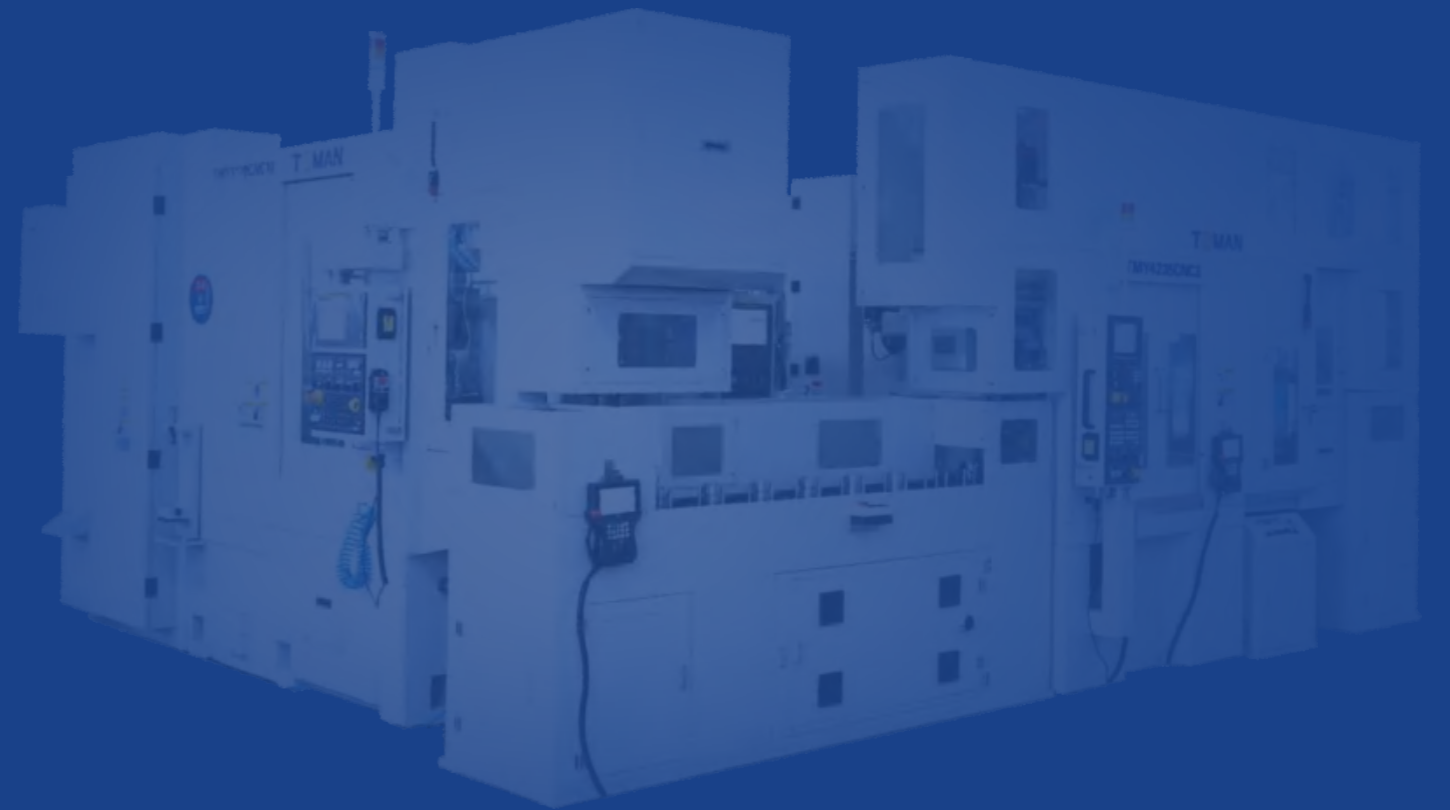


**TOMAN | 陀曼**  
智者·总是领先一步

精密加工与自动化装备  
PRECISE PROCESSING AND AUTOMATION EQUIPMENT



**TOMAN**

**浙江陀曼智能科技股份有限公司**  
ZHEJIANG TOMAN INTELLIGENT TECHNOLOGY CO., LTD.

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**TOMAN 浙江陀曼智能科技股份有限公司**  
智者·总是领先一步 ZHEJIANG TOMAN INTELLIGENT TECHNOLOGY CO., LTD.

浙江陀曼智能科技股份有限公司成立于2006年，主要从事齿轮高端数控机床、轴承自动生产线、智能制造软件以及专业智能装备等相关产品研发、制造和服务。

Zhejiang Toman Intelligent Technology Co., Ltd. was founded in 2006, mainly engaged in the R&D, manufacturing, and service for top CNC gear processing machine tools, bearing automatic production lines, intelligent manufacturing software, and professional intelligent equipment etc.

“陀曼”意为“宇宙运动之轴心”，代表一种“核心和领导”的地位，表达公司致力于成为“细分领域隐形冠军”的决心和愿望。“TOMAN”为“古波斯金币”之意，表达公司“为员工创造幸福、为客户创造财富、为社会创造价值”的愿望。

The name "toman" means "the axis of cosmic motion", symbolizing a position of "core and leadership", which expresses our determination and aspiration to become a "hidden champion in specialized fields". "toman" also means "ancient Persian gold coin", embodying the company's aspiration to "create happiness for employees, generate wealth for customers, and create value for society".



**专业生产各类齿轮加工机床以及自动化生产线!**

Professional production of all kinds of gear processing machine tools and automatic production line.

**为客户提供齿轮加工的高效、高精度、高性价比的综合解决方案!**

To provide customers with high efficiency, high precision, cost-effective comprehensive solutions for gear processing.

**数控滚齿机系列:**

CNC Gear Hobbing Machine Series:



Y3110CNC



Y3115CNC



Y3120CNC



Y3125CNC



Y3135CNC



Y3140/50CNC

外观仅供参考，我可保留跟进需要随时更改外观的权利。  
The appearance is for reference only, we reserve the right to change the appearance at any time after the need.

**复合机系列**  
Compound Gear Hobbing Machine Series



滚倒一体复合机  
Gear Hobbing Machine with Integrated Chamfering Station



滚棱一体复合机  
Gear Hobbing Machine with Integrated Chamfer Hobbing Unit



数控剃齿机  
CNC Gear Shaving Machine

**数控磨齿机系列**  
CNC Gear Grinding Machine Series



高效数控磨齿机  
High-efficiency CNC Gear Grinding Machine

**齿轮自动化生产线系列**  
Automatic Production Line Series



齿轮桁架式自动化生产线  
Automatic Production Line with Truss Robot

# 产品特性 Product Features

在简约、紧凑之中追求高性能，全面“智能化”的数控滚齿机。  
作为新一代畅销机型，实现了高效生产、高精度滚切加工。

- High performance
- Simple and compact
- Fully intelligence

As the best selling model, it realizes high-efficiency production and high-precision gear hobbing operations.



采用全数控系统7轴4轴联动，采用展成法原理，通过数控系统电子齿轮箱功能，实现分度和差动补偿运动，可完成圆柱直齿轮、斜齿轮、小锥度齿、鼓形齿、花键、蜗轮、链轮等齿部的加工。

With full CNC 7 axes and 4 axes linkage, using the principle of generating method, realize the indexing and differential compensation movement by the CNC system electronic gearbox function, it can complete the processing of cylindrical spur gear, helical gear, small cone gear, drum gear, spline, worm gear, sprocket and other gear tooth processing.

整机采取模块化设计，各功能组件可以根据客户需求快速组合成具备不同功能的机型，满足客户个性化、快速交货的要求。

Adopt modular design, each functional component can be quickly combined into models with different functions according to customer needs, to meet the requirements of customized and fast delivery.

便于接近和维护的组件，将机床的液压、润滑与气动装置组合到机床上。

Easy access and maintenance components with combined hydraulic device, lubricating system and pneumatic device to the machine tool.

具备故障自诊断、主轴过载自动监测及报警等保护功能；  
With fault self-diagnosis, spindle overload automatic monitoring and alarm etc. protection functions.

客户可以根据加工需要选购自动上下料装置、自动化料仓、去毛刺装置和粗定位等装置。

Customers can choose automatic loading/unloading device, automatic storage bin, deburring device and rough-position device according to the processing needs.

加工位与更换位的双工位上下料机械手设计，结构精巧可靠，最大限度地节约上下料时间，实现少人与无人化加工，提高机床的加工效率。

The dual-station loading and unloading manipulator design for processing position and changing position, with compact and reliable structure, minimize the loading and unloading time, to realize less-manned or unmanned processing, and improve the processing efficiency.

# 设计理念 The Design Concept

## 一流的研发技术 The First-class R&D Technology

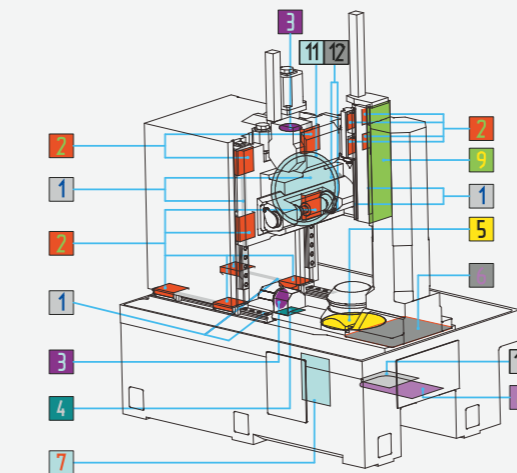
采用一流的美国参数技术公司（PTC）旗下的CAD/CAM/CAE一体化的Pro/Engineer三维设计软件。结合了零件设计、产品装配、逆向工程、自动测量、机构分析、有限元分析、产品数据库管理等功能，极大提高产品研发的质量。

Adopt the first-class American Parametric Technology Corporation (PTC) under the integration of CAD/CAM/CAE Pro/Engineer 3D design software. Combined with parts design, product assembly, reverse engineering, automatic measurement, mechanism analysis, finite element analysis, product database management etc., greatly improve the quality of product development.

## 刮削工艺 The Scraping Process

通过熟练技工对所有重要接触面进行刮削，为整机的高刚度和高精度提供可靠保证。

Scrap all important contact surface by skilled worker, to provide a reliable guarantee of high rigidity and precision.

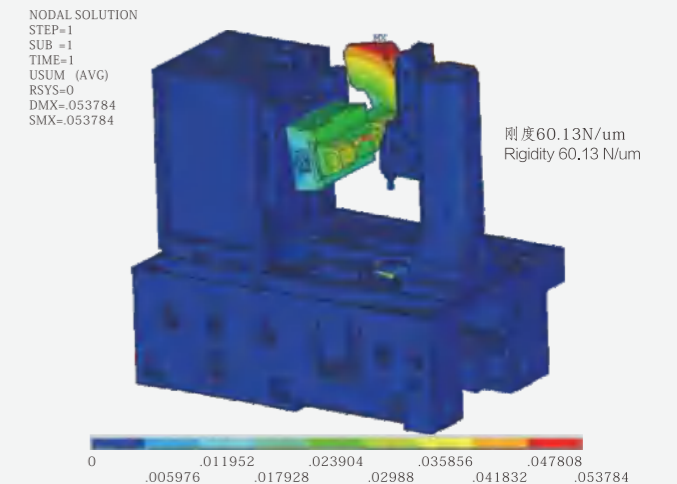


- |   |  |   |  |
|---|--|---|--|
| 1 直线导轨装配面<br>Linear guide assembly surface              | 2 滑块装配面<br>Slider assembly surface             | 3 丝杆螺母装配面<br>Ball screw assembly surface            | 4 丝杆支撑座装配面<br>Screw support assembly surface         |
| 5 工作台装配面<br>Worktable assembly surface                  | 6 小立柱装配面<br>Small column assembly surface      | 7 消除机构装配面<br>Assembly surface of backlash mechanism | 8 C轴电机底座装配面<br>C-axis motor base assembly surface    |
| 9 小立柱导轨座装配面<br>Small column guide seat assembly surface | 10 C轴电机安装座装配面<br>C-axis motor assembly surface | 11 A轴锁紧接触面<br>A-axis locking contact surface        | 12 Y轴燕尾装配面<br>Y-axis dovetail-plate assembly surface |

## 时效处理 The Aging Treatment

所有床身、大立柱、后立柱等铸件均经过二次时效处理，充分地消除铸件的内应力，提高铸件尺寸精度的稳定性，机床精度长期稳定性得以保证。

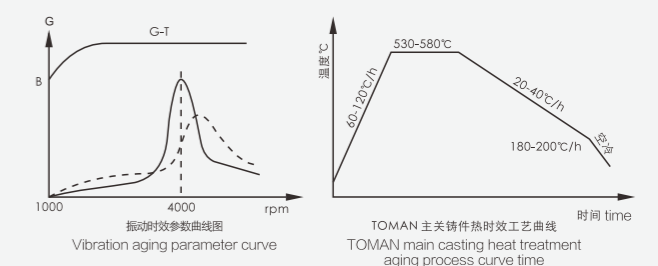
All the castings of bed, large column, rear column, etc. are treated by secondary aging, which fully eliminate the castings' internal stress and improve the stability of the dimensional accuracy, to ensure the long-term stability and accuracy of the machine tool.



## 静态与动态刚性分析 Static and Dynamic Rigidity Analysis

整机使用FEA（有限元解析）设计方法，根据机床受力分析情况进行优化设计，机床质量得到极大的提高，从而使得机床无刚性薄弱点且刚性均匀分布，大大减小机床受力变形，具有卓越性能。

The whole machine uses FEA (Finite Element Analysis) design means to optimize according to the force analysis of the machine tool, and the quality is greatly improved, so that the machine tool has no weak point and the rigidity is uniformly distributed, which highly reduce the deformation of the machine tool in the force, and it has excellent performance.



# 数控磨齿机系列

# CNC Gear Grinding Machine Series

Y7226高效数控磨齿机是适用于乘用车齿轮、商用车齿轮、高精度减速机齿轮等中小模数齿轮的磨齿加工，尤其是适用于新能源汽车齿轮的加工。  
Suitable for small and medium module gears in passenger vehicle, commercial vehicle and high precision reducer etc., especially for the gears processing of new energy vehicle.



## 机床主要特点 Main Features



机床采用双工位结构，可交替磨削、装料和卸料，保证磨齿精度的同时最大程度缩短非加工时间。

The machine adopts double-worktable structure, which can alternate grinding, loading and unloading to ensure the precision of grinding teeth while minimizing the non-processing time.

工件主轴采用大扭矩同步电机驱动，提高了机床传动精度和动态响应性能。

The workpiece spindle is driven by a high-torque synchronous motor, which improves the transmission accuracy and dynamic response performance of the machine.

高刚性高精度的砂轮主轴结构设计，可实现大进给、高效率、高速连续展成磨削和多头蜗杆砂轮修整与磨削，大幅提高了磨削效率。

The high rigidity and high precision grinding wheel spindle structure design can realize large feed, high efficiency, high speed continuous spreading grinding and multi-head worm gear dressing and grinding, which greatly improves the grinding efficiency.

采用大功率、高精度修整主轴，大幅提高了修整精度和效率；修整装置结构紧凑、闭环控制，实现修整轮精确摆角，可对压力角进行精确微调，还可以实现砂轮的变压力角修整、压力角补偿和三截面插补等功能。

Adopting high-power, high-precision dressing spindle greatly improves dressing accuracy and efficiency; dressing device has compact structure and closed-loop control, realizing precise swing angle of the dressing wheel and accurate fine-tuning of the pressure angle, and also realizing the functions of variable-pressure-angle dressing of the grinding wheel, compensation of the pressure angle, and interpolation of the three cross-sections.



自动对齿装置位于机床右侧床身上，在工件磨削的同时，在上料工位同步对齿，对齿过程不会占用任何加工时间。

The automatic tooth-align device is located on the right side of the machine tool. While grinding workpiece, synchronized tooth aligning in the loading station, the tooth aligning will not take up the processing time.



整机采用模块化设计，液压、气动和润滑装置集中后置，便于操作和维护，同时用户可以根据需要选配自动上下料装置。

The whole machine adopts modular design, the hydraulic, pneumatic and lubrication devices are centrally rearward, which is easy to operate and maintain, meanwhile, the user can choose the automatic loading and unloading device according to the need.

## 技术参数 Techonology Parameter

主要技术规格 Specifications	单位 Unit	Y7226CNC13
最大工件直径 Max. workpiece diameter	mm	262
加工齿数范围 Range of processed teeth		5-500
最大工件模数 Max. workpiece module	mm	0.5-5
砂轮大小 Grinding wheel size	mm	φ 275 × φ 160 × 160
修整轮大小 Dressing wheel size	mm	φ 123/ φ 140 × φ 52 × 40
砂轮主轴最大转速 (B轴) Max. speed of grinding wheel spindle (B-axis)	rpm	7000
工作台最高转速 (C1/C2轴) Max. worktable speed (C1/C2-axis)	rpm	3000
砂轮修整轴 (B2轴) Grinding wheel dressing axis (B2-axis)	rpm	9000
X轴行程 X-axis stroke	mm	245
Y轴行程 Y-axis stroke	mm	220
Z轴行程 Z-axis stroke	mm	220
A轴行程 A-axis stroke	Deg	± 45°
C3轴行程 C3-axis stroke	Deg	-45° ~ +225°
U轴行程 U-axis stroke	mm	43
W1/W2轴行程 W1/W2-axis stroke	mm	315
C4轴 (修整器中心摆动轴) 行程 C4-axis (trimmer center swing axis) stroke	Deg	± 13°

## 标准配置 Standard Configuration

主机 Main machine	1pc	电箱 Electrical box	1set
液压系统 Hydraulic system	1set	气动系统 Pneumatic system	1set
润滑系统 Lubrication system	1set	静电吸雾装置 Electrostatic Mist Absorption Device	1set
平衡系统 Balance system	1set	自动对齿机构 Automatic tooth align mechanism	1set
负压式冷却过滤装置 Negative pressure cooling filter device	1set	静电式集雾器 Electrostatic mist collector	1set
排屑小车 Chip conveyor	1set	压缩空气冷干机 Compressed air dryers	1pc
砂轮法兰盘 Grinding wheel flange	2set	死顶尖 Back dead center	2pcs
金刚石修整笔 Diamond dressing pen	2pcs	机床减震垫脚 Vibration-damping device	6sets
专用工具 Specialized tools	1set		

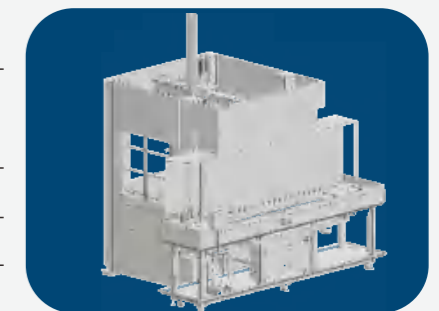
## 可选配置 Optional Configuration

自动上下料装置 (桁架机械手/关节机器人+自动循环料仓/堆垛式料仓)  
Automatic loading and unloading (Truss manipulator/Joint robot+Automatic storage bin/Stacking storage bin)

工件夹具 Workpiece fixture

活动顶尖 Live center

金刚滚轮 Diamond roller



# TM01平台系列

# Tm01 platform series



## 标准配置 Standard Configuration

滚刀刀杆组件 Hob arbor assembly (Φ32)	液压系统 Hydraulic system
刀杆自动夹紧装置 Hob arbor automatic clamping device	NC控制系统 NC controller system
工件自动夹紧装置 Workpiece automatic clamping device	NC数据存储卡接口 NC data memory card port
主轴定位 Spindle positioning	操作软件 Operational software
全密封护罩 Fully-enclosed safeguards	双手操作按钮 Buttons that can be operated by both hands
机床照明灯 Working light	以太网接口 Internet connection port
机床状态显示三色灯 Three colour lights indicate machine status	电气柜用空调 Air conditioner for electric cabinet
工件计数器 Workpiece counter	排屑机 Chip conveyor
主轴电流表 Main spindle ampere meter	自动润滑系统 Automatic lubrication system
铁屑小车 Chip cart	集雾器 Mist collector
切削油箱 Cutting oil tank (湿切用 Wet hobbing uses)	机床调整垫铁 Adjustment pad for machine tool
冷却喷枪 Cold spray gun (湿切用 Wet hobbing uses)	

## 主要技术参数 Main Techonology Parameter

TM01系列数控滚齿机 TM01 series CNC hobbing machine	单位 Unit	Y3110CNC	Y3115CNC	Y3120CNC	Y3125CNC
		湿切/干切 Wet cutting/Dry cutting	湿切/干切/直驱 Wet cutting/Dry cutting/DD	湿切/干切/直驱 Wet cutting/Dry cutting/DD	湿切/干切/直驱 Wet cutting/Dry cutting/DD
最大工件直径 Max. workpiece diameter	mm	Φ100	Φ150	Φ200	Φ250
最大工件模数 Max. workpiece module	mm	3	4	6	6
滚刀最大安装直径×长度 Max. hob diameter x length	mm	Φ110×150	Φ110×180	Φ130×230	Φ130×230
Y轴串刀长度 Y-axis hob shifting length	mm	130	150	180	180
滚刀中心至工作台中心水平距离 Horizontal distance between hob center and worktable center	mm	10-145	15-165	30-230	40-260
滑板行程 (Z轴移动量) Slide travel (Z-axis movement)	mm	210/Opt. 270	300	300/Opt. 480	350/Opt. 530
刀具最大回转角 Max. hob swivelling angle	Deg	±45°	±45°	±45°	±45°
主电机功率 Main motor power	KW	7.5	7.5/7.5/15	11/11/25	18.5/18.5/25
滚刀最大轴向移动量 Max. axial movement of hob	mm	130	150	180	180
滚刀主轴最高转速 (B轴) Max. speed of hob spindle (B-axis)	rpm	3000	1500/2000/3000	1200/1500/2500	1200/1500/2500
工作台最高转速 (C轴) Max. rotation speed of worktable (C-axis)	rpm	400	250/300/400	200/250/300	120/150/250

备注Note: Opt. ( optional 选配 ) DD ( motor direct drive 直驱电机 )

## 可选配置 Optional Configuration

自动上下料装置 Automatic loading/unloading storage device	工件夹具 Workpiece fixtures
自动储料装置 Automatic storage bin	工件粗定位装置 Workpiece rough position device
去毛刺装置 Deburring device	自动对齿装置 Automatic tooth align device
机外调刀装置 Independent hob adjustment device	切削油冷却装置 Oil cooling device
伺服液压系统 Servo hydraulic system	
滚刀刀杆组件 Hob arbor assembly (公制 metric system: Φ10、Φ13、Φ22、Φ27、Φ40)、(英制 inch system: Φ15.875、Φ22.225、Φ26.988、Φ38.1)	

# TM02平台系列

# TM02 platform series



## 标准配置 Standard Configuration

滚刀刀杆组件 Hob arbor assembly (Φ40)	液压系统 Hydraulic system
刀杆自动夹紧装置 Hob arbor automatic clamping device	NC控制系统 NC controller system
工件自动夹紧装置 Workpiece automatic clamping device	NC数据存储卡接口 NC data memory card port
主轴定位 Spindle positioning	操作软件 Operational software
全密封护罩 Fully-enclosed safeguards	双手操作按钮 Buttons that can be operated by both hands
机床照明灯 Working light	以太网接口 Internet connection port
机床状态显示三色灯 Three colour lights indicate machine status	电气柜用空调 Air conditioner for electric cabinet
工件计数器 Workpiece counter	排屑机 Chip conveyor
主轴电流表 Main spindle ampere meter	自动润滑系统 Automatic lubrication system
铁屑小车 Chip cart	集雾器 Mist collector
切削油箱 Cutting oil tank	机床调整垫铁 Adjustment pad for machine tool
冷却喷枪 Cold spray gun	

## 主要技术参数 Main Technology Parameter

TM02系列数控滚齿机 TM02 series CNC hobbing machine	单位 Unit	Y3135CNC	Y3140CNC		Y3150CNC
		工作台齿轮副/直驱 Worktable gear pair drive /DD	工作台齿轮副/直驱 Worktable gear pair drive /DD	工作台齿轮副/直驱 Worktable gear pair drive /DD	工作台齿轮副/直驱 Worktable gear pair drive /DD
最大工件直径 Max. workpiece diameter	mm	350	400		500
最大工件模数 Max. workpiece module	mm	8	12	16	12
滚刀最大安装直径×长度 Max. hob diameter x length	mm	Φ 160 × 230	Φ 200 × 230	Φ 240 × 300	Φ 200 × 230
滚刀中心至工作台中心水平距离 Horizontal distance between hob center and worktable center	mm	40-360	45-375	45-345	45-375
滑板行程 (Z轴移动量) Slide travel (Z-axis movement)	mm	400	400		400
刀具最大回转角 Max. hob swiveling angle	Deg	± 45°		± 45°	± 45°
滚刀最大轴向移动量 Max. axial movement of hob	mm	180	200	250	200
滚刀主轴最高转速 (B轴) Max. speed of hob spindle (B-axis)	rpm	750/Opt. 1200	500/Opt. 750	300	500/Opt. 750
工作台最高转速 (C轴) Max. rotation speed of worktable (C-axis)	rpm	75/200	75/200	50/150	75/90

备注Note: Opt. ( optional 选配 ) DD ( motor direct drive 直驱电机 )

## 可选配置 Optional Configuration

自动上下料装置(仅针对Y3135/40) Automatic loading/unloading storage device( only to Y3135/40)	
自动储料装置(仅针对Y3135/40) Automatic storage bin( only to Y3135/40)	
连续润滑冷却装置 Continuous Lubrication & Cooling Device	
工件夹具 Workpiece fixtures	工件粗定位装置 Workpiece rough position device
去毛刺装置 Deburring device	自动对齿装置 Automatic tooth align device
机外调刀装置 Independent hob adjustment device	切削油冷却装置 Oil cooling device
滚刀刀杆组件 Hob arbor assembly (公制 metric system: Φ22、Φ27、Φ32、Φ50、Φ60)、(英制 inch system: Φ26.988、Φ31.75、Φ38.1、Φ50.8)	

## 滚倒复合一体机系列 Hobbing Machine With Integrated Chamfering Station Series

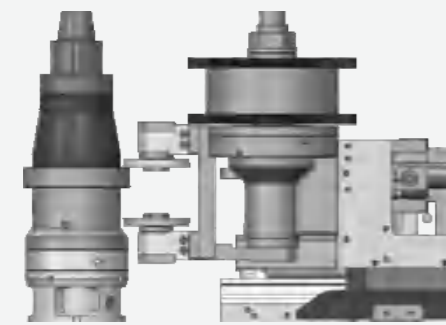
## 滚倒滚复合一体机系列 Compound Machine with Rough hobbing/Chamfering/Finished hobbing



齿轮复合机系列产品可满足齿轮行业各类客户的个性化需求，可供客户随意选型，满足乘用车、新能源汽车、中小模数工程机械行业等中小模数齿轮的加工需要。

Compound gear hobbing machine series products can meet the personalized needs of all kinds of customers in the gear industry, and can be used for customers to choose the model at will to meet the processing needs of small and medium module gears for passenger vehicles, new energy vehicles, construction machinery industry, and other small and medium module gears.

机型Type	功能Function	倒棱加工范围 Chamfering range of edge extrusion				
		最大模数 Max. module (mm)	最大直径 Max. diameter (mm)	最小直径 Min. diameter (mm)	最大长度 Max. length (mm)	齿宽 Tooth width (mm)
Y3110CNC10	滚倒一体gear hobbing/chamfering	3	100	20	300	5-60
Y3115CNC10	滚倒一体gear hobbing/chamfering	4	150	20	300	5-60
Y3120CNC10	滚倒一体gear hobbing/chamfering	5	200	20	300	5-60
Y3125CNC10	滚倒一体gear hobbing/chamfering	5	250	20	300	5-60



采取模块化设计，各功能组件如倒棱部装、液压站、气动部装、电气柜和排屑机可以根据客户需求快速组合，整体布局紧凑，占地面积小，满足客户个性化、快速交货的要求。

Adopt modular design, each functional component such as chamfering unit, hydraulic station, pneumatic unit, electrical cabinet and chip conveyor etc. can be combined quickly according to customer's needs, with compact overall layout, small floor area, to meet customized requirements and fast delivery.

采用两套独立的控制系统分别控制滚齿工位与倒棱工位加工，相对于传统的双通道控制方式，人机工程友好，操作更便利。

Adopt two sets of independent control system to control the hobbing station and chamfering station processing respectively, compared with the traditional dual-channel control method, friendly ergonomics and more convenient operation.

专用控制软件，专用的操作界面，无需编程，只需要输入被加工齿轮、刀具以及相关切削参数就可以实现滚齿与倒棱工位的自动加工，运行稳定可靠。

Special control software, special operation interface, no need to program, only need to input the processed gear, tool and related cutting parameters to realize the automatic processing of hobbing and chamfering station with stable and reliable operation.

内置倒棱机构，采用4工位旋转上下料装置，在滚齿作业时同时进行倒棱，实现高效生产。  
Built-in chamfering mechanism with 4-station rotary loading and unloading device, chamfering during the hobbing operation, to realize high-efficiency production.

挤棱工位可任意调整挤棱和去毛刺高度，倒棱工位可实现快速换产，同时通过采用特殊设计，允许选配车削去毛刺功能。  
The chamfering station can adjust the height of edge squeezing and deburring, and it allows for quick production changeover, as well as allows the optional and deburring function with a special design.



设备适用于乘用车变速齿轮、工程机械等行业中小模数齿轮的滚齿和倒棱加工。

Suitable for the gear hobbing and chamfering for small and medium module gears in passenger vehicles, construction machinery and other industries.

可选机型 Optional type	功能Function	加工范围Machining range				
		最大模数 Max. module (mm)	最大直径 Max. diameter (mm)	最小直径 Min. diameter (mm)	最大加工长度 Max. processing length (mm)	齿宽 Tooth width (mm)
Y3115CNC11	滚倒滚rough hobbing/chamfering/finished hobbing	4	150	20	280	5-60
Y3120CNC11	滚倒滚rough hobbing/chamfering/finished hobbing	5	200	20	280	5-60

实现了中小模数齿轮一次装夹完成粗滚+挤棱去毛刺+精滚的加工，彻底解决了齿面翻边毛刺和凸起的问题，在显著提升齿轮的加工精度的同时，避免了热处理后的后道工序因翻边毛刺或凸起导致刀具寿命或加工精度的降低。

To realize the processing: rough hobbing+chamfering+finished hobbing in only one clamping for medium and small module gears, which completely solves the problem of flanging burrs and bumps on the tooth surface, and significantly improves the processing accuracy while avoiding the reduction of tool life or processing accuracy due to the flanging burrs or bumps in the subsequent process after heat treatment.

挤棱工位可任意调整挤棱和去毛刺高度，倒棱工位可实现快速换产，同时通过采用特殊设计，允许选配车削去毛刺功能。

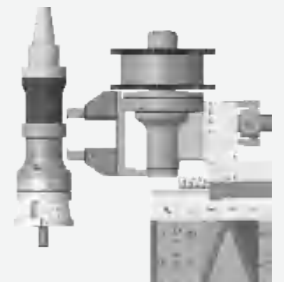
The chamfering station can adjust the height of edging squeezing and deburring, the chamfering station can realize quick production changeover, at the same time, to use the special design, it allows optional turning and deburring function.

内置桁架机械手运行速度快，定位精确可靠，调整方便，操作便利。采用多工位循环码垛式自动料仓，可以快速换产、调整方便，提升高度达400mm，一次装料可以满足长时间加工需要。

Built-in the inner truss mechanical manipulator, runs fast, accurate and reliable positioning, easy adjustment and operation. Adopt multi-station cycle palletizing automatic storage bin, it can change production quickly and adjust conveniently, the lifting height is up to 400mm, and one-time loading can meet the need of long time processing.

整机采用全封闭不锈钢内防护满足干切防护要求，将加工区和非加工区彻底隔开，大倾角内防护使铁屑能够快速排出机外。  
The whole machine adopts fully enclosed stainless steel inner protection to meet the requirements of dry cutting protection, completely separate the processing and non-processing area, and the large inclined angle inner protection enables the iron chips to be quickly discharged out of the machine.

机床采取模块化设计各功能组件可以根据客户需求快速组合，满足客户个性化需求。  
Adopt modular design, each functional component can be quickly combined according to customer needs, to meet the customized needs.



# 滚棱复合一体机系列

# Hobbing Machine with Integrated Chamfer Hobbing



该机床适用于商用车齿轮、乘用车齿轮、工程机械齿轮等中小模数齿轮的滚齿与滚棱复合加工，尤其是适用于新能源汽车齿轮的加工。

The machine tool is gear hobbing with integrated chamfer hobbing, suitable for small and medium module gears in commercial vehicle, passenger vehicle, and construction machinery etc., especially for the processing of new energy vehicle gears.

## 滚棱复合机主要特点 Main Features

在陀曼数控滚齿机的右前方集成滚棱单元，人机工程非常友好，操作人员可以站在机床正前方方便地对滚齿工位与滚棱工位进行操作，操作性和维护性便利。  
On the right front of Toman gear hobbing machine is integrated with chamfering station, friendly ergonomics, allowing operators to conveniently stand in front of the machine to operate, and easy to maintain.

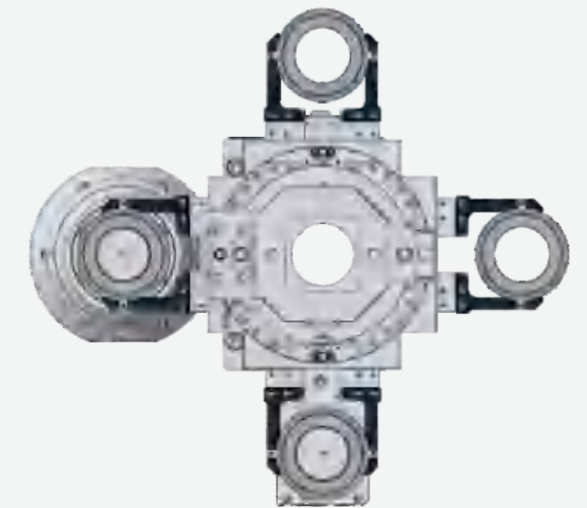
滚棱单元六轴CNC控制，使用自主研发的专用控制软件和操作界面，可以方便地快速设置或者修正以及调整倒棱参数。倒棱均匀美观，效率高，相对于传统的挤棱工艺，无端面凸起以及毛刺，刀具寿命更长，可以有效降低齿轮飞边毛刺导致传动噪音的可能，尤其适用于新能源汽车齿轮。  
The 6-axis CNC control unit of hobbing integrated with chamfering station, using self-developed proprietary control software and user interface, enable quick and easy setup or correction, and adjustment of the chamfering parameters. The chamfering effect is uniform and beautiful, high efficiency. Compared with the traditional edge extrusion process, there's no end face bump and burr, the tool life is longer, which can effectively reduce the transmission noise caused by the gear flash burr, particularly suitable for the gears processing in new energy vehicles.



滚棱工位刀架允许大角度翻转，非常方便进行滚棱刀的更换，同时可以根据需要采用多种滚棱工艺对工件上下端面进行倒角。  
The tool holder of chamfering station allows large angle reversal, which is very convenient to replace the cutter. At the same time, a variety of chamfering technology could be used according to the need of the upper and lower end face of the workpiece.

利用成熟可靠的四工位上下料机械手，实现上下料工位、待料工位、滚齿工位和滚棱工位的连续转换，最大限度地节约上下料时间，实现少人化与无人化加工，提高机床的加工效率高。  
By using a mature and reliable 4-station loading and unloading manipulator, to achieve continuous switching between the loading/unloading station, waiting station, gear hobbing station, and chamfering station, minimize loading/unloading time and achieve less humanized or unmanned processing, which improve the processing efficiency of the machine tool.

占地面积小，相比传统的滚齿铣棱+关节机器人组线单元，占地面积减少了50%，大大节约厂房面积，同时用电量大幅减少。  
It occupies a small floor area by reducing the floor space by 50% compared to the traditional gear hobbing machine and gear chamfering machine+ joint robot assembly unit. It greatly saves plant space and reduce power consumption significantly.



## 主要技术参数 Main Technology Parameter

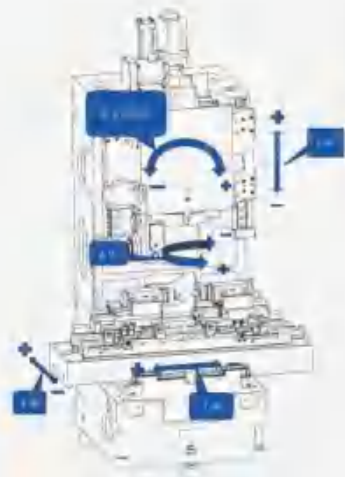
序号 No.	主要技术规格 Main Technical Specifications	主要参数指标 Main Parameters		
滚齿工位 Gear Hobbing Station				
1	最大工件直径 Max. Workpiece Diameter / ( mm )	Φ150	Φ200	Φ250
2	最大工件模数 Max. Workpiece Module / ( mm )	4	6	6
3	刀具最大回转角 Max. Swiveling Angle of Hob / ( Deg )	±45°	±45°	±45°
4	加工齿数范围 Range of Teeth Number	4~1000	4~1000	4~1000
滚棱工位 Gear Chamfering Station				
1	最大工件直径 Max. Workpiece Diameter / ( mm )	Φ150	Φ200	Φ250
2	最大工件模数 Max. Workpiece Module / ( mm )	4	6	6
3	径向快速移动速度 ( X2 ) Radial Fast Moving Speed (X2) / ( mm/min )	5000	5000	5000
4	轴向快速移动速度 ( Z2 ) Axial Fast Moving Speed (Z2) / ( mm/min )	5000	5000	5000
5	切向快速移动速度 ( Y2 ) Tangential Fast Moving Speed (Y2) / ( mm/min )	5000	5000	5000

# 数控剃齿机

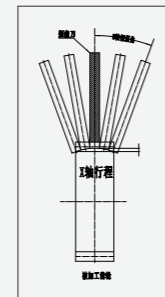
# CNC Gear Shaving Machine

高效数控剃齿机广泛用于各类直齿圆柱齿轮，斜齿轮及轴齿轮的精加工。本机床自动化程度高、刚性好、效率高、性能齐全、操作方便，特别适合于汽车、摩托车、拖拉机、工程机械、减速机等行业成批大量齿轮剃齿生产，并可根据用户的需求选配相应的盘齿或轴齿自动上下料装置，满足客户各类需求。

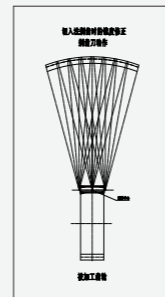
High efficiency CNC gear shaving machine is widely used in finished processing of all kinds of spur gear, helical gear and shaft gear. The machine tool has high degree of automation, good rigidity, high efficiency, perfect performance, easy operation, especially suitable for automobile, motorcycle, tractor, construction machinery, reducer and other industries in batch production, and according to the user's needs to choose automatic loading and unloading device of the appropriate disc gear or shaft gear to meet the customer's customize needs.



- NC控制轴 NC control axis
- A:** 刀架回转运动  
Rotation movement of tool holder
  - B:** R滑动面摆动  
R sliding surface swing
  - X:** 工作台轴向进给运动  
Axial feed movement of worktable
  - Y:** 工作台切向进给运动  
Tangential feed movement of worktable
  - Z:** 滑板径向进给运动  
Radial feed movement of slide
  - S:** 剃刀旋转运动  
Rotation movement of razor



轴向剃齿形  
Axial shaving drum



径向剃齿形  
Radial shaving

一、R型滑动面配置在刀架头上部，以刀架的啮合点为中心摆动，可以加工出更加理想的锥度及鼓形齿，大大缩短了剃齿机的换型的辅助时间以及提高了使用方便性。

R-type sliding surface is configured on the head of the tool holder, swinging with the meshing point of the tool holder as the center, which can process more ideal taper and drum-shaped teeth, greatly shorten the auxiliary time of shaving machine changeover as well as improve operation convenience.

二、操作者可方便地在滑板正面调整刀架回转角以达到合适的工件和刀具轴交角；主轴允许朝向正面，剃齿刀锁紧采用了快换装置，刀具更换省时省力。

The operator can easily adjust the rotation angle of the tool holder to achieve the appropriate angle of intersection between the workpiece and tool; the spindle is allowed to face the front, the shaving tooth cutter is locked with a quick change device, which saves time and labor when changing the tool.

三、采用特殊弹簧设计，完全消除了刀具安装的间隙，使刀具的旋转精度和装夹刚性大幅提升，降低了切削时刀具的振动，提升了加工的精度。

Adopt special spring design, completely eliminate the tool installation clearance, greatly improve the rotation precision and clamping rigidity of the tool, reduce the vibration of the tool during cutting, improve processing precision.

四、整机设计紧凑，配备单独的液压站和磁性排屑器，独立的电气柜置于机床后面，机床调整和维护空间集中在机床的前面和后面，两侧面不需要进行维护而有利于排线生产，同时采用了热平衡设计和补偿技术。

Compact design of the whole machine, equipped with a separate hydraulic station and chip conveyor, separate electrical cabinet placed at the back of the machine, adjustment and maintenance space is concentrated in the front and back of the machine, there is no need for maintenance on both sides, which is in favor of line production, at the same time, the heat balance design and compensation technology of the machine are used.

## 主要技术参数

### Main Technology Parameter

名称 Name	Y4235CNC5	Y4235CNC4	Y4235CNC3
最大工件直径(mm) Max.workpiece diameter(mm)	350		
最大工件模数(mm) Max.workpiece module(mm)	8 (径剃5) (radial shaving 5)		
压力角(Deg) Pressure angle(Deg)	0-30		
最大工件齿宽(mm) Max. workpiece tooth width(mm)	150		40
剃刀最大宽度(mm) Max.width of razor(mm)	50		
剃刀最大外径(mm) Max.outer diameter of razor(mm)	250		
剃刀安装孔径(mm) Assemble hole diameter of razor	63.5		
剃刀最大转速(r/min) Max.rotation speed of razor	500		
主轴功率(Kw) Spindle power (Kw)	3.7/5.5		
A轴旋转角度 A-axis rotation angle degree	+20° 到-90° (+20° to -90°)		
A轴最大旋转速度 Max. rotation speed of A axis(° /s)	240		
Z轴行程(mm) Z-axis travel(mm)	117-300		
Z轴快移速度(mm/min) Z-axis fast moving speed(mm/min)	8000		
Z轴进给速度(mm/min) Z-axis feed speed(mm/min)	1-2000		
X轴行程(mm) X-axis travel(mm)	± 75		/
X轴进给速度(mm/min) X-axis feed speed(mm/min)	1-3000		/
Y轴行程(mm) Y-axis travel(mm)	± 10		/
Y轴进给速度(mm/min) Y-axis feed speed(mm/min)	1-600	/	/
B轴摆动角度(锥度鼓形用) B-axis swing angle(for taper drum)	± 2°	± 2°	± 2°
顶尖中心高(mm) Top center height(mm)	180		

## 标准配置

### Standard Configuration

剃刀垫片 Razor gasket ( 10、12.5、15 )
磁性分离器 Magnetic separator
集屑盒 Chip collecting box
切削油箱 Cutting oil tank
机床状态显示三色灯 Three colour lights indicate machine status
机床调整垫铁 Adjustment pad for machine tool
电气柜用空调 Air conditioner for electric cabinet
液压系统 Hydraulic system
润滑系统 Lubrication system
操作软件 Operational software
温补系统 Temperature compensation system
漏电断路器 Leakage circuit breaker
双手操作按钮 Buttons that can be operated by both hands
NC控制系统 NC controller system

可根据自动化需要选配上下料装置：  
The loading and unloading device can be selected according to the needs of automation:



直动式上料机构  
Directly loading mechanism



双工位旋转式上料机构  
Dual station rotary loading mechanism

为了进一步提高加工效率与精度，降低人工需求与劳动强度，满足齿轮行业的转型升级需求；陀曼依靠多年的齿轮机床自动化经验，可以根据客户不同需求提供热前制齿工序的个性化综合解决方案，满足客户对齿轮制齿工序的自动化、智能化、个性化的需求！

Improve the processing efficiency and precision, reduce labor demand and labor intensity, to meet the transformation and upgrading needs of the gear industry; Based on many years of experience in gear cutting automation, Toman can provide personalized comprehensive solutions for gear cutting process before heat treatment, to meet customers' needs of automation, intelligence and personalized for gear cutting process!

## 滚倒剃自动化生产线—关节机器人组线

Gear Hobbing / Chamfering / Shaving Automatic Production Line- Joint Robot Assembly Line

自动线由滚齿机/倒棱机/剃齿机、关节机器人、甩油机、多工位装盘堆垛式料仓、外防护和安装装置组成，根据客户需求进行自由组合能完成所有的齿轮热前制齿加工工序。

The automatic line is composed of gear hobbing machine, gear chamfering machine, gear shaving machine, joint robot, oil sliter, multi-station stacking storage bin, outer protection and installation device etc. Finish all gear processing before heat treatment according to the customer's requirements.

### 智能化、柔性化 Intelligence and Flexibility

具备高度的智能化以及柔性化，可以与中央处理器交换数据，实现集中管理。数据可以实时在线采集和统计分析，自动报警、自动抽检等功能。

With a high degree of intelligence and flexibility, it can exchange data with the center processor to achieve centralized management. The data can be collected and statistically analyzed online in real time, automatic alarms, automatic sampling etc.

### 自动化料仓客户根据客户产品进行灵活设计定制

The automatic storage bin can be flexibly designed and customized according to the customer's products.



### 布局紧凑，设计合理

Compact Layout and Reasonable Design



## 滚倒剃自动化生产线—桁架式机器人组线

Gear Hobbing / Chamfering / Shaving Automatic Production Line- Truss Robot Assembly Line

该自动生产线适用于汽车变速箱、摩托车等中小模数齿轮的批量生产需要。

This automatic production line is suitable for the needs of mass production for small and medium module gears of automobile gearboxes, motorcycles etc.

由滚倒复合一体机、全自动数控剃齿机、自动上下料仓、自动甩油机、自动抽检台和桁架机械手等自动化设备组成，根据客户需求进行自由组合能完成所有的齿轮热前制齿加工工序。

It is composed of gear hobbing machine with chamfering station, shaving machine, automatic loading and unloading storage bin, automatic oil sliter, automatic sampling table and truss mechanical manipulator, etc. It can complete all the gear processing before heat treatment by free combination according to customer requirements.

自动线一字排开的布局形式，巧妙地将齿轮热前滚齿-倒棱-剃齿三道工序与自动上下料系统完美融合，整线布局紧凑、占地面积小、生产效率高、调试维护简单、人机操作友好和造型美观等特点。

With line production line layout, perfectly combine gear hobbing - chamfering - shaving before heat treatment with automatic loading/unloading system, with compact layout, small floor area, high production efficiency, easily debugging and maintenance, friendly ergonomics and beautiful appearance etc.



可以根据齿轮不同的热前制齿工艺，任意选择执行部分或全部加工工序，如可以跳过倒棱工序只选择滚齿与剃齿加工，或者跳过滚齿与倒棱工序，也可以对滚齿后的产品集中只进行剃齿加工，更佳的柔性化，可以适应未来市场变化进行多品种生产的要求。

According to the different gear processing requirements before heat treatment, choose some or all of the processing procedures at will, such as skip the chamfering processing, and choose gear hobbing and shaving processes, or skip the gear hobbing and chamfering processes, only focus on shaving process, with better flexibility, realize multiple variety production to adapt the market changes in the future.

# 滚铣自动线

# Gear Hobbing/ Chamfering Automatic Production Line

## 滚铣自动化生产线--关节机器人组线

Gear Hobbing/ Chamfering Automatic Production Line-Joint Robot Assembly Line

### 关节机器人组线:

Joint Robot Assembly Line:

该线主要由数控滚齿机、铣磨机、抽检台、伺服堆垛式料仓、关节机器人、安全防护防护装置组成，能完成新能源汽车齿轮热前制齿加工工序。

Compose CNC gear hobbing machine, CNC gear chamfering machine, sampling station, servo stacked storage bin, joint robot, and safety protection device etc., which can complete all the gear processing before heat treatment for the new energy vehicle gears.



设备实现零件的滚齿、铣磨二序加工，在滚齿、铣磨之后设置抽检工作台工位进行线外抽检，可以定量和随机抽检确保工件的质量；工序间的零件流转由关节机器人完成。

Realize the processes of gear hobbing and gear chamfering, after these two processes, the sampling station is set up for off-line sampling, which can ensure the workpiece quality quantitatively and randomly. The flow of the workpieces among the various machining processes is completed by the joint robot.

### 智能化、柔性化 Intelligent and Flexibility

自动化生产线具备高度的智能化以及柔性化，可以与中央处理器数据交换能力，可实现本工厂的中央集中管理；数据实时在线自动报警、自动抽检等功能。

With a high degree of intelligence and flexibility, it can exchange data with the center processor to achieve centralized management of the factory; Data real-time online automatic alarm, automatic sampling etc are available.

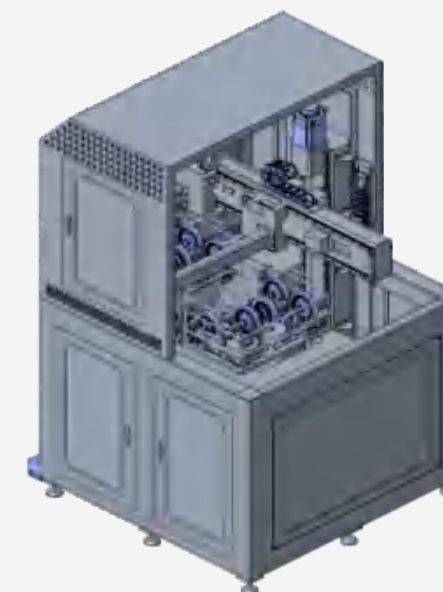
### 极高的安全性 High Safety

机器人运动空间内全防护，安全门等安全防护，进入运动区域必须要有密码，任何异常情况，机器人会立刻停止运动及报警提示，确保人身安全。

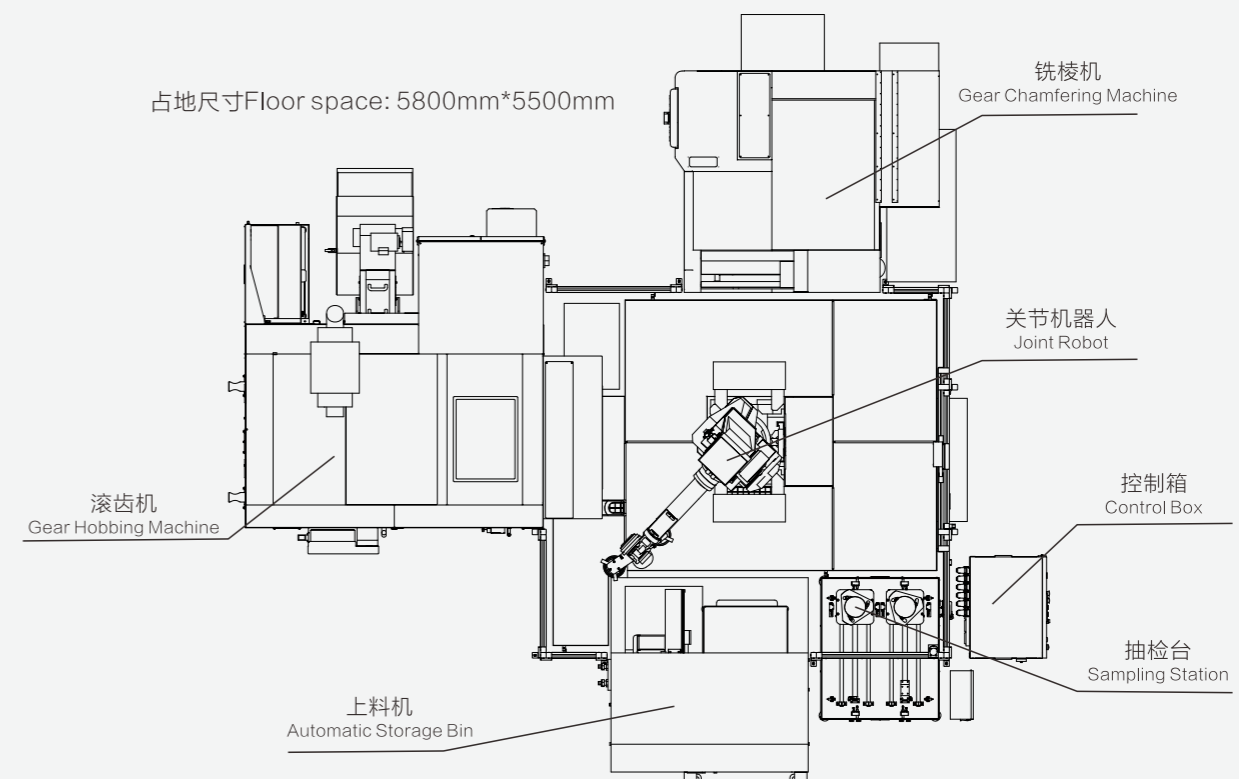
Full protection in the robot movement space, security door and other security protection, entering the movement area must have a password. Any abnormal situation, the robot will immediately stop the movement and alarm to ensure personal safety.

采用堆垛式自动化料仓不仅实现组线单元的自动化生产，同时为工厂其他工序的自动搬运和上下料提供了基础，大大降低劳动强度，节约了人力成本。

Use stacked automatic storage bin, which not only achieves automatic production of each production line unit, but also provides a foundation for automatic handling, loading/unloading for other processes, greatly reduced labor intensity and save labor cost.



### 布局紧凑、设计合理 Compact Layout and Reasonable Design



# 轴承装备系列产品

# The Bearing Equipment Series Product

经过多年的沉淀、发展和创新，轴承生产自动化装备已成为行业领导者。产品系列覆盖了各种小、中、大型轴承的套圈全自动车削设备，并针对客户批量等不同需求推出定制服务，同时还推出全自动计数系统、漏工序检测系统全自动上下料系统等系列辅助装置，进一步提高轴承生产企业自动化生产能力。

After years of precipitation, development and innovation, bearing production equipment industry has become the leader of the industry which is include variety of small, medium and large bearing rings covers of automatic turning equipment, services for the different customers requirement, and also have automatic counting systems, leakage process detection system, automatic loading and unloading systems and other auxiliary device, which further improve automation production capacity of bearing production enterprise.



## 主要技术参数 Main Technology Parameter

规格型号	自动线名称 Name of automatic line	加工范围	适合产品 Suitable for products
TM-ZC9203	微型轴承套圈车削自动线 Miniature bearing ring turning automatic line	D≤32mm	钢管、棒料、冷锻等各类轴承套圈 Steel pipe, bar, cold heading and other kinds of bearing rings
TM-ZC9206	全自动轴承套圈车削生产线 Automatic bearing ring turning production line	D≤62mm	钢管、棒料、冷锻等各类轴承套圈 Steel pipe, bar, cold heading and other kinds of bearing rings
TM-ZC9208	全自动轴承套圈车削生产线 Automatic bearing ring turning production line	D≤80mm	投资成本最省的轴承车削自动线 The most cost-effective bearing turning automatic line
TM-ZC9210	中大型轴承重切数控自动线 CNC automatic line for medium and large bearing heavy cutting	D≤100mm	钢管、棒料、冷锻等各类轴承套圈 Steel pipe, bar, cold heading and other kinds of bearing rings
TM-ZC9213	中大型轴承重切数控自动线 CNC automatic line for medium and large bearing heavy cutting	D≤130mm	钢管、棒料、冷锻等各类轴承套圈 Steel pipe, bar, cold heading and other kinds of bearing rings
TM-ZC9206D TM-ZC9210D	轴承套圈锻件粗车自动线 Automatic line for bearing ring forging	D≤110mm	各类轴承锻件、钢管件、冷锻件的粗车 All kinds of bearing forgings, steel pipe parts, cold rolled rough cars
TM-ZC9206Q TM-ZC9210Q	UC轴承套圈车削自动线 UC bearing ring turning automatic line	D≤110mm	UC轴承、水泵轴承等长轴类套圈 UC bearing, pump bearing and other long shaft rings
TM-ZC9206YT TM-ZC9210YT	圆锥(塔件)车削自动线 Taper (tower) turning automatic line	D≤110mm	冷挤压圆锥联体套圈、精锻件圆锥联体套圈 Cold extrusion conical coupling ring, fine forging conical coupling ring
TM-ZC9206Y TM-ZC9210Y	圆锥套圈车削自动线 Taper ring turning automatic line	D≤110mm	圆锥轴承套圈 Taper bearing ring
TM-ZC9206L TM-ZC9210L	轮毂轴承套圈车削自动线 Automatic turning line for hub bearing ring	D≤110mm	轮毂轴承 Wheel hub bearing
TM-ZC9206Z TM-ZC9210Z	短圆柱(滚针)轴承套圈车削自动线 Automatic turning line for short cylindrical (needle rolling) bearing rings	D≤110mm	短圆柱、滚针轴承 Short cylindrical needle roller bearings
TM-ZC9206G TM-ZC9210G	关节轴承套圈车削自动线 Automatic turning line for knuckle bearing rings	D≤110mm	关节轴承、外球面轴承 Joint bearings, outer spherical bearings

## 高效重切数控自动线 High efficient heavy cutting CNC automatic line



该设备兼顾轴承行业的大余量成型车削、非标零件的快速走刀车削两种状态，满足单一零部件的批量生产，以及非标零件的多品种小批量生产，适用于钢管、锻件等毛坯状态，具有车削力大、毛坯适应性能好、自动化加工、加工精度高等特点。广泛应用于轴承套圈、汽摩零部件、其它非标零部件的加工。

The equipment takes into account the two states of large margin molding turning and fast tool turning of non-standard parts of the bearing industry, meets the mass production of single parts and the multi-species small batch production of non-standard parts. The equipment is suitable for steel pipes, forgings and other blanks, with large turning force, good blank adaptability performance, automated processing, high machining accuracy and other characteristics. Widely used in bearing rings, automobile and motorcycle parts, and other non-standard parts.

型号 Model	TM-ZCK9206	TM-ZCK9208	TM-ZCK9210
内径尺寸 Inner diameter	φ 10-φ 30mm	φ 20-φ 40mm	φ 40-φ 80mm
外径尺寸 Outer diameter	φ 20-φ 62mm	φ 30-φ 80mm	φ 52-φ 100mm
标准宽度 Standard width	7-16mm	12-30mm	40mm
适合产品 Suitable product	各类钢管、冷碾、冷锻、精锻、热锻轴承套圈、汽摩零部件、非标零部件等 Various types of steel pipe, cold rolling, cold heading, finish forging, hot forging bearing rings, automotive and motorcycle part, non-standard part and so on		