

# YKH2035

数控螺旋锥齿轮磨齿机

YKH2035 CNC SPIRAL BEVEL GEAR GRINDER



中国天津第一机床总厂  
TIANJIN NO.1 MACHINE TOOL WORKS, CHINA



# YKH2035 数控螺旋锥齿轮磨齿机

## I. 机床的主要用途及使用范围

本机床用于精密磨削最大模数10毫米、最大加工直径为350毫米的螺旋锥齿轮，磨齿后的齿轮精度可稳定达到GB5级。该机床具有较高的加工柔性、良好动力传动特性、稳定的运动精度和安全的操作性能，适用于加工精密机械、高精度减速机、汽车主传动等中等规格的高精度弧齿锥齿轮，能够显著提高加工后的齿轮传动精度及传动平稳性。

## II. 机床的主要性能和结构特点

1. 本机床采用直线轴联动运动，机床床身采用L形布局，具有良好的刚性。机床的三个直线轴的进给运动均采用精密滚珠丝杠副及直线导轨副驱动，工件主轴和砂轮主轴分别采用力矩电机和电主轴直接驱动，各轴配置海德汉全闭环位置控制，以保证良好的运动精度。
2. 工件箱的摆动由转台来实现。转台为B轴和E轴，E轴实现齿形展成过程中的转台摆动，B轴实现根锥角调整及上下料时的大角度回转。
3. 本机床配备在线测量装置，可在机测量被加工齿轮的齿距误差和齿形偏差，并可对机床中心误差及砂轮修整误差进行补偿，从而实现加工误差的闭环控制。借助在线测量装置机床还可实现自动对刀及自动余量分配控制。
4. 采用德国西门子（SIEMENS）公司的840DSL数控系统实现七轴五联动的运动控制，通过人性化的磨削软件包实现机床的自动调整，可完成普通滚切法、滚切修正法、刀倾修正法等多种磨齿加工方法。磨削软件操作简单，使用方便。
5. 采用金刚滚轮实现砂轮形状精确修整，从而提高齿面光洁度和加工精度。通过先进的加工软件可进行砂轮形状的修形从而实现齿面形状的修正。



# YKH2035 CNC SPIRAL BEVEL GEAR GRINDER

## I . APPLICATIONS

This machine is designed for grinding precisely spiral bevel gears of module up to 10mm and diameter up to 350mm. The accuracy of the gear machined on this machine can reach Grade 5 of the GB Standard stably. With a better machining flexibility, excellent power transmission characteristics, stable dynamic accuracy and safe operation, the machine is suitable for grinding middle-sized high precision spiral bevel gears used for precision machinery, high precision speed reducers and main drives of automobile to improve tremendously the transmission accuracy and transmission smoothness of the gears machined.

## II. MACHINE FEATURES

1. The machine adopts simultaneous movements of the linear axes and an L-shape machine frame for better rigidity. The feed motions of the three linear axes are driven through precision ball screws and linear guideways, and the work spindle is driven directly by means of a torque motor. The full-loop position controls of all the axes are through the HEINDENHEIN gratings to ensure the excellent dynamic accuracy.
2. A rotary table performs the swinging of the workhead and the rotary table is the B-axis and the E-axis. The E-axis controls the swinging of the workhead during the generation of the tooth profile and the B-axis performs the adjustments of the root angle and the large-angle rotation for the workpiece loading and unloading.
3. An on-line measuring device is equipped on the machine to check the pitch error and the tooth profile deviation of the gear being machined and to compensate the machine center error and the error from the grinding wheel dressing in order to perform the full-loop control of the machining error. With the help the on-line measuring device, automatic tool setting and automatic stock dividing are possible on the machine.
4. A SIEMENS 840DSL 7-axis CNC control system is equipped on the machine to perform the 5-axis simultaneous movements. Through a user-friendly gear grinding software package, automatic machine adjustments can be made and the machine can grind gears with various gear grinding methods, such as the generating method, the modified roll method or modified cutter tilt method. The gear grinding software is simple for operation and easy for use.
5. A diamond roller is used for the precise dressing of the grinding wheel profile to improve the surface finish of the tooth surfaces and the machining accuracy.

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## III. 机床主要技术参数 SPECIFICATIONS

1. 机床规格	CAPACITY		
最大加工直径	Max. diameter of work	mm	350
最大加工模数	Max. module of work	mm	10
加工齿轮节锥角	Pitch angle	度°	5-85
最大齿深	Max. tooth depth	mm	18
最大齿宽	Max. face width	mm	60
加工齿数范围	Teeth number		5-200
最大传动比	Extreme ratio		10: 1
工件主轴锥度	Taper of work spindle		1: 19.6923
工件主轴锥孔深度	Depth of taper hole of work spindle	mm	160
工件主轴大端直径	Diameter of taper hole at large end	mm	99.219
工件主轴通孔直径	Diameter of through hole of work spindle	mm	78
2. 砂轮直径	Diameter of grinding wheel	"	2-9
3. 砂轮主轴上安装砂轮的定心轴尺寸	Size of positioning shaft for mounting the grinding wheel	mm	58.221; Taper 1:24
4. 各轴转速	Speeds		
A轴 (工件主轴)	A-axis (work spindle)	rpm	0-85
B轴 (工件箱回转)	B-axis (workhead rotation)	rpm	0-5
C轴 (砂轮主轴)	C-axis (grinding wheel rotation)	rpm	0-9000
U轴 (砂轮修整器)	U-axis (grinding wheel dresser)	rpm	0-10000
5. 电气参数	ELECTRICAL DATA		
砂轮主轴电机功率	Power of grinding wheel spindle moter	Kw	24
工件主轴电机功率	Power of work spindle motorr	Kw	4.38
B轴电机功率	Power of B-axis motor	Kw	5.8
砂轮修整机构电机功率	Power of motor for wheel dresser	Kw	0.75
X轴电机功率	Power of X-axis motor	Kw	3.3
Y轴电机功率	Power of Y-axis motor	Kw	3.3
Z轴电机功率	Power of Z-axis motor	Kw	3.3
6. 其它	MISCELANEOUS		
机床外型尺寸 (长×宽×高)	Overall dimensions (L×W×H)	mm	3120×2580×2510
机床净重	Machine weight	t	15
动力电源参数	Power supply	V, Hz	380, 50
机床总功率	Total power	KVA	60
气源压力	Compressed air	Mpa	0.7-0.8

注：随着产品不断更新，技术数据将有所变更，届时请联系我们。

Note: The specifications are reference for you only, because of the continuous development of our product.

天津第一机床总厂

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