. The basic parts of machine are HT300 precision casing. Ball screw and rolling guide are used for drill stem feeding.

- Features: 1. A laterally traverse mechanism of workpiece;
2. Rotating and CNC indexing functions of workpiece main spindle

ZK21E series machine is mainly used to process deep holes on large and long shaft parts. Except for concentric hole processing, the machine can also easily process eccentric holes and indexing holes by responding lateral mechanisms and numerical control indexing design.

When concentric holes are processed, the spindle of workpiece shall be rotated to improve the precision of hole drilling; when eccentric holes are processed, the spindle shall be fixed by the electromagnetic clutch; when multiple indexing holes of the same circle are processed, CNC indexing function of workpiece main spindle shall help to precisely locate.

Hydraulic system is parallellled placed with the host machine to achieve an overall compact structure and convenient operation. The machine is designed with the automatic chip cleaning, filtration devices (magnetic rod, filter paper, network filtration, and magnetic filtration) and the oil temperature cooler to achieve filter accuracy up to 20um.

ZK21E系列钻机技术规格 Specifications for ZK21E Series

机床型号 Model		ZK2115E		ZK2130E	
项目 Item	数控系统 CNC System	FANUC Oi Mate TC / GSK980TDC			
	主轴数量 Number of Main Spindle	1	2	1	
	主轴中心距 Center Distance of Main Spindle	/	可定制 不可调 Customized non-adjusted	/	
	钻孔直径(mm) Hole Diameter(mm)	Φ5.0 ~ Φ15.0		Φ5.0 ~ Φ30.0	
	钻孔深度(mm) Hole Depth (mm)	500; 1000		1500; 2500; 3000;	
	工件最大外径 (mm) Max Outer Diameter of Workpiece (mm)	Φ270	Φ270	Φ500	Φ600
	最大偏心量 (mm) Max Deflection (mm)	Φ250	Φ270	Φ500	Φ500
	钻杆最高转速 (rpm) Max Rotation Speed of Drill Stem (rpm)	5500			
	工件最高转速 (rpm) Max Rotation Speed of Workpiece (rpm)	100	/	100	
	工件装夹 Workpiece Clamping	液压卡盘、液压中心架，自动夹紧并定心 Hydraulic chuck and hydraulic center frame to realize automatic clamping and center locating			
冷却油工作压力 (MPa) Working Pressure of Cooling Oil (Mpa)	12MPa				



双轴枪钻机床. ZK2115 × 2E/1000

双轴中心距：207mm(可按用户要求定制)

钻杆：变频调速，旋转且进给

工件：数控分度

导向套：液压驱动，贴紧工件

工件装夹形式：工件左端液压卡盘夹持，右端液压中心架支撑，每次钻削两个孔

适宜加工工件：筒壁上同一分度圆的多个等分孔零件

Two Coordinates Gun Drill Machine Tool ZK2115 × 2E/1000

Biaxial Centre Distance: 207mm (Customized)

Drill Stem: Frequency speed adjustment, rotating and feeding

Workpiece: Numerical control indexing

Drill Bush: Hydraulic drive, closely aligning to the workpiece

Workpiece Clamping: Left end clamped by hydraulic chuck, right end supported by hydraulic centre frame; two holes drilled one time

Applications: Multiple aliquots holes on a same indexing circle of cylinder wall



单轴枪钻机床.ZK2130E/2500

钻杆：变频调速，旋转且进给

工件：旋转；横移；分度

导向套：液压驱动，左右移动，贴紧工件

工件装夹：工件左端用液压卡盘夹持，右端用液压中心架支撑。液压卡盘和中心架可分别横移，用于加工偏心孔

适宜加工工件：轴类零件同心孔及偏心孔的加工

为煤机行业活塞杆、活柱、油缸等的深孔加工专门设计制造，获得国家科技部创新基金立项，并获得研发资金支持，已成为煤机生产厂家的必备深孔加工设备。

Single Coordinate Gun Drill Machine Tool ZK2130E/2500

Drill Stem: Frequency speed adjustment, rotating and feeding

Workpiece: Rotating, traversing, indexing

Drill Bush: Hydraulic drive, left and right move and closely aligning to the workpiece

Workpiece Clamping: Left end clamped by hydraulic chuck, right end supported by hydraulic centre frame; hydraulic chuck and hydraulic center frame can respectively traverse to process eccentric holes

Applications: Processing concentric holes and eccentric holes of shaft parts

Note: ZK2130E/2500 machine is specially designed and manufactured for deep hole drilling on piston rods, plungers and oil cylinders parts of coal industry. The machine has earned the Innovation Fund Program funded by the State Science and Technology Ministry and obtained the research funds.

Zk21F系列
Zk21F Series

ZK21F系列机床简介

ZK21F系列三坐标枪钻机床，刀具采用枪钻。是钻削二维坐标孔系的高效、高精度、高自动化数控深孔加工机床。机床X（工作台横移）、Y（工作台升降）、Z（钻杆进给）三轴均为交流伺服数控控制。滚动导轨、滚珠丝杆、基础件均为HT300精密铸造，具有高刚性及高精度稳定性。

液压系统与机床主机平行放置，整体结构紧凑，操作方便。配有自动排屑，过滤装置（磁性、纸带、网式、磁棒过滤）及油温冷却机，过滤精度可达10um～20um。

Introduction to ZK21F Series

ZK21F series machine is applicable to the two dimensional coordinate hole drilling characterized by high efficiency, precision and automation. X axis (worktable traverse), Y axis (worktable lift), and Z axis (drill stem feed) are all controlled by AC servo motors. The basic parts of machine are HT300 precision casing, such as ball screw and rolling guide.

Hydraulic system is paralleled placed with the host machine to achieve an overall compact structure and convenient operation. The machine is designed with the automatic chip cleaning, filtration devices (magnetic rod, filter paper, network filtration, and magnetic filtration) and the oil temperature cooler to achieve filter accuracy up to 10~20um.

典型应用领域:

模具行业：水道孔、顶针孔、导柱孔

汽车制造：缸头、缸盖

液压机械：阀体、分配器泵体等

Typical Applications

Mould Industry: waterway holes, ejector pin holes, guide post holes

Automobile Manufacture: cylinder heads, cylinder lids

Hydraulic machinery: valve body, dispenser pump

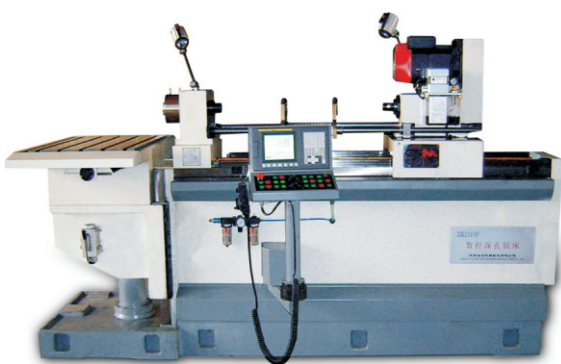
ZK21F系列钻机技术规格

Specifications for ZK21F Series

机床型号 Model		ZK2108F	ZK2120F	ZK2125F	ZK2130F
项目 Item	数控系统 CNC System	FANUC Oi Mate MD / GSK980MDC			
	主轴数量 Number of Main Spindle	1; 2	1; 2	1	1
	钻孔直径(mm) Hole Diameter (mm)	Φ1.5 ~ Φ8.0	Φ3.0 ~ Φ20.0	Φ3.0 ~ Φ25.0	Φ3.0 ~ Φ30.0
	钻孔深度Z(mm) Hole Depth Z(mm)	500	500; 1000	500; 1000	500; 1000
	工作台面积Z×X (mm) Worktable Size Z×X(mm)	750×1190	750×1190 1000×1190	750×1190 1000×1190	750×1190 1000×1190
	工作台横移距离X (mm) Worktable Laterally Traverse X (mm)	500			
	工作台升降距离Y (mm) Worktable Lifting Movement Y(mm)	300			
		750	750; 1000	750; 1000	750; 1000
		15000	7500		
	冷却油工作压力 (MPa) Working Pressure of Cooling Oil (Mpa)	16	12		



ZK2108F/500



ZK2120F/500

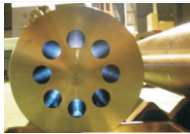
适宜加工工件 Application Parts



液阀门块 Hydraulic Valve Block



玻璃瓶模具 Glass Bottle Mold



轴类零件 Shaft Parts



模具 Mold



ZK2125F/1000



ZK2130F/1000

Zk21G 系列
Zk21G Series

ZK21G系列机床简介

机床整体呈T字形布局。横向移动工作台及立柱分别固定在整体铸造的底座上。立柱、横梁、钻杆箱等均为HT300精密铸造，机床刚性及精度保持性好。

机床移动轴包括工作台横向水平移动(X)，横梁垂直上下移动(Y)，横梁上的钻杆纵向移动进给(Z)。三个方向的移动均为数控控制，滚动导轨，滚珠丝杆。

钻杆电机采用变频调速系统。配备自动排屑系统、油温冷却系统、切削油过滤系统。

主要用于大中型模具的深孔加工；电力、汽轮机行业中机组外缸、冷凝器管板；汽车制造中缸头、缸盖；液压机械中的阀体、分配器泵体等零件的深孔加工。

Introduction to ZK21G Series

The overall machine is designed as T-shaped layout. The laterally traversing worktable and the columns are respectively fixed on the base of the whole cast. Columns, beams and drill stem box are all made of HT300 high precision castings with excellent rigidity and precision maintaining.

The moving axis of machine tool include the horizontal movement of worktable (X), vertical movement of beam (Y) and the longitudinal feeding movement of drill stem on the beam (Z). Movements on three directions are operated through numerical control, rolling guides and ball screw.

The motor of drill stem adopts frequency adjusted speed. The machines are designed with automatic chip cleaning system, oil temperature cooling system and cutting oil filtration system.

ZK21G series are applicable on the following parts: large moulds of different specifications, outer cylinder of machine unit and condenser tube plate of electricity and steam turbine industries, cylinder head and cylinder lid of automobile manufacturing industry, and valves and dispenser pumps of hydraulic machinery.

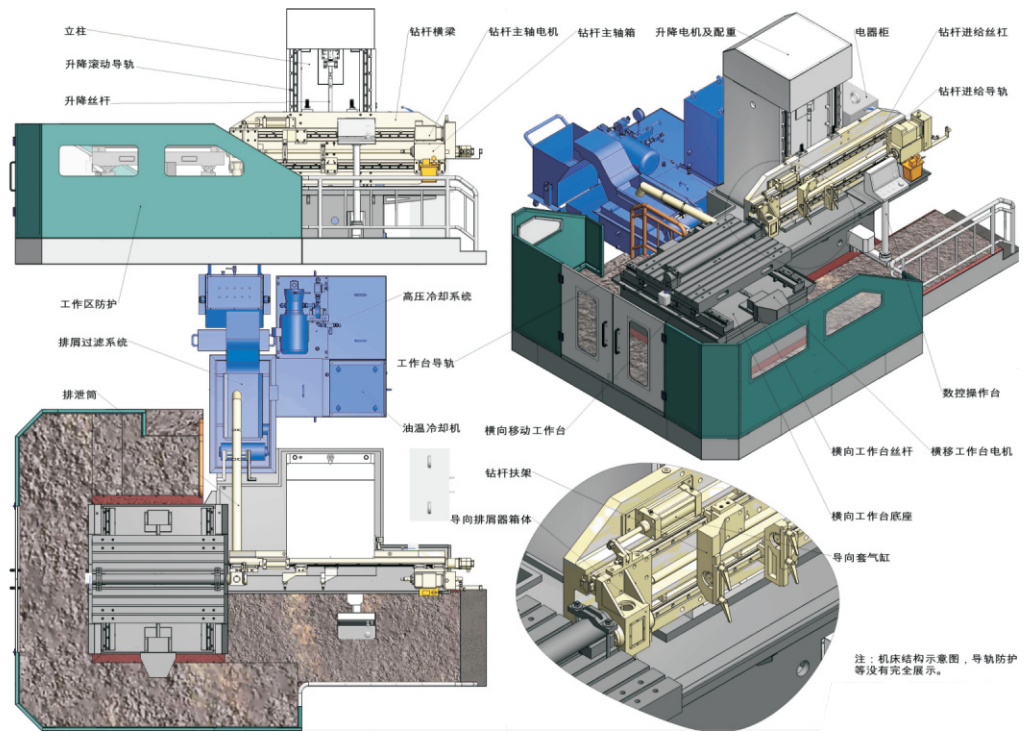
ZK21G系列钻机技术规格 Specifications for ZK21G Series

技术参数 Parameters	机床名称 Name	ZK2130G/1000	ZK2130G/1500	ZK2130G/2000
	加工能力 Machine Capacity			
	钻孔直径 Hole Diameter	Φ 3 ~ Φ 30mm		
	钻孔深度 Drilling Depth	1000	1500	2000
	工作台面积 (X × Z) Worktable Size (X × Z)	1200 × 800	1500 × 1000	3000 × 1500
	工作台承重 Worktable Load	6T	12T	20T
	行程(X × Y) Travel(X × Y)	1000 × 800	1600 × 1200	3000 × 1500
	加工速度 Processing Speed			
	主轴最高转速 Max Speed of Main Spindle	7000r/min		
	钻杆进给速度范围 Range of Drill Stem Feeding Speed	0 ~ 1500mm/min		
	钻杆快进速度 Speed of Drill Stem Fast Travelling	0 ~ 2000mm/min		
	工作台横移快进速度 Lateral Speed of Worktable	0 ~ 1000mm/min		
	钻杆横梁升降快进速度 Lifting Speed of Drill Stem Beam	0 ~ 1000mm/min		
	加工精度 Processed Precision			
	钻孔的偏斜度 Deflection	孔深 × 1/1000 (长径比 ≤ 100)		
	钻孔尺寸精度 Dimensional Precision	IT7 ~ IT10		
	钻孔粗糙度 Roughness	Ra0.4 ~ Ra3.2		
	机床功率 Machine Power			
	机床总功率 Overall Power	28KW	30KW	32KW
	钻杆主轴功率 Power of Drill Stem Main Spindle	7.5		
	钻杆进给电机功率(Z) Power of Drill Stem Feeding Motor (Z)	1.2		
	工作台横移电机功率(X) Power of Lateral Worktable Motor (X)	2.5		
	横梁升降电机功率(Y) Power of Lifting Beam Motor (Y)	2.5		
	液压系统 Hydraulic System			
	油泵变频电机功率 Power of Oil Pump Frequency Motor	2 × 5.5		
	最大流量 Max Flow	100L/min		
	最高压力 Max Pressure	12MPa		
	过滤精度 Filter Precision	20um		
	机床储油量 Oil Capacity of Machine	1360L		
	基本尺寸 General Size			
	占地面积: (长 × 宽) (Length × Width)	4500 × 3000	5500 × 4000	7500 × 6500
	数控系统 CNC System			
	日本 FANUC Oi MC; 台湾 SYNTEC; 广州数控 GSK980MDC	Japan FANUC Oi MC; Taiwan SYNTEC; CNC Guangzhou GSK980MDC		



ZK2130G/1000

ZK2130G/1000结构示意图



ZK21D系列
ZK21D Series

ZK21D系列钻机简介

该系列钻机采用内排屑法钻削加工。钻管分为单管和双管两种。单管为BTA深孔钻，双管为喷吸钻。

钻头通常靠螺纹与钻管连接，其连接部分均为圆形截面，其刚性较枪钻要高，生产效率是枪钻的2-4倍。但受刀具系统排屑空间的限制，主要用于直径≥Φ16mm孔的加工。工件旋转或固定，钻杆旋转且进给。

进给导轨采用高刚度双圆弧滚动导轨，硬度高，运动平稳，精度保持时间长。工件装夹形式多样，双卡盘、卡盘配合液压中心架、内锥顶盘等。

Zk21D系列钻机是大批量回转轴类零件深孔加工的首选设备，适用于矿山机械、机床、模具等行业。

ZK21D系列钻机技术规格
Specifications for ZK21D Series

机床型号 Model		ZK2130DB	ZK2140S	ZK2160DB	ZK2180DB	ZK21100D	ZK21150D
项目 Item	数控系统 CNC System	FANUC Oi Mate TC / GSK980TDC					
	主轴数量 Number of Main Spindle	1					
	钻孔直径(mm) Hole Diameter (mm)	16 ~ 30	18.5 ~ 40.0	16 ~ 60.0	30.0 ~ 80.0	40.0 ~ 100.0	40.0 ~ 80.0 80.0 ~ 150.0(钻 + 扩) (Drilling + Reaming)
	钻孔深度(mm) Hole Depth (mm)	500 1000 1500 2000 2500	500 1000	500 1000 1500 2000	1000 2000 3000	1000 2000 3000 4000	1000 2000 3000 4000
	工件最大外径 Max Outer Diameter of Workpiece	270; 500	200	270; 500	270; 500	270; 500	270; 500; 680
	钻杆最高转速 (rpm) Max Rotation Speed of Drill Stem (rpm)	2000	0	1500	1500	750	750
	工件最高转速 (rpm) Max Rotation Speed of Workpiece (rpm)	31.5	1500	31.5	31.5	0	0
	冷却油工作压力 (MPa) Working Pressure of Cooling Oil (Mpa)	8MPa	8MPa	8MPa	5MPa	5MPa	5MPa

Introduction to ZK21D Series

ZK21D series adopt a drilling method of internally chip removal and the drill tube shall be divided into the single tube and the double tube. The single tube is BTA drilling, and the double tube is ejector drilling.

The drill head is usually connected to the drill tube through threads. The joints are all the circular section. Its rigidity is higher than gun drilling and its machining efficiency is 2 to 4 times of that of gun drilling. But due to the constraints from chip removal space of cutting tool system, ZK21D series shall be only applicable to the hole drilling of which the hole diameter is equal or more than 16mm.

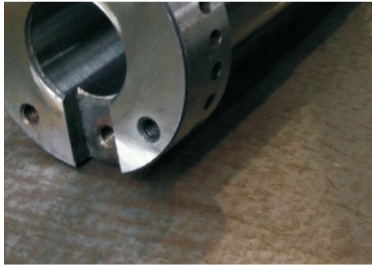
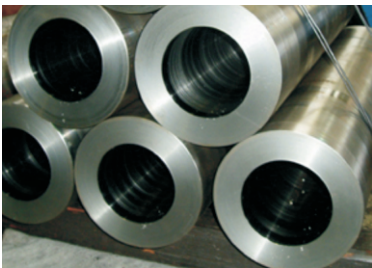
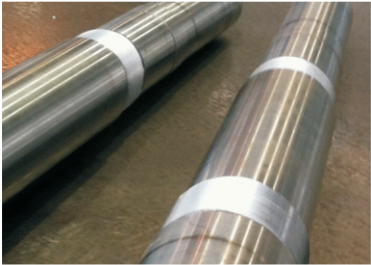
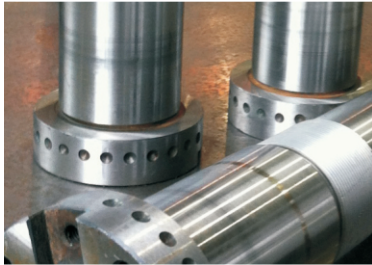
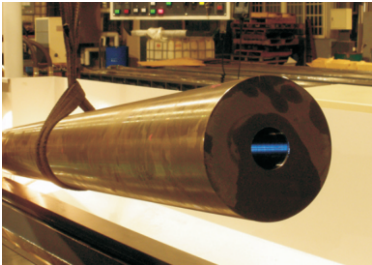
The workpiece shall be rotated or fixed and the drill stem is rotated feeding. The feeding guides are rolling guides which feature as high rigidity, steady movement and good precision maintaining. Workpiece clamps have various forms, such as dual chuck, chuck with hydraulic centre frame and clamping cone.

ZK21D series are the top equipment choice for large batch rotary shaft parts process and find application on mining machinery, machine tools and mould industry.



BTA钻头 BTA Drill Bit

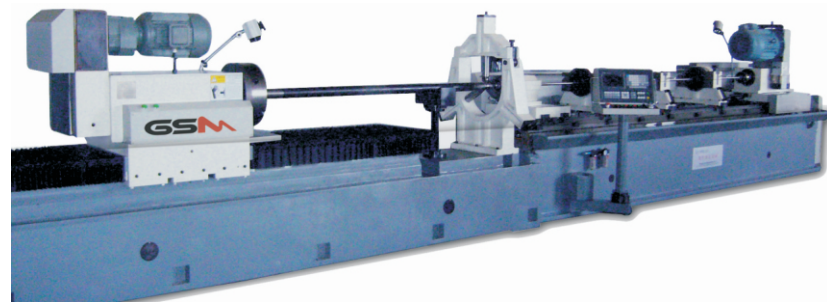
适宜工件 Application Parts



ZK21D系列
ZK21D Series

BTA深孔钻机床. ZK2130DB/2000

加工方式: BTA内排屑
孔径范围: $\Phi 16 \sim \Phi 30\text{mm}$
加工孔深: 2000mm
适宜加工工件: 轴类零件同心孔
钻杆主轴: 变频调速, 旋转且进给
工件主轴: 定速旋转
导向套: 液压驱动, 贴紧工件
工件装夹: 手动卡盘, 手动中心架



BTA Deep Hole Drilling Machine Tool ZK2130DB/2000

Processed Method: BTA internally chip removal
Range of Hole Diameter: $\Phi 16 \sim \Phi 30\text{mm}$
Hole Depth: 2000mm
Main Spindle of Drill Stem: Frequency speed adjustment, rotating and feeding
Main Spindle of Workpiece: Rotating at preset speed
Drill Bush: Hydraulic drive, closely aligning to the workpiece
Workpiece Clamping: Manual chuck, manual centre frame
Applications: Concentric holes processing on shaft parts

BTA深孔钻机床. ZK2130DB/2500

加工方式: BTA内排屑
孔径范围: $\Phi 16 \sim \Phi 30\text{mm}$
加工孔深: 2500mm
适宜加工工件: 轴类零件同心孔,如煤机行业的活塞杆、活柱、油缸等

数控系统: GSK980TDC \FANUC OI Mate TC
钻杆主轴: 变频调速, 旋转且进给
工件主轴: 定速旋转
导向套: 液压驱动, 贴紧工件
工件装夹: 液压卡盘, 液压中心架



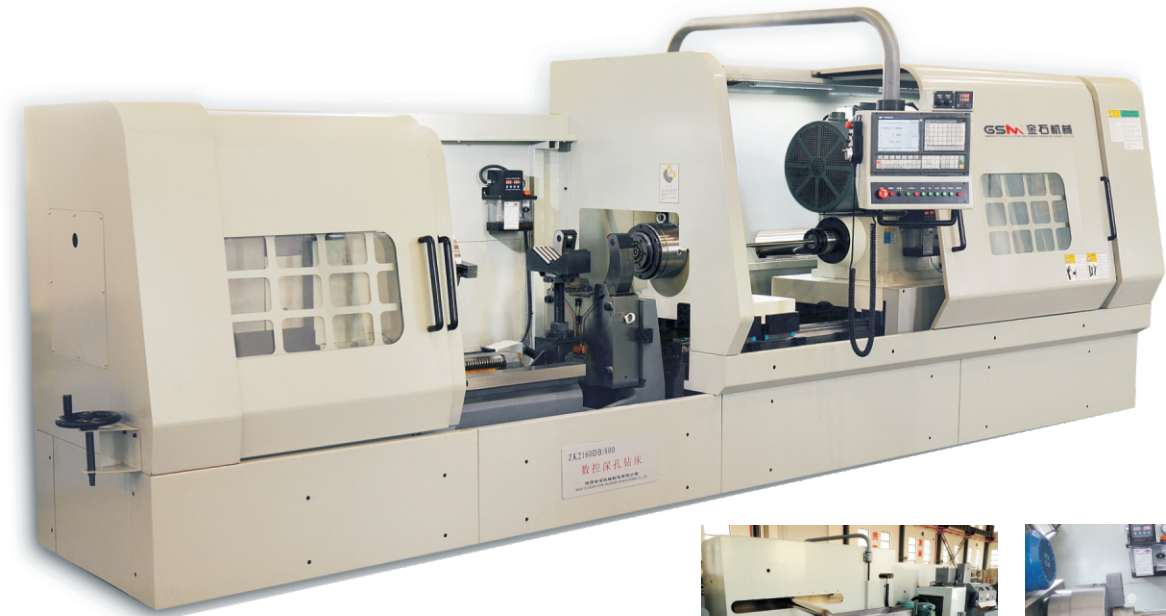
导向套、液压中心架
Guide Bush & Hydraulic Center Frame

BTA Deep Hole Drilling Machine Tool ZK2130DB/2500

Processed Method: BTA internally chip removal
Range of Hole Diameter: $\Phi 16 \sim \Phi 30\text{mm}$
Hole Depth: 2500mm
CNC System: GSK980TDC \FANUC OI Mate TC
Main Spindle of Drill Stem: Frequency speed adjustment, rotating and feeding
Main Spindle of Workpiece: Rotating at preset speed
Drill Bush: Hydraulic drive, closely aligning to the workpiece
Workpiece Clamping: Hydraulic chuck, hydraulic centre frame
Applications: Concentric holes processing on piston rods, plungers and oil cylinders of shaft parts in coal industry

BTA深孔钻机床. ZK2160DB/1000

加工方式: BTA内排屑
孔径范围: $\Phi 16 \sim \Phi 60\text{mm}$
加工孔深: 1000mm
适宜加工工件: 轴类零件同心孔加工, 如矿山机械钎头、活塞、接头、套管等高效钻孔加工
数控系统: GSK980TDC \FANUC OI Mate TC
钻杆主轴: 变频调速, 旋转且进给
工件主轴: 定速旋转
导向套: 液压驱动, 贴紧工件
工件装夹: 液压卡盘, 液压中心架



液压系统 Hydraulic System

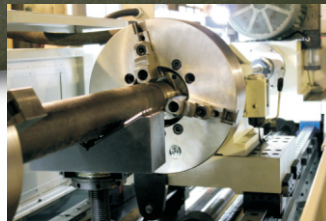
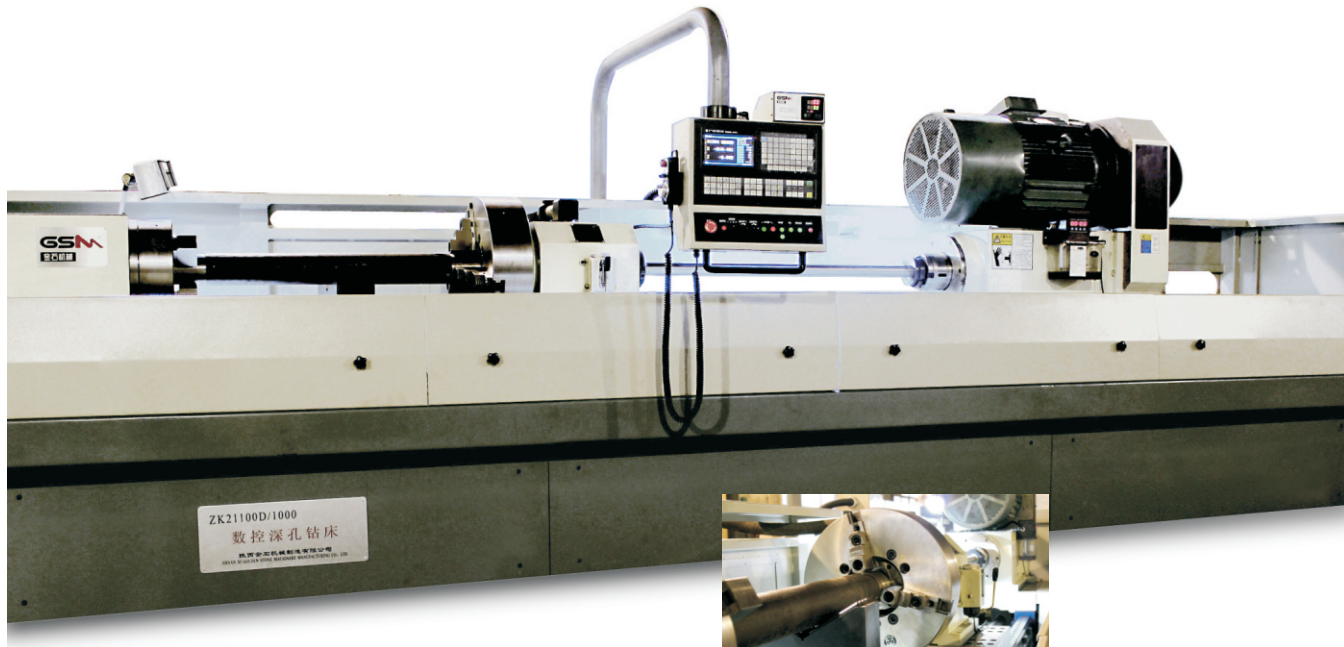


加工区 Machining Area

BTA Deep Hole Drilling Machine Tool ZK2160DB/1000

Processed Method: BTA internally chip removal
Range of Hole Diameter: $\Phi 16 \sim \Phi 60\text{mm}$
Hole Depth: 1000mm
CNC System: GSK980TDC \FANUC OI Mate TC
Main Spindle of Drill Stem: Frequency speed adjustment, rotating and feeding
Main Spindle of Workpiece: Rotating at preset speed
Drill Bush: Hydraulic drive, closely aligning to the workpiece
Workpiece Clamping: Hydraulic chuck, hydraulic center frame
Applications: Concentric holes processing of shafts parts, such as mining machinery bore bits, pistons, joints and casings.

ZK21D系列
ZK21D Series



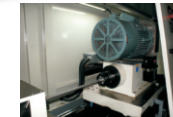
双卡盘装夹
Dual-chuck

BTA深孔钻机床. ZK21100D/1000

加工方式: BTA内排屑
孔径范围: $\Phi 40 \sim \Phi 100\text{mm}$
加工孔深: 1000mm
适宜加工工件: 轴类零件同心孔。如液压行业: 油缸
数控系统: GSK980TDC\FANUC OI Mate TC
钻杆主轴: 变频调速, 旋转且进给
工件主轴: 固定, 不旋转
导向套: 液压驱动, 贴紧工件
工件装夹: 液压卡盘夹持工件左侧, 手动卡盘夹持工件右侧, 导向套贴紧工件右端面。定心好, 夹持稳定可靠。

BTA Deep Hole Drilling Machine Tool ZK21100D/1000

Processed Method: BTA internally chip removal
Range of Hole Diameter: $\Phi 40 \sim \Phi 100\text{mm}$
Hole Depth: 1000mm
CNC System: GSK980TDC\FANUC OI Mate TC
Main Spindle of Drill Stem: Frequency speed adjustment, rotating and feeding
Main Spindle of Workpiece: Fixed without rotation
Drill Bush: Hydraulic drive, closely aligning to the workpiece
Workpiece Clamping: Left side clamped by hydraulic chuck, right side clamped by manual chuck, drill bush closely aligning to the right end surface of workpiece
Applications: Concentric holes processing of shafts parts, such as oil cylinder in hydraulic industry

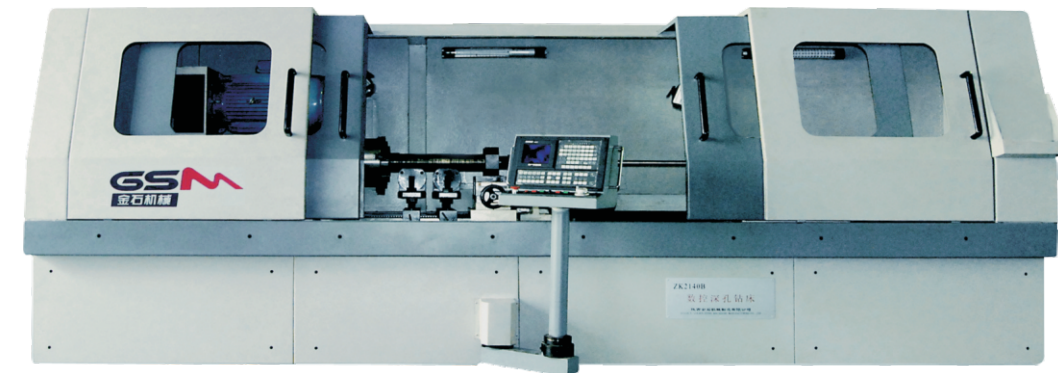


钻杆 Drill Stem

油压头 Oil Head

BTA深孔钻机床. ZK2180DB/1500

加工方式: BTA内排屑
孔径范围: $\Phi 40 \sim \Phi 80\text{mm}$
加工孔深: 1500mm;
加工工件: 轴类零件同心孔。
数控系统: GSK980TDC\FANUC OI Mate TC
钻杆主轴: 变频调速, 旋转且进给
工件主轴: 定速旋转
导向套: 液压驱动, 贴紧工件
工件装夹: 液压卡盘, 液压中心架
BTA Deep Hole Drilling Machine Tool ZK2180DB/1500
Processed Method: BTA internally chip removal
Range of Hole Diameter: $\Phi 40 \sim \Phi 80\text{mm}$
Hole Depth: 1500mm
CNC System: GSK980TDC\FANUC OI Mate TC
Main Spindle of Drill Stem: Frequency speed adjustment, rotating and Feeding
Main Spindle of Workpiece: Rotating at preset speed
Drill Bush: Hydraulic drive, closely aligning to the workpiece
Workpiece Clamping: Hydraulic chuck, hydraulic center frame
Applications: Concentric holes processing of shafts parts



喷吸式深孔钻机床. ZK2140S/1000

加工方式: 双管喷吸钻
孔径范围: $\Phi 18.5 \sim \Phi 40\text{mm}$
加工孔深: 1000mm
适宜加工工件: 轴类零件同心孔 如: 机床主轴、矿山机械活塞、油缸、钎头等
数控系统: GSK980TDC\FANUC OI Mate TC
钻杆主轴: 固定不旋转, 钻杆进给
工件主轴: 变频调速
导向套: 液压驱动, 贴紧工件
工件装夹: 液压卡盘, 自定心手动中心架

Ejector Deep Hole Drilling Machine Tool ZK2140S/1000

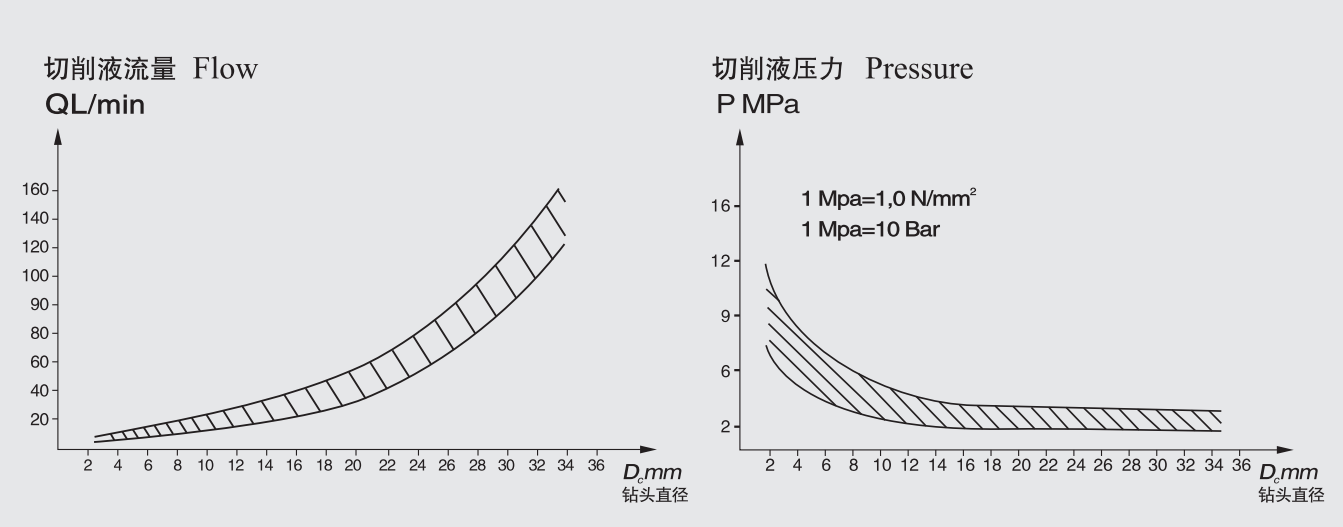
Processed Method: Double tube ejector
Range of Hole Diameter: $\Phi 18.5 \sim \Phi 40\text{mm}$
Hole Depth: 1000mm
CNC System: GSK980TDC\FANUC OI Mate TC
Main Spindle of Drill Stem: Fixed without rotation but feeding
Main Spindle of Workpiece: Frequency speed adjustment
Drill Bush: Hydraulic drive, closely aligning to the workpiece
Workpiece Clamping: Hydraulic chuck, manual center frame
Applications: Concentric holes processing on machine main shaft, mine machinery piston rods, oil cylinder and bore bits of shaft parts

深孔钻削机床切削参数及切削液压力流量表

枪钻机床的切削参数 Drilling Parameter of Gun Drilling Machine

ISO	材 料 Material		特定切削力 N/mm ² Specific cutting force n/mm ²	布氏硬度 Brinell hardness hb	切削速度 Cutting speed v.m/min	钻头直径，mm Drill bit diameter, mm			
						0,98–3,00	3,00–6,30	6,00–12,50	12,50–40,50
						进给量，mm/r Feed, fa mm/r			
P 钢 P steel	非合金 Non-alloy	非淬硬0,1–0,25% Non-quench hardened 0.1- 0.25% c	2000	90-200	60-120	0,003-0,010	0,005-0,030	0,015-0,055	0,020-0,110
		非淬硬0,25–0,55% Non-quench hardened 0.25-0.55% c	2100	125-225	50-120	0,003-0,010	0,005-0,030	0,015-0,055	0,020-0,110
		非淬硬0,55–0,80% Non-quench hardened 0.55-0.80% c	2180	150-250	40-100	0,003-0,010	0,004-0,025	0,010-0,050	0,020-0,100
		非淬硬 Non-quench hardened	2100	150-260	40-120	0,003-0,010	0,004-0,030	0,010-0,055	0,020-0,110
	低合金 Low alloy	淬硬与回火 Quench hardened and tempered	2775	220-450	40-120	0,003-0,010	0,004-0,025	0,010-0,050	0,020-0,100
		退火 Annealed	2500	150-250	40-100	0,003-0,010	0,004-0,025	0,010-0,050	0,020-0,100
	高合金 High alloy	淬硬工具钢 Quench hardened tool steel	3750	250-350	50-100	0,003-0,010	0,005-0,025	0,015-0,050	0,030-0,100
		非合金 Non-alloy	1800	90-225	50-120	0,003-0,010	0,005-0,030	0,015-0,055	0,020-0,110
	铸钢 Cast steel	低合金（合金元素 < 5%） Low alloy (alloy contents < 5%)	2100	150-250	40-100	0,003-0,010	0,004-0,025	0,010-0,050	0,020-0,100
		轧制/锻造 Rolled/forged	2300	150-270	40-90	0,003-0,008	0,004-0,025	0,010-0,040	0,020-0,100
	M 不锈钢 M stainless steel	轧制/锻造 Rolled/forged	2600	150-275	40-90	0,003-0,008	0,004-0,025	0,010-0,040	0,020-0,100
		奥氏体 Austenite							
K 铸铁 K cast iron	可锻铸铁 Malleable cast iron	铁素体 Ferrite	950	110-145	70-90	0,005-0,010	0,008-0,030	0,020-0,070	0,050-0,190
		珠光体 Pearlite	1100	150-270	60-90	0,004-0,010	0,005-0,030	0,010-0,070	0,030-0,190
	灰口铸铁 Grey cast iron	低拉伸强度 Low tensile strength	1100	150-220	60-90	0,004-0,010	0,005-0,030	0,010-0,070	0,030-0,190
		高拉伸强度 High tensile strength	1290	200-330	15-90	0,003-0,010	0,003-0,030	0,005-0,070	0,010-0,190
	球墨铸铁 Nodular cast iron	铁素体 Ferrite	1050	125-230	70-90	0,005-0,010	0,008-0,030	0,020-0,070	0,050-0,190
		珠光体 Pearlite	1750	200-300	60-90	0,004-0,010	0,005-0,030	0,010-0,070	0,030-0,190
N 有色金属 N nonferrous metal	铝合金 Aliminum alloy	铸造，非时效 Casted, non-aged	750	40-100	65-300	0,005-0,015	0,005-0,040	0,020-0,070	0,030-0,150
	铜和铜合金 Copper and copper alloy	易切合金pb > 1% Easy-cut alloy pb > 1%	700	70-160	65-300	0,005-0,015	0,005-0,040	0,020-0,070	0,030-0,150
		黄铜，加铅青铜pb ≤ 1% Brass, leaded bronze ≤ 1%	700	50-200	65-300	0,005-0,015	0,005-0,040	0,020-0,070	0,030-0,150

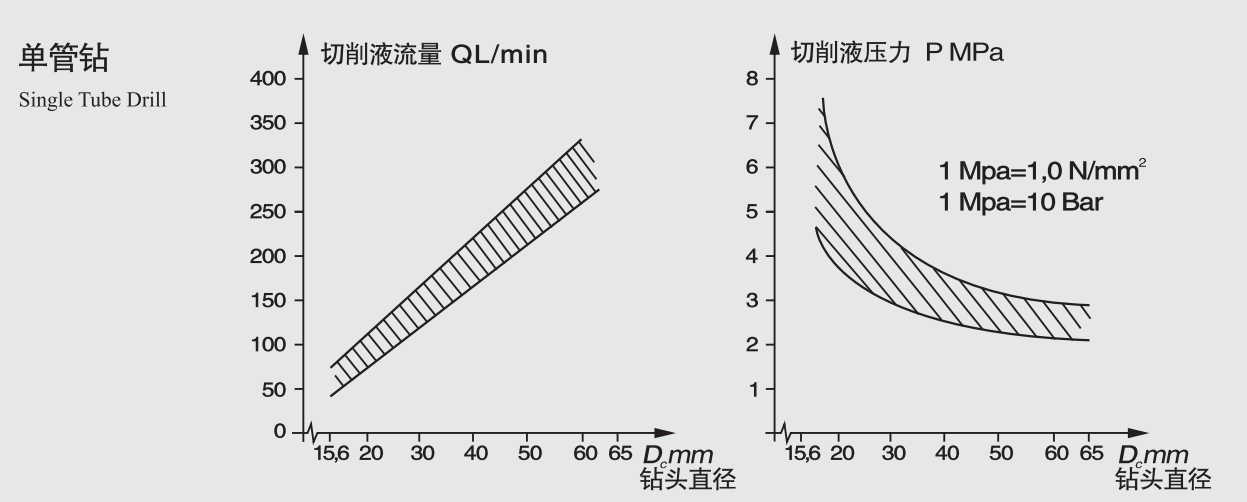
枪钻机床的冷却液压力和流量表 Coolant Pressure and Flow of the Gun Drilling Machine



BTA深孔钻床切削参数
Machining Parameters for BTA Drilling Machine

ISO	材 料		特定 切削力 N/mm ²	布氏 硬度 HB	切削 速度 V _m /min	钻头直径，mm			
						15,60–20,00	20,01–31,00	31,01–43,00	43,01–65,00
						进给量，f. mm/r			
P 钢	非合金	非淬硬 0,1–0,25% C 非淬硬 0,25–0,55% C 非淬硬 0,55–0,80% C 高碳钢，退火	2000 2100 2180 2320	90–200 125–225 150–250 180–275	70–120 70–120 70–120 70–120	0,14–0,20 ¹⁾ 0,14–0,20 ¹⁾ 0,14–0,20 0,14–0,20	0,15–0,20 ¹⁾ 0,15–0,20 ¹⁾ 0,17–0,25 0,17–0,25	0,15–0,25 0,15–0,25 0,20–0,30 0,20–0,30	0,18–0,28 0,18–0,28 0,24–0,32 0,24–0,32
	低合金	非淬硬 淬硬与回火	2100 2775	150–260 220–450	70–100 55–100	0,14–0,20 0,14–0,20	0,17–0,25 0,17–0,25	0,20–0,30 0,20–0,30	0,24–0,32 0,24–0,32
	高合金	退火 退火高速钢 淬硬工具钢 淬硬钢，其它	2500 2750 3750 4000	150–250 150–250 250–350 250–450	70–100 70–100 55–100 55–100	0,14–0,20 0,14–0,20 0,14–0,20 0,14–0,20	0,17–0,25 0,17–0,25 0,17–0,25 0,17–0,25	0,20–0,30 0,20–0,30 0,20–0,30 0,20–0,30	0,24–0,32 0,24–0,32 0,24–0,32 0,24–0,32
	铸钢	非合金 低合金（合金元素 < 5%）	1800 2100	90–225 150–270	50–100 50–100	0,12–0,18 0,12–0,18	0,15–0,22 0,15–0,22	0,20–0,28 0,20–0,28	0,24–0,32 0,24–0,32
	铸钢	奥氏体不锈钢 锰钢 12–14% Mn	2300 3600	150–250 200–300	50–85 35–70	0,16–0,20 0,16–0,20	0,18–0,25 0,18–0,25	0,22–0,30 0,22–0,30	0,24–0,36 0,24–0,36
	轧制/锻造	铁素体，马氏体 非淬硬	2300	150–270	40–85	0,16–0,20	0,18–0,25	0,22–0,30	0,24–0,36
M 不锈钢	轧制/锻造	奥氏体	2600	150–275	40–85	0,16–0,20	0,18–0,25	0,22–0,30	0,24–0,36
	轧制/锻造	奥氏体/铁素体(双相) 不可焊接 ≥ 0,05% C 奥氏体/铁素体(双相) 可焊接 < 0,05% C	2600 3000	180–290 200–320	35–60 35–60	0,12–0,15 0,12–0,15	0,20–0,27 0,20–0,27	0,22–0,30 0,22–0,30	0,25–0,35 0,25–0,35
K 铸铁	可锻铸铁	铁素体 珠光体	950 1100	110–145 150–270	80–100 80–100	0,14–0,20 0,14–0,20	0,18–0,25 0,18–0,25	0,20–0,30 0,20–0,30	0,24–0,32 0,24–0,32
	灰口铸铁	低拉伸强度 高拉伸强度	1100 1290	150–220 200–330	60–100 60–100	0,12–0,18 0,12–0,18	0,15–0,22 0,15–0,22	0,20–0,28 0,20–0,28	0,24–0,32 0,24–0,32
	球墨铸铁	铁素体 珠光体	1050 1750	125–230 200–300	50–100 50–100	0,12–0,18 0,12–0,18	0,15–0,22 0,15–0,22	0,20–0,28 0,20–0,28	0,24–0,32 0,24–0,32
N 有色金属	铝合金	铸造或锻造 + 冷作，非时效处理 铸造或铸造加时效处理	500 800	30–100 30–150	65–130 65–130	0,10–0,20 0,10–0,20	0,16–0,25 0,16–0,25	0,18–0,30 0,18–0,30	0,20–0,45 0,20–0,45
	铝合金	铸造，非时效 铸造或铸造加时效处理	750 900	40–100 70–140	65–130 65–130	0,10–0,20 0,10–0,20	0,16–0,25 0,16–0,25	0,18–0,30 0,18–0,30	0,20–0,45 0,20–0,45
	铜和铜合金	易切合金Pb > 1% 黄铜，加铅青铜Pb ≤ 1%	700 700	70–160 50–200	65–130 65–130	0,10–0,20 0,10–0,20	0,16–0,25 0,16–0,25	0,18–0,30 0,18–0,30	0,20–0,45 0,20–0,45
S 耐热优质合金	铁基	退火或固溶处理	3000	180–230	10–50	0,10–0,18	0,14–0,20	0,18–0,26	0,20–0,30
	镍基	退火或固溶处理	3320	140–300	10–50	0,10–0,18	0,14–0,20	0,18–0,26	0,20–0,30
	钴基	退火或固溶处理	3300	180–230	10–50	0,10–0,18	0,14–0,20	0,18–0,26	0,20–0,30
	钛	α，近 α 与 α + 退火处理的 β 合金	1675	Rm ²⁾ 600–1100	30–50	0,14–0,16	0,16–0,22	0,18–0,26	0,20–0,30

BTA深孔钻床的冷却液压力和流量表
Coolant Pressure and Flow of BTA Drilling Machine



感谢

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products and considerate services*

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你们的选择，是金石引以为豪的最大的骄傲

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their needs is our progressing
power and their choice is our great pride*

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我们的团队
每一位勤奋进取的金石人
你们的努力和汗水
是金石机械发展壮大的稳固基石
你们的聪明智慧
是金石机械不断前行的无限动力

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our team members for
their every effort and aspiration
their creations and wisdom
are the progressive power of G.S.M*



金石服务

GSM Services

贴心的售前售中服务

Pre-sale Services

- 客户咨询 Clients Inquiry
- 准确了解客户需求 Needs Exploration
- 制定精准、专业的个性化技术方案 Technical Proposal
 - 销售工程师 Sale Engineer
 - 设计工程师 Design Engineer
- 技术方案的交流与讨论 Proposal Exchanges
 - CAD优化设计 CAD Design
 - 销售工程师 Sale Engineer
 - 技术中心 Technology Center
 - 设计工程师 Design Engineer
 - 制造工程师 Manufacture Engineer
- 客户确认技术方案 Proposal Confirmation
- 精心制造、装配、检测、调试(GSM团队)
 - Machine Manufacture, Assembly, Inspection, Commission (GSM Team)
- 设备交付 Delivery
- 客户人员培训(GSM团队) Training

高效的售后服务

After-sale Services

- 客户问题反馈 Problems Feedback
- 准确了解故障状态(2小时内) Problems Confirmation (within 2 hours)
- 制定合理的处理方案(4小时内) Trouble Shooting (within 4 hours)
 - 电话指导处理 Phone Solution
 - 现场处理（国内48小时内） On Site Solution (within 48 hours in China)
- 故障排除及预防措施（GSM团队） Precautions (GSM Team)
- 主动回访客户 Return Visits
- 准确了解设备工作现状 Follow-up