

成线/成套 螺杆转子加工设备

A complete line of CNC screw rotor grinding machine

高精 高速 高效

High precision, high speed, high efficiency



SK 7020

智能数控螺杆转子磨床
CNC Screw Rotor Grinding Machine

机床主要用途

主要用于空压机、冷冻机、工业泵等行业磨削精密螺杆转子,也可磨削其它各种异型复杂型面的螺纹类零件。

Main usage

The machine is designed and made to grind precise screw rotors of air compressors, refrigerators, industrial pumps and other special-shaped threaded parts.

机床技术特点

- > 全数字化自动控制
- > 具备工艺参数智能优化、机床参数自整定、主轴振动自动避让、基于二维码的故障维修、Z、C轴同步动态误差补偿、进给轴全生命周期机床负荷图、机床装配质量和一致性检测分析等智能化功能。

- > 双工位高速CBN砂轮磨削;
- > 大功率同步内装电机直驱;
- > 工件自动夹持;
- > 液态自动涨紧芯轴;
- > 高精度静压导轨;
- > 全封闭防护系统;
- > 油雾处理及自动灭火系统;
- > 选配功能: 自动对刀系统, 自动在线测量系统;

Feature

- > Full-digital auto control
- > Intelligent optimization of process parameters; Machine data self-adaptive; Active avoidance of spindle vibration; dynamic error compensation of Z/C synchronization; Analysis of feeding axis lifespan; Machine assembly quality and consistency analysis;
- > Double-station & high-speed CBN wheels.
- > Powerful synchronous built-in motor with direct drive;
- > Workpiece auto clamping;
- > Auto liquid-tensioned mandrel;
- > High-precision hydrostatic guideways;
- > Full-closed protection system;
- > Oil-mist extractor and auto fire distinguisher;
- > Optional: auto wheel aligning and on-line measuring system;

机床主要工作精度 (检测螺杆标准试件):

- > 测量方法
螺杆导程精度按螺纹检测方法验收, 螺杆齿形精度按螺杆端面形状检测或检测螺杆曲面坐标, 比较螺杆空间曲面坐标与理论坐标在曲面法线方向上的误差值。

- > 精度
螺杆导程精度: 在300mm上, 0.009mm
螺杆齿形精度: 0.02 mm

Main working accuracy (as per standard testing specimen) :

- > Measuring method
In accordance with GB Standard about thread lead inspection and acceptance. Profile error: by three-coordinate measuring machine; or by error comparison between theoretical spatial surface coordinate values and measured surface coordinate values in the normal direction.

- > Accuracy
Lead error : 0.009 over 300mm length
Profile error : 0.015



机床主要规格参数:

- > 最大安装直径 ϕ 200mm
- > 顶间距 750mm
- > 中心高 210mm
- > 磨削螺纹直径 ϕ 30 - ϕ 200mm
- > 可磨螺纹的头数 1 - 99
- > 最大的螺旋升角 $\pm 55^\circ$
- > 头架主轴转速 (C轴) 0.5 ~ 50r/min
- > 系统分辨率 X、Z 0.0001mm
- > C 轴 0.0001°
- > 定位精度
X轴定位精度 0.005mm
Z轴定位精度 0.006mm
- > 重复定位精度
X轴重复定位精度 0.003mm
Z轴重复定位精度 0.003mm
C轴定位精度 10 "
- > C轴重复定位精度 6 "
- > 工作台最大纵向行程 500mm
- > 工作台最大移动速度 3000mm/min
- > CBN砂轮直径 ϕ 220 - ϕ 300mm
- > 宽度 40、50mm
- > 砂轮转速 6000 ~ 9000rpm
- > 最大工件重量 50kg

机床数控系统配置:

- > 数控系统采用SIEMENS 828D高档数控系统实现五轴三联动。
- > 控制轴数

C轴: 头架主轴回转运动	全闭环控制
Z轴: 工作台纵向运动	全闭环控制
X轴: 砂轮架横进给运动	全闭环控制
W轴: 砂轮移动	全闭环控制
A轴: 砂轮轴导程角调整运动	

其中C、Z两轴联动, 实现螺纹运动; 配置电子手轮, 可对机床各数控轴的运动进行手动控制。

Main specifications

- > Max. diameter mounted ϕ 200mm
- > Distance between centers 750mm
- > Centre height 210mm
- > Diameter of thread to be ground ϕ 30 - ϕ 200mm
- > No. of starts 1 - 99
- > Max. helix angle $\pm 55^\circ$
- > Speed of work spindle (axis C) 0.5 ~ 50r/min
- > Resolution axes X & Z 0.0001mm
- > Axis C 0.0001°
- > Positioning accuracy
Axis X 0.005mm
Axis Z 0.006mm
- > Repeating accuracy
Axis X 0.003mm
Axis Z 0.003mm
Positioning accuracy of axis C 10 "
Repeating accuracy of axis C 6 "
- > Max. table traverse 500mm
- > Max. table speed 3000mm/min
- > CBN wheel diameter ϕ 220 - ϕ 300mm
- > Thickness 40、50mm
- > Speed of wheel spindle 6000 ~ 9000rpm
- > Max.workpiece weight 50kg

CNC system :

- > SIEMENS 828D system, controlling 5 NC axes, of which 3 in linkage.
- > Programmable axes

Axis C:Rotation of work spindle	full-closed loop control
Axis Z:Table traverse	full-closed loop control
Axis X:Wheel head cross feeding	full-closed loop control
Axis W:Wheel movement	full-closed loop control
Axis A:Helix angle swiveling	

Where, C & Z are in linkage to perform thread grinding movement; Each NC axis able to move by electric handwheel manually.

SK 7032x12

数控螺杆转子磨床

CNC screw rotor grinding machine

机床主要用途

主要用于磨削空压机、冷冻机、工业泵等行业精密螺杆转子零件及其他各种异形齿面的螺纹类零件。

Main usage

The machine is mainly used to mill precise screw rotor & other thread parts with various special flanks in industries such as air-compressor, cooler & industrial pump etc.

机床数控系统配置

> 采用SIEMENS 840DSL高档数控系统，实现七轴三联动。

> 控制轴数

X轴：砂轮架横进给运动	配置光栅尺	全闭环控制
Z轴：工作台纵向运动	配置光栅尺	全闭环控制
C轴：头架主轴回转运动	配置角度编码器	全闭环控制
V轴：修整器滑座垂直运动	配置光栅尺	全闭环控制
W轴：修整器拖板水平运动	配置光栅尺	全闭环控制
A轴：砂轮架螺旋升角自动调整运动		
SP轴：砂轮主轴回转运动		

CNC system

> Equipped with a SIEMENS 840DSL CNC system, there are seven programmable axes including three synchronous ones with the machine.

> Programmable axes are

Axis X: Cross-feed of wheelhead (with grating scale)	full close-looped
Axis Z: Longitudinal table travel (with grating scale)	full close-looped
Axis C: Rotation of work spindle (with angular encoder)	full close-looped
Axis V: Vertical feed of dresser (with grating scale)	full close-looped
Axis W: Horizontal feed of dresser (with grating scale)	full close-looped
Axis A: Auto-adjustment of helix angle	
Axis SP: Rotation of wheel spindle	

机床工作精度

> 螺纹试件螺距误差：

螺距在6毫米以内的螺纹，其精度为：

相邻螺距误差	4 μm
在25mm长度上	7 μm
在100mm长度上	8 μm
在300mm在长度上	11 μm

> 螺杆试件：

(1) 测量方法

螺杆导程精度按螺纹检测方法验收，螺距齿形精度按螺距端面形状检测或检测螺距曲线坐标，比较螺距空间曲线坐标与理论坐标在曲面法线方向上的误差值。

(2) 精度

螺距导程精度：按螺纹标准试件验收，在300mm在长度上9 μm。

螺距齿形精度：0.03mm。

Working accuracy

> Pitch error of thread test

Pitch error of a part with a pitch not bigger than 6mm	
At adjacent pitch	4 μm
At any length of 25mm	7 μm
At any length of 100mm	8 μm
At any length of 300mm	11 μm

> Screw rotor test

(1) Measuring method

The lead error of screw rotor is measured & accepted in accordance with the method & standard for thread. The profile error of screw rotor is the difference between the measuring value of end face of the rotor or the curve coordinate value of the rotor profile measured and the theoretical value in the normal direction of the curve.

(2) Error

Lead error: In accordance with the standard for acceptance of thread, the lead error should be not more than 9 μm at any length of 300mm.

Profile error: 0.03mm



机床技术特点

- > 大功率内置式同步电机与高精度滚动轴承组合的砂轮主轴，使工件磨削效率和表面质量大大提高；
- > 多次优化的CNC砂轮修整器使各种形状砂轮的修整精度更高，修整柔性更好；
- > 配置恒温、大流量、双重过滤冷却系统，使螺杆转子加工精度受温度的影响程度大大减小；
- > 恒温、大流量、双重过滤冷却系统的升级及多点式工件淋浴冷却装置的开发，使滚珠丝杠加工精度受温度的影响程度大大减小；
- > 智能式磨削软件，通过人机交互方式灵活方便的实现各种砂轮形状的修整和不同工件的磨削；
- > 绿色制造技术全面提升整机安全及环境保护，全面提升机床液压、润滑系统防漏、防渗技术及导轨、电机、光栅防护系统。

机床主要技术参数

> 最大安装直径	φ 320mm
> 顶尖距	1200mm
> 工作台最大纵向行程	1000mm
> 最大磨削螺纹直径	φ 320mm
> 可磨螺杆导程	950mm
> 可磨螺杆最大深度	60 mm
> 可磨螺纹最大螺旋角	± 60°
> 可磨螺纹头数	1 ~ 99 (任意)
> 头架主轴转速 (C轴)	0.5 ~ 50r/min
> 砂轮尺寸	
直径	φ 500mm ~ φ 350mm
内径	φ 203mm
厚度	60、80、100、120mm
> 砂轮主轴转速	1910r ~ 2750r/min
> 最大工件重量	350kg
> 机床重量	约8500Kg

Features

- > The wheel spindle is driven by a powerful built-in synchronous motor and supported by precise rolling bearings, resulting a high grinding effectiveness & good surface quality.
- > A CNC dresser has optimized several times, resulting a high dressing precision & flexibility.
- > Thanks for the updating of the coolant system featured of constant temperature, large flow as well as double-filtering, and development of cooling device of multi-pointed showing, the thermal influence on machining accuracy is decreased sharply.
- > The intelligent grinding software makes that the dressing of wheel with various profiles and the grinding of different workpieces is smart and easy by man-computer interactive conversation.
- > Thanks for the green manufacturing technology, we have improve the safety of the machine & environmental protection entirely, for details, we have improve the protection for leakage of the hydraulic & lubrication system, guide ways, motor as well as grating etc.

Main technical data

> Max. diameter mounted	φ 320mm
> Max. center distance	1200mm
> Max. longitudinal travel of table	1000mm
> Max. thread diameter to be ground	φ 320mm
> Max. lead to be ground	950mm
> Max. thread depth to be ground	60 mm
> Max. helix angle	± 60°
> No. of starts	1 ~ 99 (any)
> Speed of work spindle (axis C)	0.5 ~ 50r/min
> Wheel size	
OD.	φ 500mm ~ φ 350mm
ID.	φ 203mm
Thickness	60、80、100、120mm
> Speed of wheel spindle	1910r ~ 2750r/min
> Max. weight of workpiece	350kg
> Machine weight	(Approx.)8500Kg

SK 7032x750

数控螺杆转子磨床

CNC screw rotor grinding machine

机床主要用途

主要用于磨削空压机、冷冻机、工业泵等行业精密螺杆转子零件及其他各种异形齿面的螺纹类零件。

Main usage

The machine is mainly used to grind precise screw rotor & other thread parts with various special flanks in industries such as air-compressor, cooler & industrial pump etc.

机床数控系统配置

> 采用SIEMENS 840DSL高档数控系统，实现七轴三联动。

> 控制轴数

X轴：砂轮架横进给运动 配置光栅尺 全闭环控制
Z轴：工作台纵向运动 配置光栅尺 全闭环控制
C轴：头架主轴回转运动 配置角度编码器 全闭环控制
V轴：修整器滑座垂直运动 配置光栅尺 全闭环控制
W轴：修整器拖板水平运动 配置光栅尺 全闭环控制

A轴：砂轮架螺旋升角自动调整运动

SP轴：砂轮主轴回转运动

CNC system

> Equipped with a SIEMENS 840DSL CNC system, there are seven programmable axes including three synchronous ones with the machine.

> Programmable axes are

Axis X: Cross-feed of wheelhead (with grating scale) full close-looped
Axis Z: Longitudinal table travel (with grating scale) full close-looped
Axis C: Rotation of work spindle (with angular encoder) full close-looped
Axis V: Vertical feed of dresser (with grating scale) full close-looped
Axis W: Horizontal feed of dresser (with grating scale) full close-looped
Axis A: Auto-adjustment of helix angle
Axis SP: Rotation of wheel spindle

机床工作精度

> 螺纹试件螺距误差：

螺距在6毫米以内的螺纹，其精度为：

相邻螺距误差 3 μm
在25mm长度上 5 μm
在100mm长度上 6 μm
在300mm在长度上 9 μm

> 螺杆试件：

(1) 测量方法

螺杆导程精度按螺纹检测方法验收，螺距齿形精度按螺距端面形状检测或检测螺距齿形坐标，比较螺距空间曲线坐标与理论坐标在曲面法线方向上的误差值。

(2) 精度

螺距导程精度：按螺距标准试件验收，在300mm在长度上9 μm。

螺距齿形精度：±0.03mm。

Working accuracy

> Pitch error of thread test

Pitch error of a part with a pitch not bigger than 6mm
At adjacent pitch 3 μm
At any length of 25mm 5 μm
At any length of 100mm 6 μm
At any length of 300mm 9 μm

> Screw rotor test

(1) Measuring method

The lead error of screw rotor is measured & accepted in accordance with the method & standard for thread. The profile error of screw rotor is the difference between the measuring value of end face of the rotor or the curve coordinate value of the rotor profile measured and the theoretical value in the normal direction of the curve.

(2) Error

Lead error: In accordance with the standard for acceptance of thread, the lead error should be not more than 9 μm at any length of 300mm.

Profile error: ± 0.03mm



机床技术特点

- > 大功率内置式同步电机与高精度滚动轴承组合的砂轮主轴，使工件磨削效率和表面质量大大提高；
- > 多次优化的CNC砂轮修整器使各种形状砂轮的修整精度更高，修整柔性更好；
- > 配置恒温、大流量、双重过滤冷却系统，使螺杆转子加工精度受温度的影响程度大大减小；
- > 恒温、大流量、双重过滤冷却系统的升级及多点式工件淋浴冷却装置的开发，使滚珠丝杠加工精度受温度的影响程度大大减小；
- > 智能式磨削软件，通过人机交互方式灵活方便的实现各种砂轮形状的修整和不同工件的磨削；
- > 绿色制造技术全面提升整机安全及环境保护，全面提升机床液压、润滑系统防漏、防渗技术及导轨、电机、光栅防护系统。

机床主要技术参数

- > 最大安装直径 φ 200mm
- > 顶尖距 750mm
- > 工作台最大纵向行程 550mm
- > 最大磨削螺纹直径 φ 200mm
- > 可磨螺杆导程 400mm
- > 可磨螺杆最大深度 35 mm
- > 可磨螺纹最大螺旋角 ± 55°
- > 可磨螺纹头数 1 ~ 99 (任意)
- > 头架主轴转速 (C轴) 0.5 ~ 50r/min
- > 砂轮尺寸
 - 直径 φ 500mm ~ φ 400mm
 - 内径 φ 203mm
 - 厚度 40mm、50mm
- > 砂轮主轴转速 1910r ~ 2750r/min
- > 最大工件重量 200kg
- > 机床重量 约6500Kg

Features

- > The wheel spindle is driven by a powerful built-in synchronous motor and supported by precise rolling bearings, resulting a high grinding effectiveness & good surface quality.
- > A CNC dresser has optimized several times, resulting a high dressing precision & flexibility.
- > Thanks for the updating of the coolant system featured of constant temperature, large flow as well as double-filtering, and development of cooling device of multi-pointed showing, the thermal influence on machining accuracy is decreased sharply.
- > The intelligent grinding software makes that the dressing of wheel with various profiles and the grinding of different workpieces is smart and easy by man-computer interactive conversation.
- > Thanks for the green manufacturing technology, we have improve the safety of the machine & environmental protection entirely, for details, we have improve the protection for leakage of the hydraulic & lubrication system, guide ways, motor as well as grating etc.

Main technical data

- > Max. diameter mounted φ 200mm
- > Max. center distance 750mm
- > Max. longitudinal travel of table 550mm
- > Max. thread diameter to be ground φ 200mm
- > Max. lead to be ground 400mm
- > Max. thread depth to be ground 35 mm
- > Max. helix angle ± 55°
- > No. of starts 1 ~ 99 (any)
- > Speed of work spindle (axis C) 0.5 ~ 50r/min
- > Wheel size
 - OD. φ 500mm ~ φ 400mm
 - ID. φ 203mm
 - Thickness 40mm、50mm
- > Speed of wheel spindle 1910r ~ 2750r/min
- > Max. weight of workpiece 200kg
- > Machine weight (Approx.)6500Kg

SK 7040x20

数控螺杆转子磨床

CNC screw rotor grinding machine

机床主要用途

主要用于磨削空压机、冷冻机、工业泵等行业精密螺杆转子零件及其他各种异形齿面的螺纹类零件。

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> 采用SIEMENS 840DSL高档数控系统，实现七轴三联动。

> 控制轴数

- X轴：砂轮架横进给运动 配置光栅尺 全闭环控制
- Z轴：工作台纵向运动 配置光栅尺 全闭环控制
- C轴：头架主轴回转运动 配置角度编码器 全闭环控制
- V轴：修整器滑座垂直运动 配置光栅尺 全闭环控制
- W轴：修整器拖板水平运动 配置光栅尺 全闭环控制
- A轴：砂轮架螺旋升角自动调整运动
- SP轴：砂轮主轴回转运动

CNC system

> Equipped with a SIEMENS 840DSL CNC system, there are seven programmable axes including three synchronous ones with the machine.

> Programmable axes are

- Axis X: Cross-feed of wheelhead (with grating scale) full close-looped
- Axis Z: Longitudinal table travel (with grating scale) full close-looped
- Axis C: Rotation of work spindle (with angular encoder) full close-looped
- Axis V: Vertical feed of dresser (with grating scale) full close-looped
- Axis W: Horizontal feed of dresser (with grating scale) full close-looped
- Axis A: Auto-adjustment of helix angle
- Axis SP: Rotation of wheel spindle

机床工作精度

> 螺纹试件螺距误差：

螺距在6毫米以内的螺纹，其精度为：

- 相邻螺距误差 4 μm
- 在25mm长度上 7 μm
- 在100mm长度上 8 μm
- 在300mm在长度上 11 μm

> 螺杆试件：

(1) 测量方法

螺杆导程精度按螺纹检测方法验收，螺齿齿形精度按螺齿端面形状检测或检测螺齿杆端面坐标，比较螺齿空间坐标与理论坐标在曲面法线方向上的误差值。

(2) 精度

螺杆导程精度：按螺纹标准试件验收，在300mm在长度上9 μm。

螺齿齿形精度：±0.03mm。

Working accuracy

> Pitch error of thread test

- Pitch error of a part with a pitch not bigger than 6mm
- At adjacent pitch 4 μm
- At any length of 25mm 7 μm
- At any length of 100mm 8 μm
- At any length of 300mm 11 μm

> Screw rotor test

(1) Measuring method

The lead error of screw rotor is measured & accepted in accordance with the method & standard for thread. The profile error of screw rotor is the difference between the measuring value of end face of the rotor or the curve coordinate value of the rotor profile measured and the theoretical value in the normal direction of the curve.

(2) Error

Lead error: In accordance with the standard for acceptance of thread, the lead error should be not more than 9 μm at any length of 300mm.

Profile error: ± 0.03mm



机床技术特点

- > 大功率内置式同步电机与高精度滚动轴承组合的砂轮主轴，使工件磨削效率和表面质量大大提高；
- > 多次优化的CNC砂轮修整器使各种形状砂轮的修整精度更高，修整柔性更好；
- > 配置恒温、大流量、双重过滤冷却系统，使螺杆转子加工精度受温度的影响程度大大减小；
- > 恒温、大流量、双重过滤冷却系统的升级及多点式工件淋浴冷却装置的开发，使滚珠丝杠加工精度受温度的影响程度大大减小；
- > 智能式磨削软件，通过人机交互方式灵活方便的实现各种砂轮形状的修整和不同工件的磨削；
- > 绿色制造技术全面提升整机安全及环境保护，全面提升机床液压、润滑系统防漏、防渗技术及导轨、电机、光栅防护系统。

机床主要技术参数

- > 最大安装直径 φ 400mm
- > 顶尖距 2000mm
- > 工作台最大纵向行程 1750mm
- > 最大磨削螺纹直径 φ 400mm
- > 可磨螺杆导程 1600mm
- > 可磨螺杆最大深度 90 mm
- > 可磨螺纹最大螺旋角 ± 60°
- > 可磨螺纹头数 1 ~ 99 (任意)
- > 头架主轴转速 (C轴) 0.5 ~ 50r/min
- > 砂轮尺寸
 - 直径 φ 500mm ~ φ 350mm
 - 内径 φ 203mm
 - 厚度 60mm、80mm、100mm、120mm
- > 砂轮主轴转速 1910r ~ 2750r/min
- > 最大工件重量 600kg
- > 机床重量 约12000Kg

Features

- > The wheel spindle is driven by a powerful built-in synchronous motor and supported by precise rolling bearings, resulting a high grinding effectiveness & good surface quality.
- > A CNC dresser has optimized several times, resulting a high dressing precision & flexibility.
- > Thanks for the updating of the coolant system featured of constant temperature, large flow as well as double-filtering, and development of cooling device of multi-pointed showing, the thermal influence on machining accuracy is decreased sharply.
- > The intelligent grinding software makes that the dressing of wheel with various profiles and the grinding of different workpieces is smart and easy by man-computer interactive conversation.
- > Thanks for the green manufacturing technology, we have improve the safety of the machine & environmental protection entirely, for details, we have improve the protection for leakage of the hydraulic & lubrication system, guide ways, motor as well as grating etc.

Main technical data

- > Max. diameter mounted φ 400mm
- > Max. center distance 2000mm
- > Max. longitudinal travel of table 1750mm
- > Max. thread diameter to be ground φ 400mm
- > Max. lead to be ground 1600mm
- > Max. thread depth to be ground 90 mm
- > Max. helix angle ± 60°
- > No. of starts 1 ~ 99 (any)
- > Speed of work spindle (axis C) 0.5 ~ 50r/min
- > Wheel size
 - OD. φ 500mm ~ φ 350mm
 - ID. φ 203mm
 - Thickness 60mm、80mm、100mm、120mm
- > Speed of wheel spindle 1910r ~ 2750r/min
- > Max. weight of workpiece 600kg
- > Machine weight (Approx.)12000Kg

SK 6420

数控螺杆转子铣床
CNC screw rotor grinding machine

机床主要用途

SK6420数控螺杆转子铣床主要用于空压机、冷冻机、工业泵等行业精密螺杆转子及其他各种异形螺旋面类零件的铣削加工，也可用于ZA、ZN、ZI、ZK型圆柱形蜗杆铣削加工。机床CNC系统可控制五轴三联动，实现异形螺旋面工件的铣削加工。

Main usage

SK6420 CNC screw rotor milling machine, having 5 axes of which 3 are linked, is mainly used to machine screw rotors of air compressors, freezer and industrial pumps, and cylindrical worms with ZA, ZN, ZI, ZK tooth profiles.

机床特点

- > 机床采用高强度、高刚性结构设计，并应用最新技术研究成果；
- > 头架采用了大减速比的齿轮箱和蜗轮蜗杆副驱动工件，铣刀架采用矩形铸钢导轨，并带有自动夹紧机构，夹紧可靠，具有良好的支撑强度和高刚性；
- > 铣刀主轴采用大扭矩、大功率驱动电机，交流变频调速，实现刀具无极调速，配合使用硬质合金镶片铣刀，提高切削效率；
- > 导轨润滑采用自动间歇润滑。

Features

- > High strength and rigidity structure;
- > Head spindle driven by large reduction ratio gears and worm pair;
- > Milling cutter stand auto locking and moving along rectangular cast steel guide rails;
- > Large torque and powerful servo motor driving cutter spindle;
- > Material cut by carbide inserts;
- > Auto intermittent lubrication for rails;

Working accuracy
铣削螺杆的螺距精度： $\pm 0.035\text{mm}$ 。
Pitch error of screw rotor machined:



机床数控系统、电气系统主要配置及要求

> 数控系统:

采用台湾宝元专用高档数控系统,实现四轴三联动。

> 控制轴数:

Z轴:工作台的纵向运动 X轴:铣刀架的横进给运动

C轴:头架主轴的回转运动

A轴:铣刀架的自动旋转

其中 C、Z两轴联动，实现螺纹运动;配置电子手轮，可对机床各数控轴的运动进行手动控制。

> 数控系统功能

- 1)补偿功能:反向间隙补偿、丝杠螺距误差补偿;
- 2)进给功能:快速进给，精进给。进给倍率调整（每分钟/每转）
- 3)最小脉冲量:直线轴 0.001mm、旋转轴0.001°。

> 其余主要电气元件配置

- 1)电气控制柜防护等级IP54，配置壁挂式工业空调,电柜内安装维修用照明灯及电源插座;
- 2)动力电缆和信号电缆分开安装，避免电磁干扰，保证控制系统可靠运行。

> CNC System:

TAIWAN LNC special CNC system. Controlling 4 axes , 3 of them in a linkage

> NC axes :

Z axis: longitudinal movement of the table .

X axis: cross feed t of the milling cutter spindle.

C axis: rotation of the work spindle

A axis: automatic adjusting of helix angle

The C and Z axes are linked to realize thread movement;

Equipped with MPG , each axis can be controlled manually.

> Function of CNC system

- 1) Compensation function: backlash compensation, pitch error compensation;
- 2) Feed function: fast feed, fine feed ; feed rate adjustment (per minute and per turn)
- 3) Minimum pulse: linear axis 0.001mm, rotary axis 0.001° .

> Configuration of other main electrical components

- 1) Electrical cabinet protection level is IP54, cabinet equipped with air conditioner; installed lights and power outlets for maintenance;
- 2) Power cables and signal cables are installed separately to avoid electromagnetic interference and ensure the control system operation stable and reliable.

主要技术参数

- > 最大安装直径 250mm
- > 最大顶尖距 750mm
- > 中心高 240mm
- > 最大可加工直径 200mm
- > 铣刀轴线与工件轴线最小距离 110mm
- > 可加工螺纹最大长度 700mm
- > 工作台最大行程 700mm
- > 可加工牙型最大深度 40mm
- > 可加工螺纹最大螺旋升角 $\pm 55^\circ$
- > 可加工螺纹的头数 1 ~ 99(任意)
- > 铣刀架横向移动量 280mm
- > 铣刀主轴转速 50 ~ 300r/min
- > 铣刀尺寸
 - 外径 $\phi 280 \sim \phi 250\text{mm}$
 - 内径 $\phi 60\text{mm}$
 - 最大宽度 100mm

Main specifications

- > Max. diameter mounted 250mm
- > Max. center distance 750mm
- > Center Height 240mm
- > Max. work-piece machine diameter 200mm
- > Min. distance between central line of cutter and work-piece 110mm
- > Max. work-piece machining length 700mm
- > Max. table stroke 700mm
- > Max. tooth depth 40mm
- > Helix angle range $\pm 55^\circ$
- > No. of thread starts 1 ~ 99(any)
- > Cross traverse of cutter stand 280mm
- > Speed of cutter spindle 50 ~ 300rad/min
- > Cutter size
 - OD $\phi 280 \sim \phi 250\text{mm}$
 - ID $\phi 60\text{mm}$
 - Max. width 100mm

SK 6432A

数控螺杆转子铣床

CNC screw rotor grinding machine

机床主要用途

主要用于铣削加工空压机、冷冻机、工业泵等行业精密螺杆转子零件及其他各种异形齿面的螺纹类零件。

Main usage

The machine is mainly used to mill precise screw rotor & other thread parts with various special flanks in industries such as air-compressor, cooler & industrial pump etc.

机床数控系统配置

- > 采用SIEMENS 828D高档数控系统,实现四轴三联动。
- > 控制轴数
 - Z轴: 工作台纵向运动
 - X轴: 铣刀架横进给运动
 - C轴: 头架主轴回转运动
 - B轴: 铣刀架在垂直平面内回转运动
- 其中C、Z两轴联动,实现螺纹运动;配置电子手轮,可对机床各数控轴的运动进行手动控制。

CNC system

- > There are four programmable axes including three synchronous one with the machine, caused by the appliance of SIEMENS 828D high-level CNC system.
- > Programmable axes:
 - Axis Z: table longitudinal traverse
 - Axis X: Cross-feed of miller's holder
 - Axis C: Rotation of work spindle
 - Axis B: Swivel of miller's holder in the vertical plane
- The thread is generated by the synchronous movement of axes C & Z. With the operation of MPGs, the programmable axes can be controlled manually.

Working accuracy

铣削螺杆的螺距精度: $\pm 0.035\text{mm}$ 。
Pitch error of screw rotor machined:



机床技术特点 Features

- > 工件装夹采用两顶尖定心,带动头带动旋转,使用托架作为辅助支撑;
- > 尾架采用液压驱动,刚性充足,可自动补偿加工时工件的热伸长;
- > 铣刀主轴由变频电机经过精密齿轮减速箱、同步齿形带驱动,功率强劲,可实现无级调速;
- > 铣削刀具采用硬质合金可转位镶片式铣刀,切削效率高;
- > 工作台导轨采用矩形滑动导轨,承载力大,刚性好;
- > 铣刀架导轨采用重载滚柱直线导轨,配置自动锁紧机构,承载力大,刚性好;
- > 铣刀主轴螺旋升角调整采用伺服调整,调整方便,准确度高。

Features

- > The workpiece is tapered with two centers, drives with driving dog and supported with steady rest.
- > Driven by hydraulic power, with sufficient rigid, the tailstock can compensate the thermal expansion of the workpiece during milling.
- > The tool spindle is driven by a motor regulated with a frequency converter through precise gear box & timely belt, so it is run powerfully at a stepless speed.
- > The miller is combined with indexing carbide inserts with high effectiveness.
- > The guide ways of the table is one with rectangular section, so featured of heavy load and high rigid.
- > The miller's holder is fed along the heavy-loading linear roller guides, and equipped with a self-locking mechanism, resulting a heavy load and great rigid.
- > The adjustment of helix angle is done by means of servo motor, so it is convenient and precise.

机床主要规格参数

- > 最大安装直径 320mm
- > 最大顶尖距 1200mm
- > 最大铣削螺纹直径 250mm
- > 可铣削螺纹的最大螺旋角 $\pm 55^\circ$
- > 可铣削螺纹头数 1 ~ 99 (任意)
- > 可铣削牙形最大深度 50mm
- > 可铣削螺纹最大长度 1000mm
- > 工作台纵向最大行程 1100mm
- > 铣刀架横向最大行程 200mm
- > 铣刀电机功率 33KW
- > 铣刀尺寸
 - 外径 $\phi 250\text{mm}$
 - 内径 $\phi 60\text{mm}$
 - 宽度 120mm
- > 铣刀主轴转速 50 ~ 200r/min
- > 工件最大重量 200Kg
- > 机床重量 约8500Kg

Main Technical Data

- > Max. diameter mounted 320mm
- > Max. center distance 1200mm
- > Max. thread diameter milled 250mm
- > Max. helix angle milled $\pm 55^\circ$
- > No. of starts milled 1 ~ 99 (any)
- > Max. thread depth milled 50mm
- > Max. length of thread milled 1000mm
- > Max. longitudinal travel of table 1100mm
- > Max. horizontal travel of mill holder 200mm
- > Power of tool spindle motor 33KW
- > Miller size
 - OD. $\phi 250\text{mm}$
 - ID. $\phi 60\text{mm}$
 - Thickness 120mm
- > Speed of tool spindle 50 ~ 200r/min
- > Max. weight of workpiece 200Kg
- > Machine weight (Approx.) 约8500Kg

螺杆转子加工实际



荣誉





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