LECN 2025

安徽力成智能装备股份有限公司

0566-2610088　0566-2610099

www.lecn.cn　lecn@vip.163.com

池州市高新技术开发区通港大道58号

NO.58 Tonggang Avenue High-Tech Development Zone Chizhou

LECN | 力成专机

BESPOKE MACHINE | 专注轴类零件解决方案

- 自动化 & 联线 Automatic & connect line
- 车床 & 双头车床 Lathe & double head lathe
- 搓齿机 Rolling machine
- 深孔钻床 Deep hole drilling machine
- 外圆磨床 Cylindrical grinding machine
- 等速万向节专机 CV joint machine
- 铣端面钻中心孔机床 Facing and centering machine
- 定制专机 Customized bespoke machine

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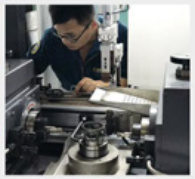
LECN | 力成专机

客户需求分析
Customer Needs Analysis



教育训练
Education And Training

装配
Assembly

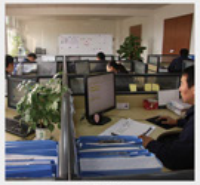
齿轮检测中心
Gear Testing Center

调试
Debugging

三坐标测量仪
Three-coordinate Measuring Machine

整机装配车间
Machine Assembly Workshop

检测中心
Testing Center



产品设计
Product Design

开发评审
Development Review

精度检测
Accuracy Detection

客户交流
Customer Communication

使命 MISSION

以轴为媒 与德为邻

Communicate via shafts
Collaborate with morality

愿景 VISION

成为装备领域的标杆企业

Become a benchmark enterprise in equipment field.

价值观 VALUES

高新技术企业

High And New Tech Enterprises

国家级专精特新“小巨人”企业

National Specialized New "Little Giant" Enterprise

关于我们

About Us

力成专机全称“安徽力成智能装备股份有限公司”，2003 年创始于美丽的玉环岛上，2010 年公司迁至位于长三角城市群之安徽池州，一直以来专注于轴类零件高效专机的研发和全面解决方案的探索。

力成营销及售后网络遍及国内工业重镇和制造业集聚区，并在韩国、日本、英国、俄罗斯、东南亚等国家和地区设有常驻代表处。作为国内装备领域的重要成员之一，力成团队以勤勉致知、持续创新的工匠精神在花键成型和等速万向节制造等多个领域开启了专机定制和行业机床标准化的先河，十余年来，力成团队以广阔的技术视野和丰富的设计经验，服务于全球众多行业的 1000 余家客户，在业内广为知晓。

力成以精密搓齿机、数控车床、双头车床、数控磨床、深孔钻床、铣打专机、球笼专机等为代表的 8 大系列 80 余种专用机床、行业机床和自动化生产线紧密契合了用户需求。产品广泛用于汽车（变速箱、发动机、起动机、传动轴、转向系统、制动系统、等速万向节等）、摩托车、纺织行业、工程机械、电动工具、水暖阀门、五金家电等行业用户的轴类加工现场。力成朴素、简洁的设计风格和稳定、耐用的产品品质，深得用户口碑。

按照现代精密装备的技术条件建设的生产和办公场所共 30000 余平米，包含设计中心、运营中心、检测中心、精密加工、恒温部装、整机组装、钣金制造等，配有加工中心、龙门镗铣、龙门导轨磨床等关键工序加工装备 30 余台套，齿轮检测中心、三座标测量仪、激光干涉仪、动平衡仪等国际先进的检测手段。即使面对订单多样化的运营环境，也可以借助供应链体系以及 ERP 管理系统，实现快速交付。

力成以“内省、宽和、严谨、自由”为企业价值观，构建员工正确为人的心智模型和职业修养，积极提升管理水平和产品制造标准。根植东方，面向全球，以前瞻的思维专注于用户需求，把最有竞争力的现代化装备带给全球的制造业用户。

LECN, full name LECN ANHUI CO., LTD,since its founding in 2003 on the beautiful Yuhuan island,which moved to Chizhou of Anhui province in the city group of Yangtze River Delta in 2010, we have been focusing on the research and development of efficient special machine for shaft parts and the exploration of comprehensive solutions.

LECN's marketing and after-sales network throughout the domestic industrial centers and manufacturing clusters, and we have permanent representative offices in South Korea, Japan, the United Kingdom, Russia, southeast Asia and so on. LECN is the most important members in the field of domestic equipment,and with the craftsman spirit of diligent knowledge and continuous innovation, the team of LECN has pioneered the customization of bespoke machine and the standardization of industrial machine tools in the fields of spline forming and CV joint manufacturing.For more than ten years, with its broad technical vision and rich design experience, LECN's team has served more than 1000 customers in many industries around the world and is widely known in the industry.

LECN's 8 series of more than 80 kinds of special machine tools, industrial machine tools and automatic production lines, represented by precise rolling machine, CNC lathe,double-head lathe, grinding machine,deep hole drilling machine,facing and centering machine, CV joint machine, etc., are closely in line with the needs of users. LECN's products are widely used in automobile (gearbox, engine, starter, transmission shaft, steering system, braking system, constant speed universal joint, etc.), motorcycle, textile industry, construction machinery, electric tools, plumbing valve, hardware and electrical appliances and other industries users of the shaft processing site.LECN's simple design style and durable product quality have won users' praise.

According to the technical conditions of modern precision equipment, we have built a total of more than 30,000 quare meters of production and office space, including design center, operation center, testing center, precision machining, constant temperature department, complete machine assembly, sheet metal manufacturing, etc.Equipped with machining center, gantry boring and milling, gantry guide grinding machine and other key process processing equipment more than 30 sets, gear detection center, three coordinate measuring instrument, laser interferometer, dynamic balance instrument and other international advanced detection means.Even in the face of diversified orders operating environment, we can also use the supply chain system and ERP management system to achieve rapid delivery.

With the enterprise values of "self-examination,harmony, preciseness and freedom", LECN constructs the correct mental model and professional accomplishment for employees, and actively improves the management level and product manufacturing standards.Rooted in the east and facing the world, we focuses on user needs with forward-looking thinking and brings the most competitive modern equipment to manufacturing users all over the world.

LECN/力成专机

部分客户名录 Partial Customer Directory

已为国内外超过 1000 多家汽车零部件生产企业提供产品及交钥匙工程。
It has provided products and key delivery projects for more than 1000 auto parts manufactures at home and abroad.

按笔画排列 Arrange By Brush

大连创新零部件制造有限公司	DALIAN INNOVATIVE PARTS MANUFACTURING CO., LTD.
大连德迈仕精密科技股份有限公司	DALIAN DMS PRECISION TECHNOLOGY CO., LTD.
万向钱潮等速驱动轴工厂	UNIVERSAL QIANCHAO CONSTANT SPEED DRIVE SHAFT FACTORY
山东光大机械制造有限公司	SHANDONG GUANGDA MACHINERY MANUFACTURING CO., LTD.
山东金马工业集团股份有限公司	SHANDONG JINMA INDUSTRIAL GROUP CO., LTD.
广东富华重工制造有限公司	GUANGDONG FUHUA HEAVY INDUSTRY MANUFACTURING CO., LTD.
广西汽车集团有限公司	GUANGXI AUTOMOTIVE GROUP CO., LTD.
无锡威孚高科技集团股份有限公司	WUXI WEIFU HIGH-TECH GROUP CO., LTD.
太仓南雁新能源传动有限公司	TAICANG NANYAN NEW ENERGY TRANSMISSION CO., LTD.
日本三井物产机床贸易（上海）有限公司	JAPAN MITSUI PRODUCTS MACHINE TOOL TRADE (SHANGHAI) CO., LTD.
日本电产（浙江）有限公司	JAPAN NIDEC (ZHEJIANG) CO., LTD.
东风汽车电气有限公司	DONGFENG AUTOMOTIVE ELECTRIC CO., LTD.
东华汽车实业有限公司	DONGHUA AUTOMOTIVE INDUSTRY CO., LTD.
北方重工集团有限公司	NORTH HEAVY INDUSTRY GROUP CO., LTD.
宁波惠元精密机械有限公司	NINGBO HUIYUAN PRECISION MACHINERY CO., LTD.
宁波鲍斯能源装备股份有限公司	NINGBO BAOS ENERGY EQUIPMENT CO., LTD.
台湾华镥机械工业股份有限公司	TAIWAN HUAFU MACHINE INDUSTRY CO., LTD.
西安铁路信号有限责任公司	XI'AN RAILWAY SIGNAL CO., LTD.
西班牙西艾意汽车零部件（上海）有限公司	SPAIN CIE AUTOMOTIVE PARTS (SHANGHAI) CO., LTD.
成都青山实业有限公司	CHENGDU QINGSHAN INDUSTRIAL CO., LTD.
庆铃汽车股份有限公司	QINGLING MOTORS COMPANY LIMITED
江苏盟阳控股集团	JIANGSU GONGYANG HOLDING GROUP
安徽万安汽车零部件有限公司	ANHUI WANAN AUTOMOTIVE PARTS CO., LTD.
安徽江淮汽车集团股份有限公司	ANHUI JIANGHUAI AUTOMOTIVE GROUP CO., LTD.
安徽星瑞齿轮传动有限公司	ANHUI XINGRUI GEAR DRIVE CO., LTD.
青岛阿迪尔车桥制造有限公司	QINGDAO ADR BRIDGE MANUFACTURING CO., LTD.
奇精机械股份有限公司	QIJING MACHINERY CO., LTD.
河南中轴中汇汽车零部件有限公司	HENAN ZHONGHUI AUTOMOTIVE PARTS CO., LTD.
陕西东风车桥传动系统股份有限公司	SHAANXI DONGFENG TRUCK-AXLE DRIVE SYSTEM CO., LTD.
南京康尼精密机械有限公司	NANJING KANNI PRECISION MECHANICS CO., LTD.
耐世特凌云工业股份有限公司	NEXTEER LINGYUN INDUSTRIAL CO., LTD.
科普费尔(常州)传动技术有限公司	COPPERFIELD (CHANGZHOU) TRANSMISSION TECHNOLOGY CO., LTD.
重庆龙洞汽车转向器有限公司	CHONGQING LONG RUN AUTOMOTIVE STEERING GEAR CO., LTD.
重庆北特科技有限公司	CHONGQING BEITE TECHNOLOGY CO., LTD.
重庆市北碚区颜宏齿轮工业有限责任公司	CHONGQING BEIBEI YANHONG GEAR INDUSTRY CO., LTD.
重庆市诚润机械有限公司	CHONGQING CHENGRUN MACHINERY CO., LTD.
重庆兰黛动力传动机械股份有限公司	CHONGQING LANDAI POWER TRANSMISSION MACHINERY CO., LTD.
重庆环松工业(集团）有限公司	CHONGQING HUANSONG INDUSTRY (GROUP) CO., LTD.
重庆建设工业（集团）有限责任公司	CHONGQING CONSTRUCTION INDUSTRY (GROUP) CO., LTD.
莱州市金田机械有限公司	LAIZHOU JINTIAN MACHINERY CO., LTD.
株洲欧格瑞传动股份有限公司	ZHUZHOU OGREY POWER TRANSMISSION CO., LTD.
格林精密部件（苏州）有限公司	GREEN PRECISION COMPONENTS (SUZHOU) CO., LTD.
唐山通力齿轮有限公司	TANGSHAN TONGLI GEAR CO., LTD.
浙江万达汽车方向机股份有限公司	ZHEJIANG WANDA AUTOMOTIVE STEERING MACHINE CO., LTD.
浙江双环传动机械股份有限公司	ZHEJIANG DOUBLE RING DRIVE MACHINERY CO., LTD.
浙江世宝股份有限公司	ZHEJIANG SHIBAO CO., LTD.
浙江东音泵业股份有限公司	ZHEJIANG DONGYIN PUMP CO., LTD.
浙江向隆机械有限公司	ZHEJIANG XIANGLONG MACHINERY CO., LTD.
浙江宏鑫曲轴有限公司	ZHEJIANG HONGXIN CRANKSHAFT CO., LTD.
浙江欧迪恩传动科技股份有限公司	ZHEJIANG ODN DRIVE TECHNOLOGY CO., LTD.
深圳市比亚迪汽车有限公司	SHENZHEN BYD AUTOMOTIVE CO., LTD.
湖北三环集团有限公司	HUBEI SANHUAN GROUP CO., LTD.
温州市冠盛汽车零部件制造有限公司	WENZHOU GUANSHENG AUTOMOTIVE PARTS MANUFACTURING CO., LTD.
富顺安建汽车零部件（东莞）有限公司	FUSHUN ANJIAN AUTOMOTIVE COMPONENTS (DONGGUAN) CO., LTD.
韶能集团韶关宏大齿轮有限公司	SHAOGUAN HONGDA GEAR CO., LTD.
鹤山捷仕克汽车配件有限公司	HESHAN JESK AUTOMOTIVE ACCESSORIES CO., LTD.
襄阳汽车轴承股份有限公司	XIANGYANG AUTOMOTIVE BEARING CO., LTD.
襄阳博亚精工装备股份有限公司	XIANGYANG BOYA PRECISION EQUIPMENT CO., LTD.

以轴为媒 与德为邻

COMMUNICATE VIA SHAFTS COLLABORATE WITH MORALITY

轴类专机 | 自动化单元 | 自动化生产线

SHAFT BESPOKE MACHINE | AUTOMATIC UNIT | AUTOMATIC PRODUCTION LINE

- 自动化 & 联线
  Automatic & connect line
- 车床 & 双头车床
  Lathe & double head lathe
- 搓齿机
  Rolling machine
- 深孔钻床
  Deep hole drilling machine
- 外圆磨床
  Cylindrical grinding machine
- 等速万向节专机
  CV joint machine
- 铣端面钻中心孔机床
  Facing and centering machine
- 定制专机
  Customized bespoke machine

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BESPOKE MACHINE | 专注轴类零件解决方案

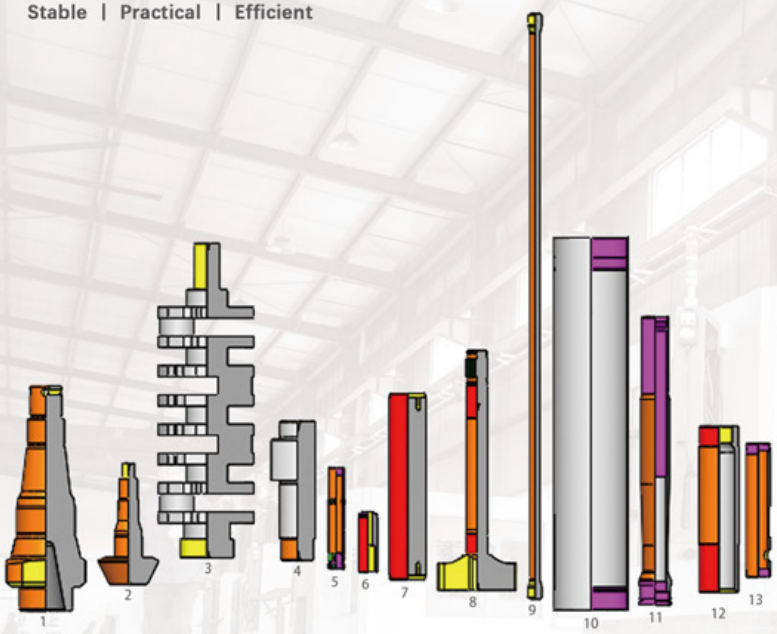
专注轴类零件解决方案
FOCUS ON SHAFT PARTS SOLUTIONS

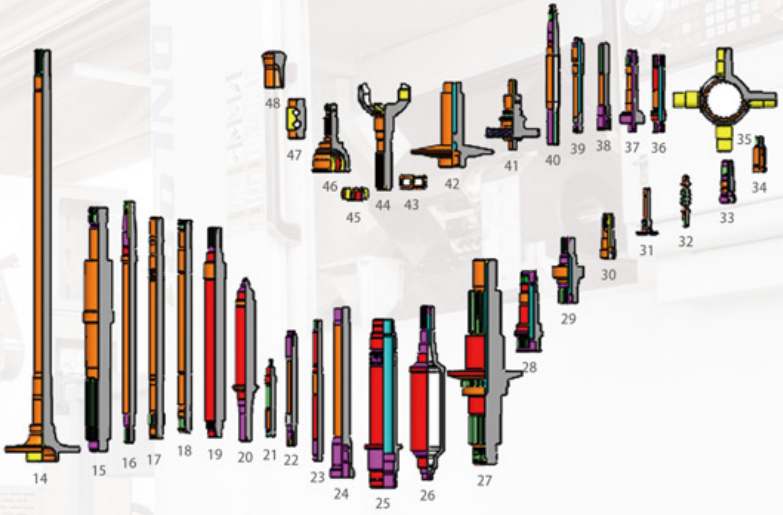
稳定 | 实用 | 高效

Stable | Practical | Efficient

LECN | 力成专机

BESPOKE MACHINE | 专注轴类零件解决方案



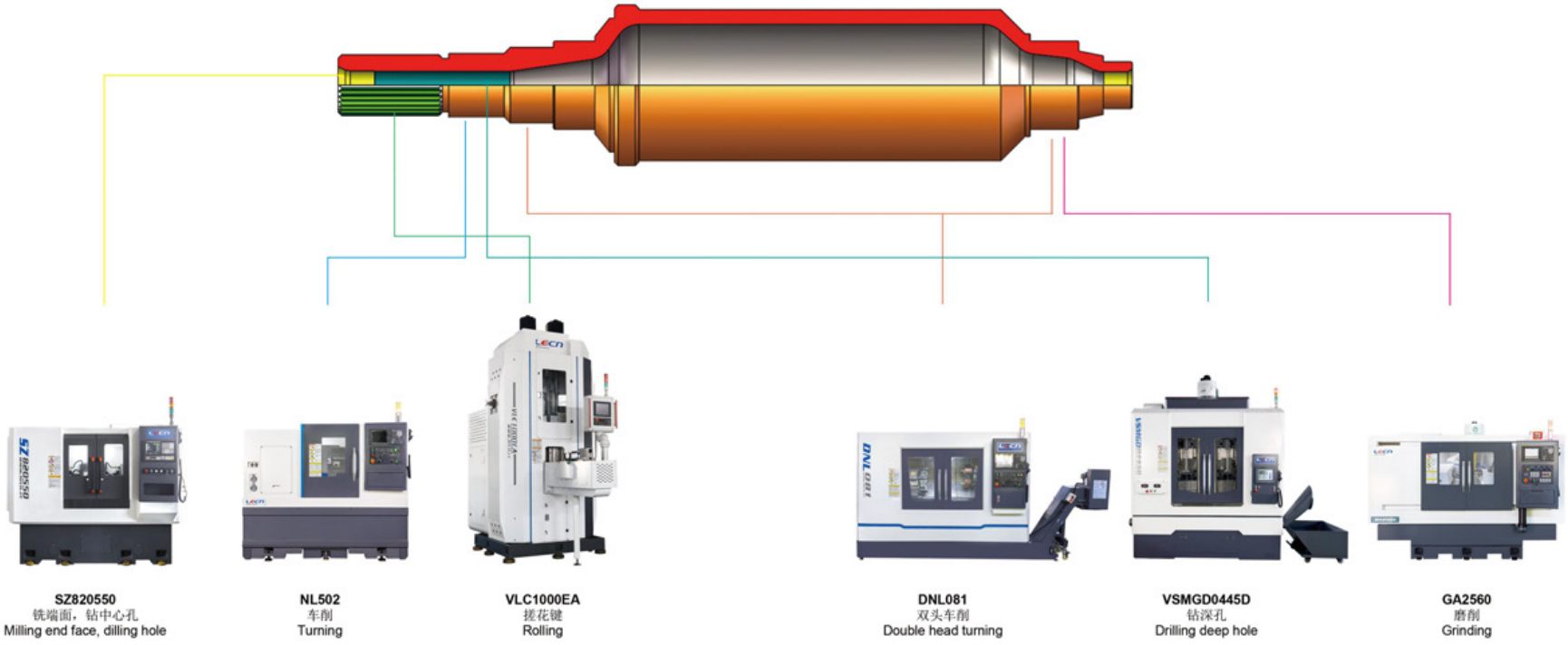


1 轴头 axle head
2 伞齿轮轴 umbrella gear shaft
3 曲轴 crankshaft
4 摇臂轴 rock shaft
5 脱水轴 dehydration shaft
6 导套 guide sleeve
7 大锁轴 big lock shaft
8 制动凸轮轴 cam shaft
9 扭杆 torsion bar
10 机筒 barrel
11 外筒 out barrel
12 管件 pipe fitting
13 柱管 column tube
14 半轴 half shaft
15 中间轴 jackshaft
16 半轴 half shaft
17 实轴 real shaft
18 实轴 real shaft
19 轴 shaft
20 转轴 rotating shaft
21 电机轴 motor shaft
22 转轴 rotating shaft
23 转子 rotor
24 输出轴 output shaft
25 新能源电机轴 new energy motor shaft
26 新能源电机轴 new energy motor shaft
27 输入轴 input shaft
28 洗衣机轴 washing machine shaft
29 输入轴 input shaft
30 输出轴 output shaft
31 驱动轴 drive shaft
32 蜗杆 worm shaft
33 输出轴 output shaft
34 驱动轴 drive shaft
35 十字轴 cross shaft
36 中轴 centre shaft
37 太阳轮轴 sun shaft
38 输入轴 input shaft
39 输入轴 input shaft
40 转向轴锁管 steering shaft lock tube
41 倒档齿轮轴 reverse gear shaft
42 从动带轮轴 driven belt shaft
43 保持架 cage
44 传动轴叉 transmission shaft fork
45 星形套 inner race
46 钟形壳 outer race
47 摇臂轴 rocker shaft
48 钎头 borel bit

铣面,钻孔 Milling face,drilling	双头车削 Double head turning	车削 Turning	钻深孔 Drilling deep hole	搓齿 Rolling	磨削 Grinding

新能源电机轴成套装备
New energy motor shaft complete equipment

LECN | 力成专机
BESPOKE MACHINE | 专注轴类零件解决方案



SZ820550
铣端面，钻中心孔
Milling end face, dilling hole

NL502
车削
Turning

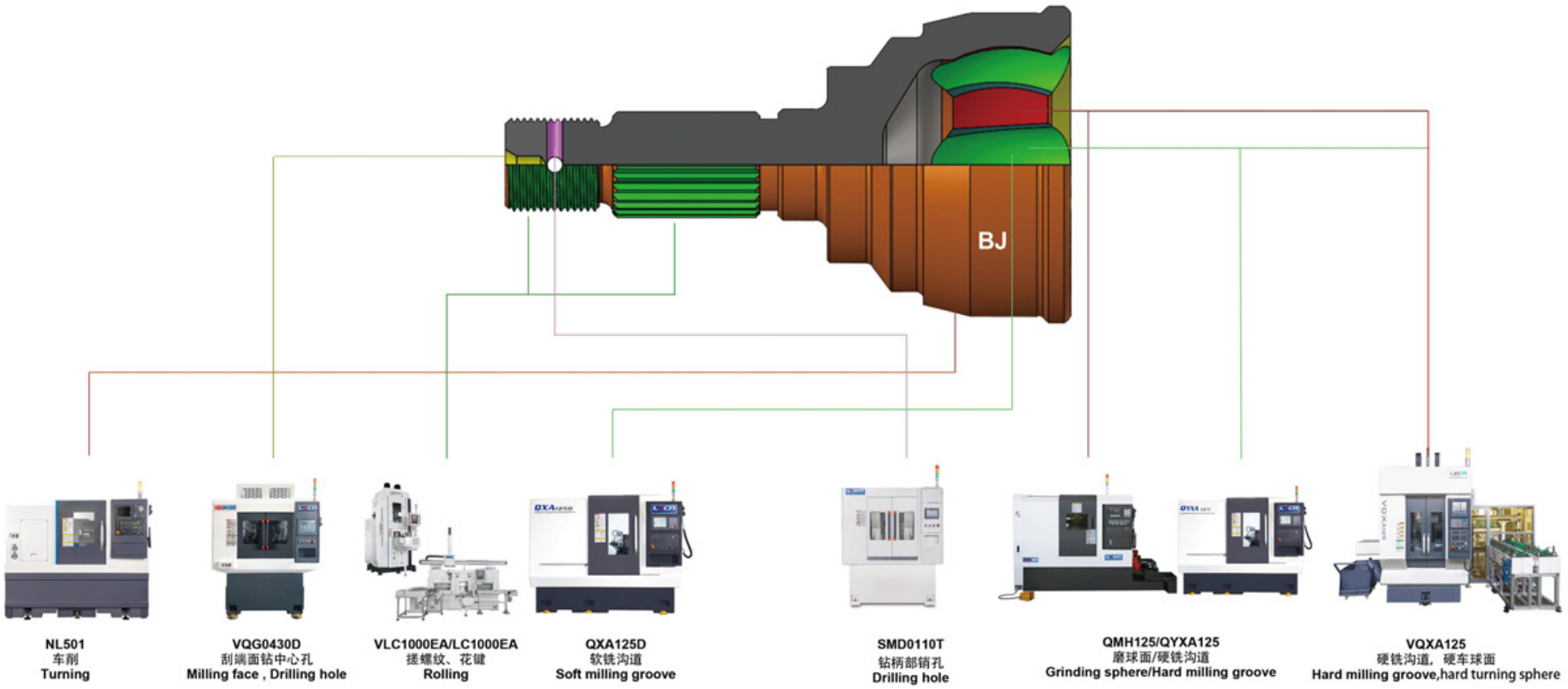
VLC1000EA
搓花键
Rolling

DNL081
双头车削
Double head turning

VSMGD0445D
钻深孔
Drilling deep hole

GA2560
磨削
Grinding

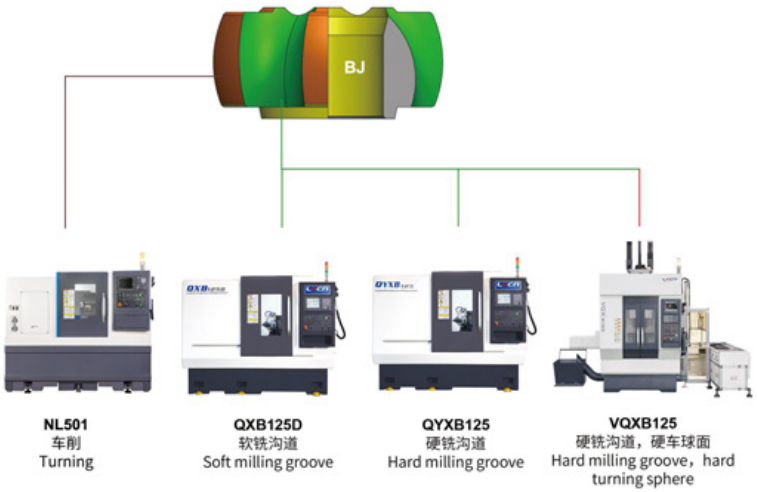
等速万向节—钟形壳成套装备
CV joint—Outer race complete equipment



沟道 Groove				机床 Machine / 加工 content				机床 Machine / 加工 content				
BJ	UFJ	SX	DOJ	NL501	VQG0430D	VLC1000EA/LC1000EA		QXA125D	SMD0110T	QMH125/QYXA125	或	VQXA125
				车削 Turning	刮端面钻中心孔 Milling face，drilling hole	搓花键、螺纹 Rolling		软铣沟道 Soft milling groove	柄部钻孔 Drilling hole	磨球面/硬铣沟道 Grinding sphere/Hard milling groove	OR	硬铣沟道、硬车球面 Hard milling groove，hard turning sphere
VL		CG		NL501				QXC125D		QYXC125	或	VQXC125
				车削 Turning				软铣沟道 Soft milling groove		硬铣沟道 Hard milling groove	OR	硬铣沟道 Hard milling groove

LECN
BESPOKE MACHINE

等速万向节—星形套成套装备
CV joint —Inner race complete equipment



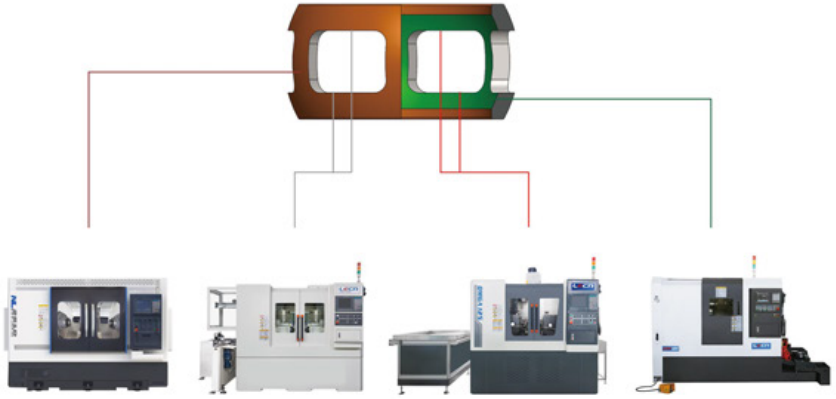
NL501
车削
Turning

QXB125D
软铣沟道
Soft milling groove

QYXB125
硬铣沟道
Hard milling groove

VQXB125
硬铣沟道，硬车球面
Hard milling groove，hard turning sphere

等速万向节—保持架成套装备
CV joint —Cage complete equipment



NL251D
车削
Turning

QXGA125
铣窗口
Milling window

QMGA125
磨窗口
Grinding window

QMH125
磨内球面
Grinding Inner sphere

沟道 Groove				机床 Machine / 加工 content				
BJ	UFJ	SX	DOJ	NL501	QXB125D	QYXB125	或	VQXB125
				车削 Turning	软铣沟道 Soft milling groove	硬铣沟道 Hard milling groove	OR	硬铣沟道，硬车球面 Hard milling groove,hard turning sphere
VL		CG		NL501	QXD125D	QYXD125	或	VQXD125
				车削 Turning	软铣沟道 Soft milling groove	硬铣沟道 Hard milling groove	OR	硬铣沟道 Hard milling groove

LECN
BESPOKE MACHINE

机床 Machine / 加工 content			
NL251D	QXGA125	QMGA125	QMH125
车削 Turning	铣窗口 Milling Window	磨窗口 Grinding window	磨内球面 Grinding internal

1

自动化&联线

AUTOMATIC & CONNECT LINE

力成丰富的专机产品线和多年交钥匙经验,可以为用户提供零件的系统解决方案,并使之实现单机自动化或自动化联线。

LECN can provide users the parts system solutions because we have rich experiences on bespoke machine lines and turn-key projects for many years, which can achieve the single automatic & connect lines.

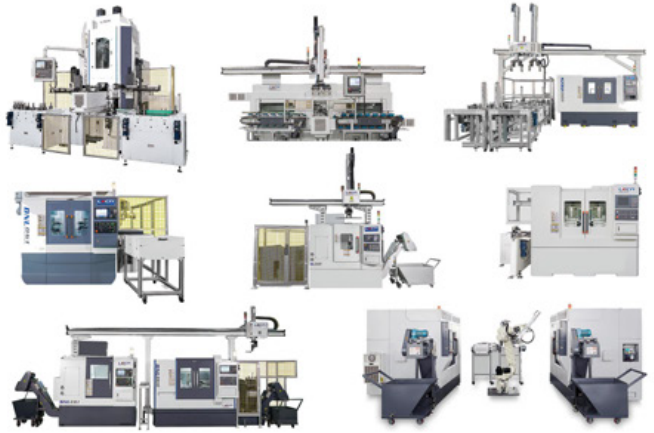
LECN

原厂设计
Factory design

遵循可靠高效原则
Follow the principles of reliability and efficiency

以自动化单元为基础
Based on automation units

500余台在线运行案例
More than 500 online running cases



轴类自动车削单元（机器人）
Shaft parts automatic turning unit (Robot)

Machine video

数控外圆磨床+桁架式机器人
CNC cylindrical grinding machine + Truss robot

自动化生产线

自动化生产线是指按照工艺过程，把一条生产线上的机器联结起来，形成上料、下料、装卸以及产品加工等全部工序都能自动控制、自动测量和自动连续的生产线。

布局原则
流畅原则：各工序有机结合，相关联工序集中放置，流水化布局。短距离原则：尽量减少搬运，流程不可交叉，直线运行。平衡原则：工站之间资源配置，速率配置尽量平衡。固定循环原则：尽量减少诸如搬运。经济产量原则：适应小批量生产的情形，利用空间、减少地面的放置。柔韧性的原则：对未来变化具有充分的应变力，方案有弹性。防错的原则：从硬件布局上预防错误，减少生产上的损失。

布线观点
能短不长，能断不联，能单元不长线。

Automatic production line

Automatic production line refers to the process by which the machines on a production line are linked together to form a production line which can automatically control,measure and continous processing including feeding,loading,unloading and product processing.

Layout principle
Flow principle: organic combination of each process, centralized placement of related processes and fluidized layout.Short-distance principle: minimize handling, process can not be crossed, straight running.Balance principle: resources allocation between workstations and speed allocation should be balanced as far as possible.Fixed cycle principle: minimize handling.Principle of economic output: adapt to the situation of small-scale production, make use of space and reduce the placement of ground.Principle of flexibility: sufficient strain on future changes and flexible plan.Error-proof principle: prevent errors from hardware layout and reduce production losses.

Wiring Views
Can be short not be long, can be disconnected not be continous,can be unit not be long line.

可选桁架式或关节式机器人 Truss or joint robots are optional
首选桁架式机器人 Preferred truss robot

桁架式机器人特点

- *高效：*其各轴以极高的速度直线运行，可用伺服电机快速响应。
- *稳定：*极小的重复性误差，可达± 0.05mm。
- *高强度：*可7天24小时作业。
- *高精度：*定位精度可达±0.02mm（可根据工况适当放大定位精度）。
- *性价比高：*相比关节机器人，其负载重量大，制作成本低。
- *操作简单：*基于直角坐标体系，其运动参数较为简单。

Characteristics of truss robot

- High efficiency: Its axes run in a straight line at a very high speed and can respond quickly with a servo motor.
- Stable: Minimal repeatability error, up to ± 0.05mm.
- High strength: It can work 24 hours a day.
- High precision: The positioning accuracy can reach ± 0.02mm (the positioning accuracy can be appropriately enlarged according to the working conditions).
- High cost performance: Compared with joint robot, its load weight is large and its production cost is low.
- Simple operation: Based on the rectangular coordinate system, its motion parameters are relatively simple.

项目 Project	桁架式机器人 Truss robot		关节式机器人 Joint robot	
工作空间 Workspace	1）一般安装于设备上方或内部，占地空间小； 2）可用多梁拼接延伸生产线，易实现多工序加工和完整自动化生产。 3）在一根横梁上可装多个Z轴，适合加工节拍短的工作方式。 4）观察加工过程、调整刀具、维修等方便。	1) Generally installed on the device or inside, the footprint is small; 2) Can be used multi-beam stitching extension production line, easy to achieve multi-process processing and complete automated production; 3) On a beam can be installed on multiple Z-axis, suitable for processing short beats of the working method; 4) It is convenient to observe the machining process, adjust the tool, repair,etc.	1）一般固定于地面，工作空间受限，只能在特定的空间范围内工作； 2）机床排列方式较固定，不适于节拍长、工序多、设备多的生产型场； 3）轨道为极坐标轨迹不适合长零件抓取，也可增加地轨，但增加节拍； 4）上下料在机床前方，不便加工时观察、调整刀具与维修。	1) Generally fixed to the ground, limited work space, can only work within a specific space range; 2) Machine tool arrangement is more fixed, not suitable for long beats, more processes, more equipment production site; 3) The trajectory for polar coordinate track is not suitable for long part crawl, can also increase the ground orbit, but increase the beat; 4) Up and down in front of the machine, inconvenient to observe, adjust the tool and maintenance.
承载能力 Carrying capacity	1）垂直提升零件，无悬伸，承载能力强； 2）采用重载横梁等结构，最大承载重量可达5吨以上； 3）手爪、料道可采用多种方式。	1) Vertical lift parts, no overhang, strong carrying capacity; 2) The use of heavy-duty beams and other structures, the maximum carrying weight of more than 5 tons; 3) Hand claws, materials can be used in a variety of ways.	1）在空间内抓取零件，悬伸越长，承载能力越差； 2）随着抓取零件重量的增加，其承载能力也要相应的增强，但价格高； 3）手爪复杂影响抓取重量，空间限制料道方式也受限。	1) Grab the part in space, the longer the overhang, the worse the carrying capacity; 2) With the increase of the weight of the crawled part, its carrying capacity should be correspondingly enhanced, but the price is high; 3) The complexity of the claws affects the weight of the claw, and the space limit is limited by the way the material is taken.
工作精度 Working accuracy	重复定位精度可达 ±0.05mm，定位精度可达 ±0.02mm。	Repeated positioning accuracy up to ±0.05 mm and positioning accuracy up to ±0.02 mm.	重复定位精度一般都在 ±0.2mm。且载荷越大，精度越差。	Repeated positioning accuracy is typically ±0.2 mm. And the greater the load, the worse the accuracy.
现场走线及防护 On-site route and protection	1）行走轨迹固定，便于防护； 2）线缆架于空中或设备内部，走线方便。	1) The walking trajectory is fixed, which is easy to protect; 2) Cable rack in the air or inside the equipment, easy to walk.	1）行走轨迹不固定，难以防护，一般都是采用全防护，成本较高； 2）设备围绕机器人的形式布线，走线困难。	1) Walking trajectory is not fixed, difficult to protect, generally using full protection, higher cost; 2) The equipment is routed around the robot's form, and the wiring is difficult.
空间自由度 Space freedom	1）采用直角坐标系，工作路径清楚，程序编排容易； 2）空间自由度低，灵活性相对较差，只能在固定的轨迹或角度内工作。	1) The right-angle coordinate system is adopted, the working path is clear, and the programming is easy; 2) Low spatial freedom, relatively poor flexibility, can only work in a fixed track or angle.	1）采用类似极坐标的坐标方式，编程较难； 2）空间自由度高，灵活性好，适合于任何轨迹或角度的工作。	1) It is difficult to program by using coordinates similar to polar coordinates; 2) High degrees of space freedom, good flexibility, suitable for any track or angle of work.
组合方式 combination	组合方式多样，可根据不同的负载、行程、功能及特殊空间要求，选用对应需求产品。甚至可以在 X、Y、Z 三轴基础上扩展旋转轴或翻转轴，构成五自由度或六自由度机器人，用于实现零件各种姿态的调整。	The combination of different ways, according to different loads, travel, functions and special space requirements, the selection of corresponding requirements of the product. The rotating or flip axes can even be extended on top of the X,Y and Z axes to form a five-degree-of-freedom or six-degree-of-freedom robot for adjustment of various postures of parts.	可细分为 6 自由度机器人、特种机器人、四连杆机器人等，种类相对较少，组合的选择性和灵活性相比桁架机器人要差一些。	Can be subdivided into 6 degrees of freedom robots, special robots, four-link robots, etc. , the type is relatively small, the combination of choice and flexibility than truss robots are worse.
安装与维护 Installation and maintenance	1）使用的零件及工作原理与数控机床相近，维护容易； 2）现场快装简单，用户也可自行安装； 3）机械零件基本为通用品，维修维护费用低。	1) The parts used and the working principle are similar to CNC machine tools and are easy to maintain; 2) On-site assembly is simple, users can also install their own; 3) Mechanical parts are basically general supplies, maintenance costs are low.	1）集成化程度高，整体性好，但需要专业人员进行机械安装和调试； 2）安装维护复杂，成本较高。	1) High degree of integration, good integrity, but the need for professionals for mechanical installation and commissioning; 2) Installation and maintenance is complex and costly.

有关自动化与联线的技术信息，请访问：
www.lecn.cn/automatic-connect-line

搓齿机单机自动化

- 无缝对接桁架式机器人或关节式机器人
- 立式、卧式机型自动化搭载率100%
- 用户处机床可快速增配标准桁架式机器人
- 重力、网袋、链条等节距、皮带式料机可选
- 可定制特殊上下料机

Single machine automation of rolling machine

- Seamless butt truss robot or joint robot
- Automatic carrying rate of vertical and horizontal models 100%
- Standard truss robot can be added to machine tool quickly at user
- Gravity, net bag, chain equal pitch, belt conveyor optional
- Customizable special feeder and unloader

专机单机自动化
铣端面钻中心孔机床/等速万向节专机
Single machine automation of bespoke machine
Facing and centering machine/CV joint machine

- 无缝对接桁架式机器人或关节式机器人
- 保持架机床标配内置桁架式机器人
- 铣端面钻中心孔机床内外置桁架可选
- 铣端面钻中心孔机床重力、网袋、链条等节距、皮带式料机可选
- 用户处机床可快速增配标外置准桁架式机器人
- 可定制特殊上下料机
- Seamless butt truss robot or joint robot
- Cage machine standard with internal truss robot
- Facing and centering machine with internal and external truss optional
- Facing and centering machine gravity, net bag, chain equal pitch, belt conveyor optional
- External truss robot with standard can be rapidly added to machine at user
- Customizable special feeder and unloader

车削单机自动化
数控车床/双头数控车床
Single machine automation of turning machine
CNC lathe/Double head CNC lathe

- 无缝对接桁架式机器人或关节式机器人
- 自动化搭载率100%
- 双头数控车床内外置桁架可选
- 重力、网袋、链条等节距、皮带式料机可选
- 用户处机床可快速增配标外置准桁架式机器人
- 可定制特殊上下料机
- Seamless butt truss robot or joint robot
- Automatic carrying rate 100%
- Optional internal and external truss for double head CNC lathe
- Gravity, net bag, chain equal pitch, belt conveyor optional
- External truss robot with standard can be rapidly added to machine at user
- Customizable special feeder and unloader

自动化 & 联线 Automatic & connect line

自动化实例 Automation show

超过500余台在线运行案例 More than 500 online running cases



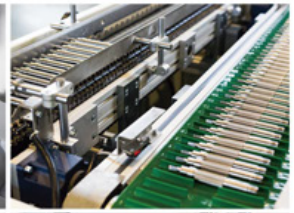




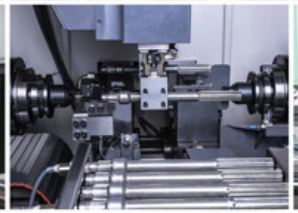

Bespoke Machine



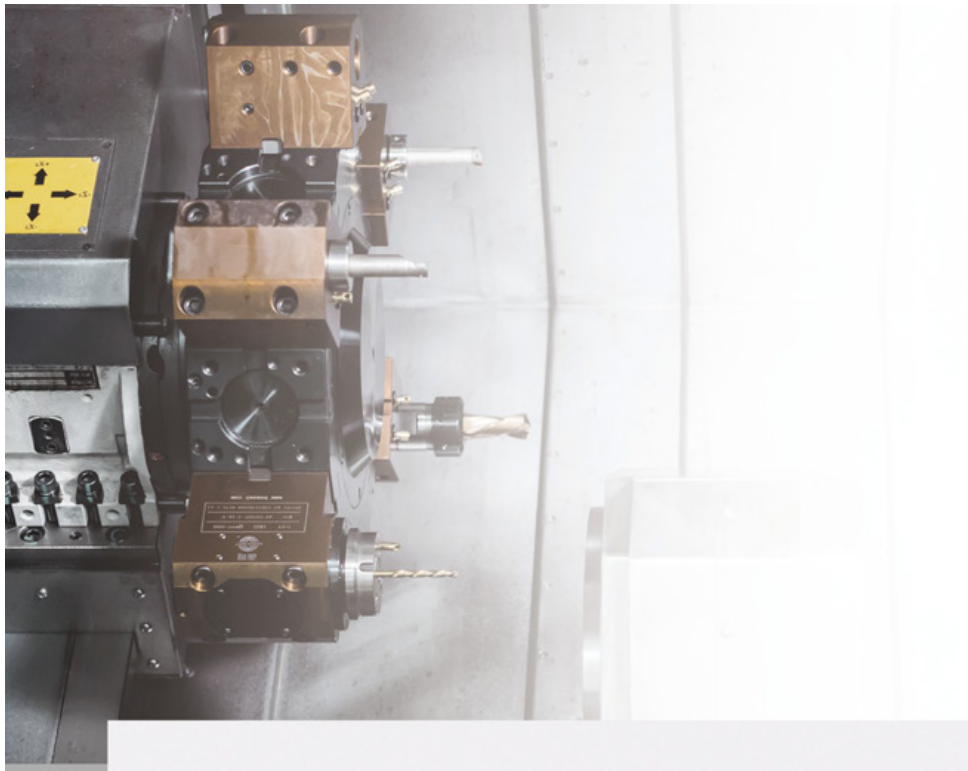






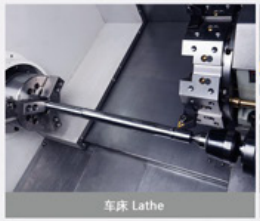


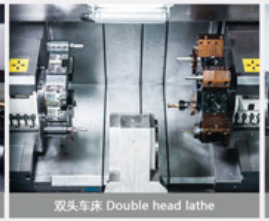
车床 & 双头车床
LATHE & DOUBLE HEAD LATHE

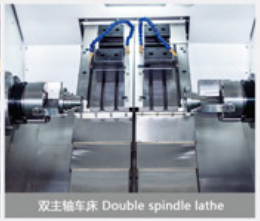
2

因提供全面解决方案的需求而研发的更适合生产线的全功能车床、双头车床和双主轴车床，加载了我们多年的专机设计经验。

Full-function lathe, double head lathe and double spindle lathe developed to better suit the production line due to the need to provide comprehensive solutions have loaded our years of experience in bespoke machine design.


车床 Lathe


双头车床 Double head lathe


双主轴车床 Double spindle lathe

Ø15-Ø250mm
夹持直径 CLAMPING DIAMETER

1500mm
最大车削长度 MAX TURNING LENGTH

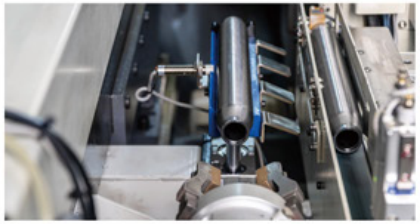
LECN
Bespoke Machine

车床 & 双头车床 Lathe & double head lathe
双头数控车床 Double head CNC lathe

性能特点 Function features

- 立式整体式框架机身，刚性好，易排屑；
- 应对多变零件，只需要更换筒夹和治具；
- 一次装夹两端同时加工，效率高精度好；
- 特别结构的中置主轴，可响应高转速和切削刚性的需要；
- 左右独立式排刀单元，配可伸缩刀具，可有效解决刀具干涉；
- 双通路控制器，左右同步作业轻松应对；
- 可搭载桁架式或关节式机器人，支持自动化联线。

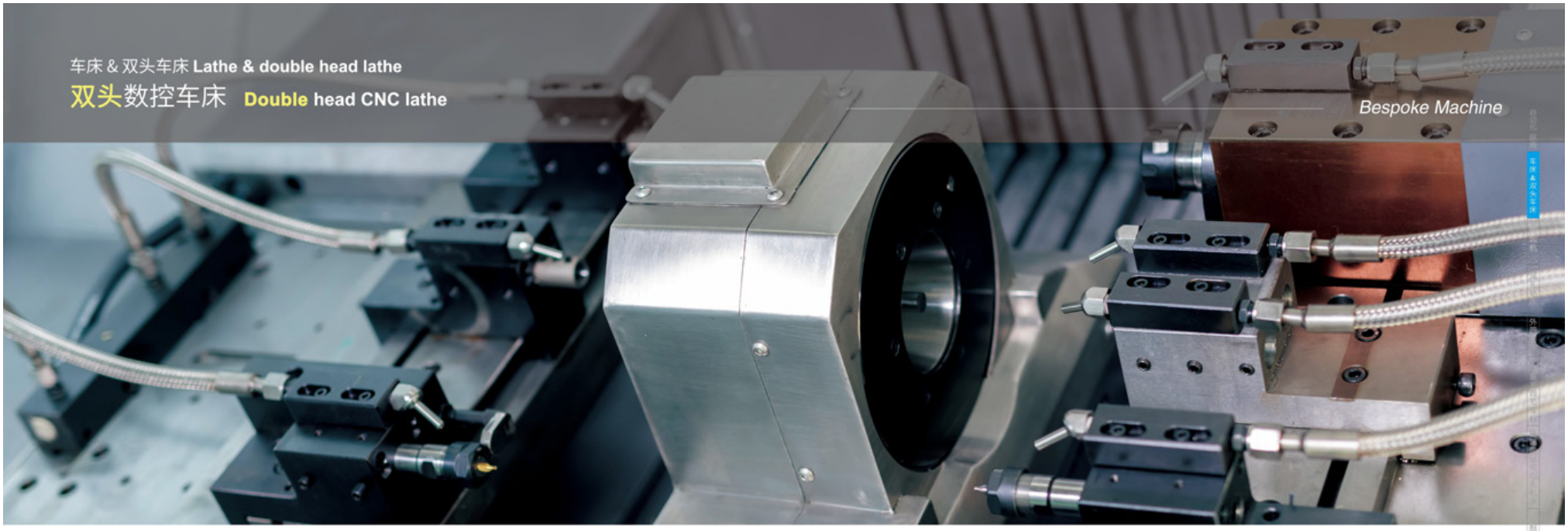
- Vertical integral frame body, rigidity, easy chip;
- Respond to different parts, only replace the collet and fixtures;
- Fix one time,processing both end at one time, high efficiency ,good precision;
- Special structure central spindle can respond to high speed and cutting rigid;
- Independent row cutter with telescopic tool, effectivey slove the tool in terference;
- Dual-channel controller, easily respond to synchronization processing;
- Can carry with truss or joint robot and automatical line .

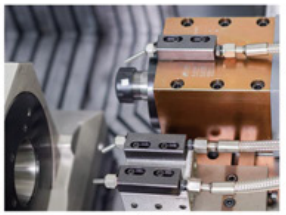


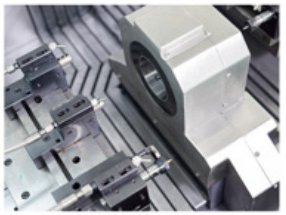
主要参数 The main parameters

项 目	ITEM		DNL061	DNL062
床身最大旋径	max body rotate diameter	mm	Ø200	Ø200
夹持直径范围	clamping diameter scope	mm	Ø15-Ø50	Ø15-Ø50
车削长度范围	turning length scope	mm	100-300	300-480
主轴最大夹持直径	spindle clamp diameter	mm	Ø50	Ø50
X/Z 轴行程	X/Z travel	mm	280/180	280/180
X/Z 轴快速移动速度	X/Z fast speed	m/min	18/24	18/24
刀座形式	fool type		排刀（cutter）	排刀（cutter）

双头数控车床 Double head CNC lathe







性能特点 Function features

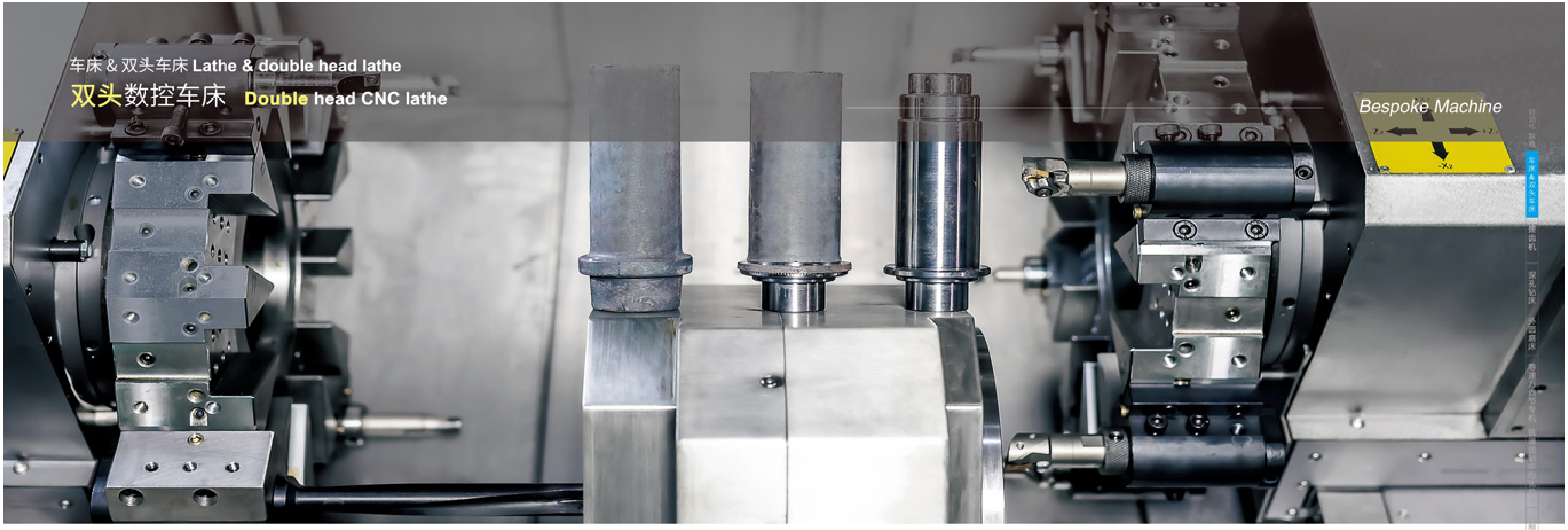
- ○ 斜式整体式框架机身，刚性好，左、右、后排屑任选；
- ○ 应对多变零件，只需要更换筒夹和治具；
- ○ 一次装夹两端同时加工，效率高精度好；
- ○ 特别结构的中置主轴，可响应高转速和切削刚性的需要；
- ○ 左右独立排刀,可加装刀塔和铣削动力头；
- ○ 双通路控制器，左右同步作业轻松应对；
- ○ 可搭载桁架式或关节式机器人，支持自动化联线。

- ○ Oblique integral frame body, rigidity, left, right and rear chip removal options;
- ○ Respond to difdifferent parts, only replace the collet and fixtures;
- ○ Fix one time,processing both end at one time, high efficiency ,good precision;
- ○ Special structure central spindle can respond to high speed and cutting rigid;
- ○ Independent row cutter, additional turret and milling power head;
- ○ Dual-channel controller, easily respond to synchronization processing;
- ○ Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		DNL081G	DNL082G	DNL083G
床身最大旋径	max body rotate diameter	mm	Ø300	Ø300	Ø300
夹持直径范围	clamping diameter scope	mm	Ø20-Ø70	Ø20-Ø70	Ø20-Ø70
车削长度范围	turning length scope	mm	100-300	300-500	500-750
主轴最大夹持直径	spindle clamp diameter	mm	Ø70	Ø70	Ø70
X/Z 轴行程	X/Z travel	mm	280/200	280/200	280/350
X/Z 轴快速移动速度	X/Z fast speed	m/min	18/24	18/24	18/24
刀座形式	fool type		排刀(cutter)	排刀(cutter)	排刀(cutter)

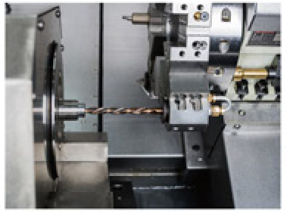
双头数控车床 Double head CNC lathe

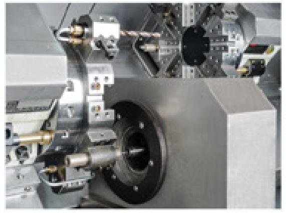


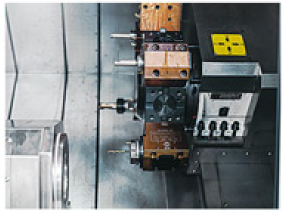
性能特点 Function features

- ◎ 斜式整体式框架机身，刚性好，易排屑；
- ◎ 应对多变零件，只需要更换筒夹和治具；
- ◎ 一次装夹两端同时加工，效率高精度好；
- ◎ 特别结构的中置单或双主轴，可响应高转速和切削刚性的需要；
- ◎ 双主轴间距根据工件长度可调；
- ◎ 左右独立刀塔；
- ◎ 双通路控制器，左右同步作业轻松应对；
- ◎ 可搭载桁架式或关节式机器人，支持自动化联线。

- ○ Oblique integral frame body, rigidity, easy chip;
- ○ Respond to difiifferent parts, only replace the collet and fixtures;
- ○ Fix one time,processing both end at one time, high efficiency ,good precision;
- ○ Special structure central single or double spindle can respond to high speed and cutting rigid;
- ○ Double spindle distance can be adjusted according to workpiece length;
- ○ Independent turret on left and right;
- ○ Dual-channel controller, easily respond to synchronization processing;
- ○ Can carry with truss or joint robot and automatical line.

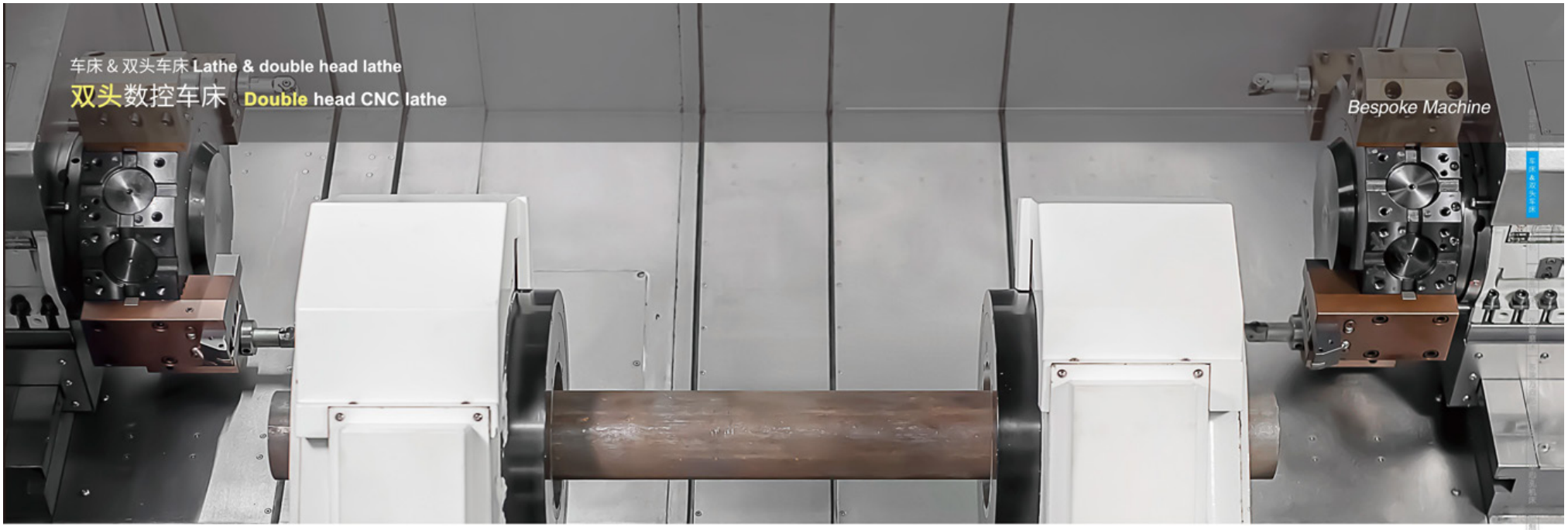


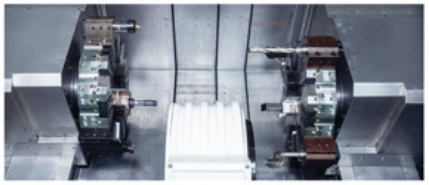




主要参数 The main parameters

项　目	ITEM		DNL081	DNL082	DNL083	DNL085
床身最大旋径	max body rotate diameter	mm	Ø300	Ø300	Ø300	Ø300
夹持直径范围	clamping diameter scope	mm	Ø20-Ø70	Ø20-Ø70	Ø20-Ø70	Ø20-Ø70
车削长度范围	turning length scope	mm	100-300	300-500	500-750	800-1200
主轴最大夹持直径	spindle clamp diameter	mm	Ø70	Ø70	Ø70	Ø70
X/Z 轴行程	X/Z travel	mm	160/200	160/200	160/350	160/350
X/Z 轴快速移动速度	X/Z fast speed	m/min	18/24	18/24	18/24	18/24
刀座形式	fool type		刀塔(turret)	刀塔(turret)	刀塔(turret)	刀塔(turret)
中置主轴数	number of central spindles		1	1	1	1 或 2





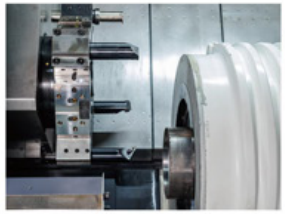
性能特点 Function features

- 斜式整体式框架机身，刚性好，易排屑；
- 应对多变零件，只需要更换筒夹和治具；
- 一次装夹两端同时加工，效率高精度好；
- 特别结构的中置单或双主轴，可响应高转速和切削刚性的需要；
- 双主轴间距根据工件长度可调；
- 左右独立刀塔；
- 双通路控制器，左右同步作业轻松应对；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Oblique integral frame body, rigidity, easy chip;
- Respond to difffferent parts, only replace the collet and fixtures;
- Fix one time,processing both end at one time, high efficiency ,good precision;
- Special structure central single or double spindle can respond to high speed and cutting rigid;
- Double spindle distance can be adjusted according to workpiece length;
- Independent turret on left and right;
- Dual-channel controller, easily respond to synchronization processing;
- Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		DNL121	DNL122	DNL125
床身最大旋径	max body rotate diameter	mm	Ø300	Ø300	Ø300
夹持直径范围	clamping diameter scope	mm	Ø70-Ø120	Ø70-Ø120	Ø70-Ø120
车削长度范围	turning length scope	mm	100-300	300-500	1000-1700
主轴最大夹持直径	spindle clamp diameter	mm	Ø120	Ø120	Ø120
X/Z 轴行程	X/Z travel	mm	180/200	180/200	220/250
X/Z 轴快速移动速度	X/Z fast speed	m/min	18/24	18/24	18/24
刀座形式	fool type		刀塔（turret）	刀塔（turret）	刀塔（turret）
中置主轴数	number of central spindles		1	1	1 或 2



性能特点 Function features

- ○ 斜式整体式框架机身，刚性好，易排屑；
- ○ 应对多变零件，只需要更换筒夹和治具；
- ○ 一次装夹两端同时加工，效率高精度好；
- ○ 特别结构的单或双中置主轴，可响应高转速和切削刚性的需要；
- ○ 双主轴间距根据工件长度可调；
- ○ 左右独立刀塔；
- ○ 双通路控制器，左右同步作业轻松应对；
- ○ 可搭载桁架式或关节式机器人，支持自动化联线。

- ○ Oblique integral frame body, rigidity, easy chip;
- ○ Respond to difffferent parts, only replace the collet and fixtures;
- ○ Fix one time,processing both end at one time, high efficiency ,good precision;
- ○ Special structure single or double central spindle can respond to high speed and cutting rigid;
- ○ Double spindle distance can be adjusted according to workpiece length;
- ○ Independent turret on left and right;
- ○ Dual-channel controller, easily respond to synchronization processing;
- ○ Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		DNL162	DNL223
床身最大旋径	max body rotate diameter	mm	Ø400	Ø400
夹持直径范围	clamping diameter scope	mm	Ø100-Ø160	Ø160-Ø220
车削长度范围	turning length scope	mm	200-400	400-600
主轴最大夹持直径	spindle clamp diameter	mm	Ø160	Ø220
X/Z 轴行程	X/Z travel	mm	180/200	220/200
X/Z 轴快速移动速度	X/Z fast speed	m/min	18/24	18/24
刀座形式	fool type		刀塔（turret）	刀塔（turret）
中置主轴数	number of central spindles		1 或 2	1 或 2

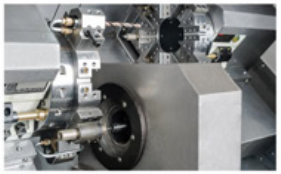
双头车削技术
Double head turning technology

应用

双头数控车床是一种利用中置主轴驱动零件旋转两端同时进行车削等加工的数控车削机床。主要用于汽车传动轴、新能源电机轴、减震器、深水泵轴等各种轴类零件高精、高效加工。

APPLICATION

Double head CNC lathe is a kind of CNC turning machine which uses the central spindle to drive both ends of the part to rotate and perform turning and other processing at the same time. It is mainly used for high-precision and efficient processing of various shaft parts such as automobile transmission shaft, new energy motor shaft, shock absorber, deep-water pump shaft, etc.



结构

■*机床结构*，有立式、斜式、单主轴、双主轴、排刀和刀塔多种不同机型。主要是在于占地面积、加工复杂程度、加工能力等方面的差异，在不同的机型上各有优势。

STRUCTURE

■ Machine tool structure, including vertical, oblique, single spindle, double spindle, cutter and turret. It is mainly due to the difference in floor area, processing complexity, processing capacity, etc., which has advantages in different models.

特点

■*专用性强*，需要根据零件夹持位置直径大小、长度等来定制中间驱动主轴、筒夹和治具，且对毛坯夹持位置的直线度、圆度有要求。

■*高效、高同轴度*，可一次装夹两端同时或独立进行车削、钻孔、攻牙、镗孔等加工。与传统数控车床加工比较，一台机床相当于两台机床效率，同轴度可达 μ 级。

CHARACTERISTIC

■ With strong specificity, it is necessary to customize the intermediate drive spindle, bobbin clamp and fixture according to the diameter and length of the part clamping position, and there are requirements for the straightness and roundness of the blank clamping position.

■ With high efficiency and high coaxiality, both ends can be clamped at one time for simultaneous or independent turning, drilling, tapping, boring and other processing. Compared with the traditional CNC lathe, one machine tool is equivalent to two machine tools, and the coaxiality can reach μ Class.

力成技术优势
LECN technical advantages

■ *全系数控双头车床*，无论立式、斜式还是排刀、刀塔机，都有全系列的可以搭载单夹或双夹主轴的机型供您选择。

■ *双通道数控系统*，双边可做相同或者不同的加工、互不干涉。

■ *丝杆预拉伸技术*，无论立式、斜式的伺服传动均采用伺服电机 + 滚珠丝杆 + 丝杆预拉伸技术，从而有效的避免了传动时因滚珠丝杆磨损及温升伸长而导致的偏差和精度的丧失。

■ *伺服主轴电机*，无论立式、斜式机型均采用大扭矩高转速伺服主轴电机。

■ *独立主轴恒温控制*，无论立式、斜式机型均采用独立主轴温控系统，保持精度稳定。

■ *全封闭车削空间*，无论立式、斜式机型均采用全封闭的内外防护结构。

■ *全面解决方案*，无论加工还是自动化方案需求，力成在车削和相关自动化领域拥有20多年制造经验的专业化团队都可以提供全面解决方案或建议。

■ All series of CNC double head lathes, whether vertical, oblique or cutter, turret machine, have a full range of models that can be equipped with single clamp or double clamp spindles for your choice.

■ The dual channel CNC system can perform the same or different processing on both sides without interference.

■ The pre stretching technology of the lead screw, no matter the vertical or oblique servo drive, adopts the servo motor+ball screw+lead screw pre stretching technology, thus effectively avoiding the loss of deviation and accuracy caused by the wear and temperature rise elongation of the ball screw during the drive.

■ High torque and high speed servo spindle motors are used for both vertical and oblique models.

■ Independent spindle thermostatic control. Independent spindle temperature control system is used for both vertical and oblique models to maintain stable accuracy.

■ Totally enclosed turning space, both vertical and oblique models adopt fully enclosed internal and external protective structures.

■ Comprehensive solutions, regardless of the requirements for processing or automation solutions, LECN professional team with more than 20 years of manufacturing experience in turning and related automation fields can provide comprehensive solutions or suggestions.

有关双头数控车床的技术信息，请访问
www.lecn.cn/double-head-cnc-lathe

如何选型双头数控车床
How to select double head CNC lathe

各有优势： 无论立式、斜式、单主轴和双主轴机型，主要是在于占地面积、加工复杂程度、加工能力等方面的差异，在不同的机型上各有优势。

设计细节、工艺能力决定加工精度： 无论何种机型，除了以上的几点区别外，其对于产品精度、加工效率影响并不十分明显， 在机型能力范围内工件的加工精度取决机型的设计细节和制造厂家的工艺能力。

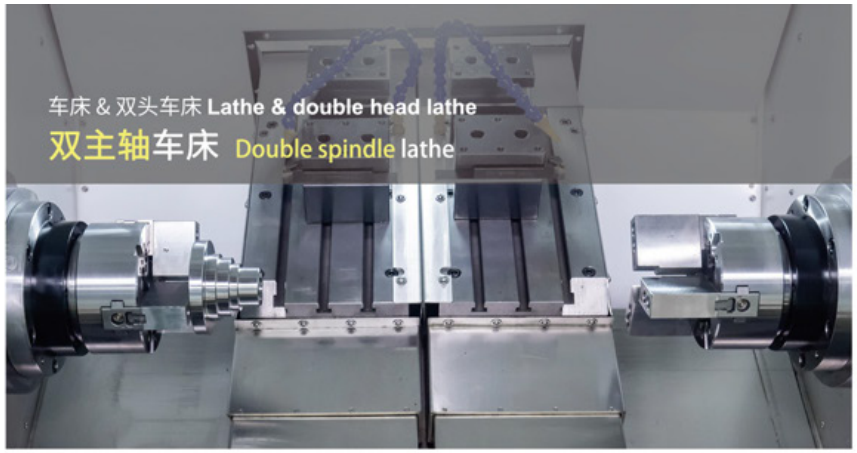
斜式刀塔机型可以覆盖立式排刀所有规格： 08 及以上系列机型可以用单主轴或双主轴； 08 系列机型可以覆盖立式机型所有规格 .

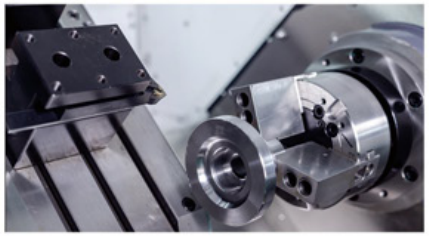
Each has its own advantages: whether it is vertical, oblique, single spindle or double spindle models, it mainly depends on the differences in floor area, processing complexity, processing capacity, etc., and has its own advantages in different models.

The design details and process capability determine the processing accuracy: regardless of the model, except for the above differences, its impact on the product accuracy and processing efficiency is not very obvious. The processing accuracy of the workpiece within the model capability depends on the design details of the model and the manufacturer's process capability.

Oblique turret machine can cover all specifications of vertical cutter machine: 08 and above series machines can use single spindle or double spindle; 08 series machines can cover all specifications of vertical machines.

机床型式 Machine type	优点 Advantage	缺点 Disadvantage
立式 Vertical 	1. 占地面积较小，对于场地紧张的用户是不错的选择。 2. 排屑方便，铁屑自由落体直接落排屑槽里。 3. 左右排刀，换刀速度快。 4. 左、右侧排屑或后排屑由任选。 5. 利于搭载推进式换料内置料架式机器人，节拍短，料机左进右出或右进左出可选。 6. 可搭载内置桁架式或关节式机器人。 1. Small area is a good choice for users with tight space. 2. Easy debris removal, free fall of iron debris directly into the debris removal slot. 3. Left and right row of knives, fast tool change. 4. Left and right side debris removal or rear debris removal is optional. 5. Advantageous to carry the built-in truss robot for propelling refueling ,short rhythm. Left-in and right-out or right-in and left-out of the feeder are optional. 6. Can carry built-in truss or joint robot.	1. 整体刚性和加工电震的能力不如斜式。 2. 不便搭载外置桁架式机器人。 2. 不便加工直径大于70mm以上的零件。 3. 不便安装刀塔。 1.Overall rigidity and the ability to process shock absorption are not as inclined. 2. Inconvenient to carry the external truss robot. 2. Inconvenient to process parts with diameters greater than 70mm. 3.Inconvenient to install the turret.
斜式 Oblique 	1. 整体刚性低于立式结构，利于大负载切削。 2. 可加工小于70mm和230mm直径的零件，且易于定制中置主轴。 3. 斜式排刀机型可追加铣钻动力头及车方动力头等扩展功能。 4. 斜式刀塔机型可搭载8或12工位伺服或动力刀塔可选。 5、左、右侧排屑或后排屑由任选。 6. 利于搭载推进式换料内置料架式机器人，节拍短，料机左进右出或右进左出可选。 7. 可搭载内置桁架式或关节式机器人。 1. Integral rigidity better vertical structure, beneficial for heavy load cutting. 2. Parts between 70mm and 230mm diameters can be machined, intermediate spindle can be easily customized. 3. Oblique cutter machine can add extended functions such as milling drill power head and vehicle power head. 4. Oblique turret machine can be equipped with 8 or 12-station servo or power turret optional. 5. Left and right side debris removal or rear debris removal is optional. 6. Advantageous to carry the built-in truss robot for propelling refueling ,short rhythm. Left-in and right-out or right-in and left-out of the feeder are optional. 7. Can carry built-in truss or joint robot.	1. 占地面积较大，不利于场地紧张的用户选用。 2. 排屑较比立式稍差。 3. 成本高于立式排刀机型。 4. 斜式刀塔机型不便追加铣钻及车方动力头等扩展功能。 1. Covers large area, not conducive to the selection of users with tight space. 2. Chip removal slightly worse than vertical machine. 3. Cost higher than vertical machine. 4. Oblique turret machien inconvenient to add extended functions such as milling drill power head and vehicle power head.
单主轴 Single spindle 	1. 适用于长度小于800mm的管类或轴类零件。 2. 中间驱动主轴可配双夹头。 3. 左、右侧排屑或后排屑由任选。 4. 利于搭载推进式换料内置料架式机器人，节拍短，料机左进右出或右进左出可选。 5. 可搭载外置桁架式或关节式机器人。 1. Suitable for pipe or shaft parts less than 800mm in length. 2. Intermediate drive spindle can be equipped with double clamps. 3. Left or right side debris removal or rear debris removal is optional. 4. Advantageous to carry the built-in truss robot for propelling refueling ,short rhythm. Left-in and right-out or right-in and left-out of the feeder are optional. 5. Can carry built-in truss or joint robot.	1. 不便于做排刀。 2. 主轴宽度决定零件长度，可加工零件长度范围有限。 1. Not easy to make cutter machine. 2. Width of the spindle determines the length of the part ,the range of Machinable parts is limited.
双主轴 Double spindle 	1. 适用于长度大于800mm的管类或轴类零件。 2. 两个中间主轴驱动分为主从动模式和双驱动模式，可根据零件长度和直径大小而定。一般细长轴使用双驱动模式，可使零件在加工过程中扭曲达到最小。 3. 双主轴其中一个主轴可编程移动，可实现在两个主轴中间上下料，节省设备长度。 4. 前侧面右排屑和后排屑任选。 5. 可搭载外置桁架式或关节式机器人。 1. Suitable for pipe or shaft parts more than 800mm in length. 2.Two intermediate spindle drives are divided into master-slave mode and dual-drive mode, depending on the length and diameter of the part. Typical slim shafts use a dual drive mode that minimizes distortions during machining. 3. One of the two spindles can be programmed to move so as to save the length of equipment by feeding and unloading between the two spindles. 4.Front side right and rear side debris removal optional. 5. Can carry built-in truss or joint robot.	1. 占地面积较大，不利于场地紧张的用户选用。 2. 成本高于单主轴机型。 1. Covers large area, not conducive to the selection of users with tight space. 2. Cost higher than vertical machine.





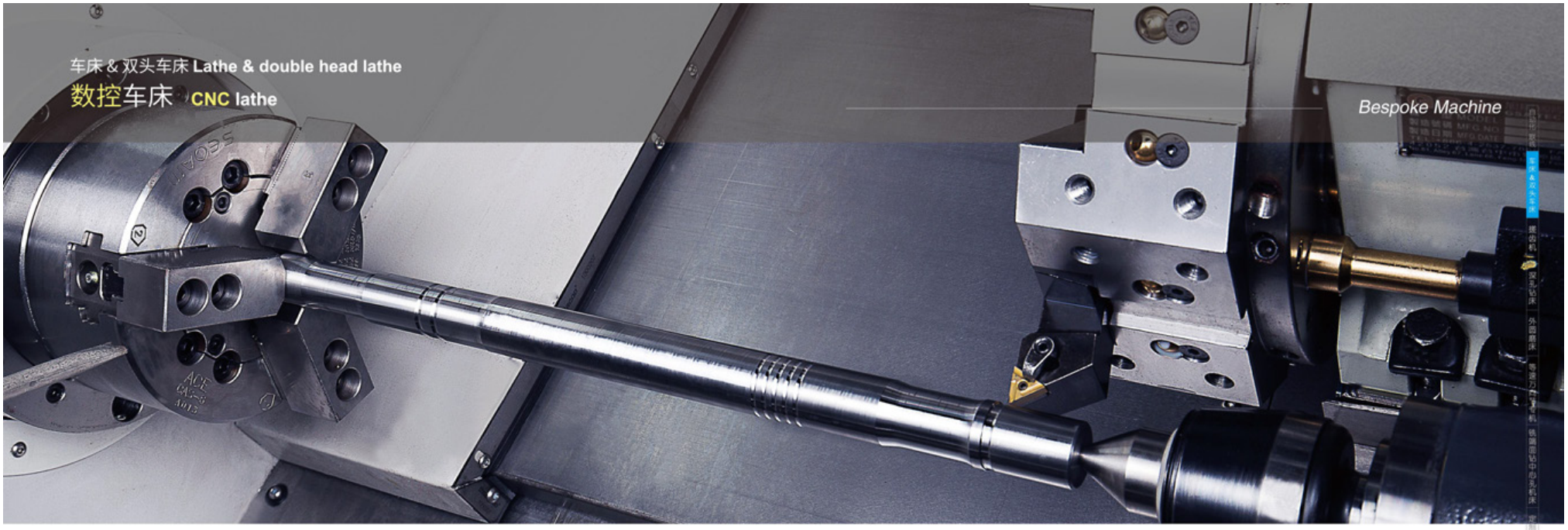
性能特点 Function features

- ○ 30度整体斜式框架式机身，刚性好，易排屑；
- ○ 双主轴平行对置，中置排刀架，易操作；
- ○ 双主轴可实现工件自动交换，全序车削加工，效率高；
- ○ 双通道控制器，左右左右同步作业轻松应对；
- ○ 机床合二为一，占地面积小，减少工序转换；
- ◎ 可搭载桁架式或关节式机器人，支持自动化联线。

- ○ 30 degree oblique frame type body, high rigidity, easy chip removal;
- ○ Double spindles are parallel and opposite, middle row tool holder , easy to operate;
- ○ Double spindles can realize automatic workpiece exchange, full sequence turning, high efficiency;
- ○ Dual-channel controller, easily respond to synchronization processing;
- ○ Machine combined into one, small area, reducing process conversion;
- ○ Can carry with truss or joint robot and automatical line .

主要参数 The main parameters

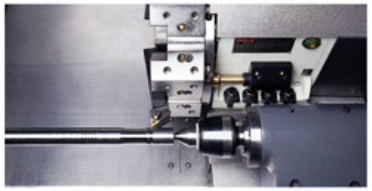
项 目	ITEM		NL251D
床身最大旋径	max body rotate diameter	mm	Ø300
最大加工直径	max processing diameter	mm	Ø150
最大车削长度	max turning length	mm	200
主轴通孔直径	spindle through-hole diameter	mm	Ø42
X/Z 轴行程	X/Z travel	mm	400/250
X/Z 轴快速移动速度	X/Z fast speed	m/min	24/30
刀座形式	fool type		排刀(cutter)



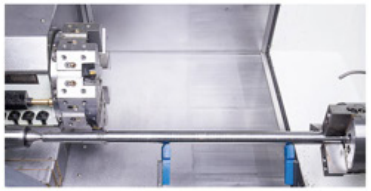
车床 & 双头车床 Lathe & double head lathe

数控车床 CNC lathe

Bespoke Machine



正手 forhand



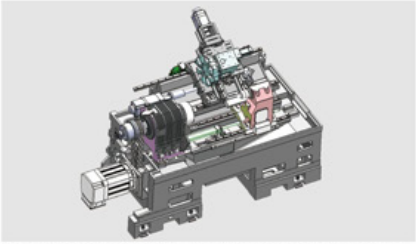
反手 backhand

性能特点 Function features

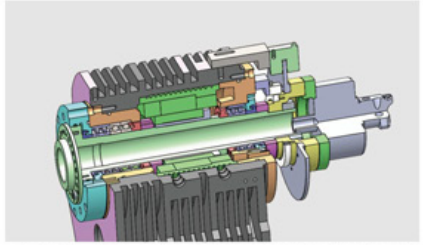
- 整体30度阶梯式高刚性低重心机身；
- 高精度高刚性精密主轴单元；
- 全行程可调节油压尾座或编程尾座；
- 就近选刀的精密刀塔；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Overall 30-degree stepped high rigidity low center of gravity body;
- High precision and high rigidity precision spindle unit;
- Programmable hydraulic tailstock or programe tailstock;
- Precision turret selects tool nearby;
- Can carry with truss or joint robot and automatical line.

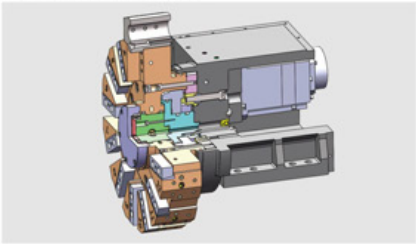
数控车床功能模块 CNC lathe functional module



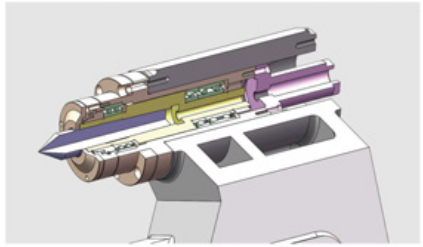
▲经过有限元分析的阶梯式整体机身，高低平导轨+大跨距高刚性滑鞍，均摊切削力，延长导轨寿命；尾座大跨距导轨，保障高速重切削；30度滑鞍，结构紧促，易排屑。
Stepped integral body through finite element analysis, high-low flat guide rail + large span high rigid saddle, can share cutting force and prolong the life of guide rail. Large span tailstock guide rail ensures high speed and heavy cutting. 30 degree saddle, compact structure, easy to remove chips.



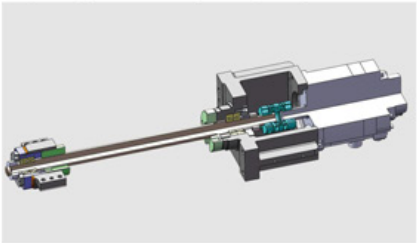
▲内置式电主轴（选配）：内置式高速电机直驱、P4级轴承支撑、油压刹车，结构紧促，转速高，震动小，噪声低，可响应高速、高精、高刚性切削需求。
Built-in electric spindle (optional): built-in high-speed motor direct drive, P4 bearing support, oil brake, compact structure, high speed, low vibration, low noise, can respond to high speed, high precision, high rigidity cutting requirements.



▲8或12工位内泄式高压伺服刀塔（选配）：三片式端齿盘、伺服电机驱动、油压自动锁紧，重复定位精度高，换刀速度快，适合重切削；高压出水时换刀时泵无需启停，切削液无渗漏，出水压力最高达70 kg。
8 or 12-station internal discharge high-pressure servo turret (optional): three-piece end gear disc, servo motor drive, oil pressure automatic locking, high repeat positioning accuracy, fast tool change speed, suitable for heavy cutting. The pump does not need to start or stop when changing tools under high pressure water outlet, and there is no leakage of cutting fluid. The water outlet pressure is up to 70 kg.



▲主轴式尾座（选配）：P4级轴承支撑、MT4顶尖、迷宫式机械密封，在高速旋转时提供高精度、高刚性零件支撑，轴承使用寿命长，零件加工的圆柱度高。
Spindle tailstock (optional): P4 grade bearing support, MT4 apex, labyrinth mechanical seal, high precision and rigid parts support at high speed of rotation, long bearing life, high cylindricity of parts processing.



▲X、Z轴均采用C3级双螺母滚珠丝杆和高速精密丝杆专用轴承，并实施预拉伸，传动稳定，热胀后精度保持性好。伺服电机通过精密联轴器直联，可优化因载荷引起的传动精度变化。
X and Z axles adopt C3 class double nut ball screw and special bearing for high-speed precision screw, carry out pre-stretching, with stable transmission and good accuracy after thermal expansion. Servo motors are directly coupled through precision couplings to optimize transmission accuracy changes due to loads.

▲X、Z轴均使用P级高刚性滚珠线轨，配合精密滚珠丝杆传动，可实现快速移动速度24m/min，减少了非切削时间。
Both X and Z axes use P-grade high rigid ball track with precise ball screw drive to achieve fast moving speed of 24m/min and reduce non-cutting time.

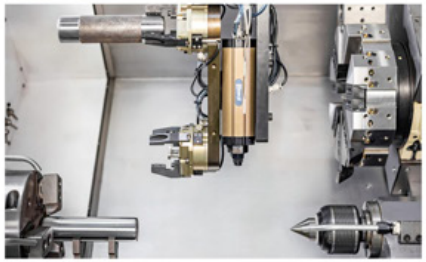
Specifications & parameter 规格参数

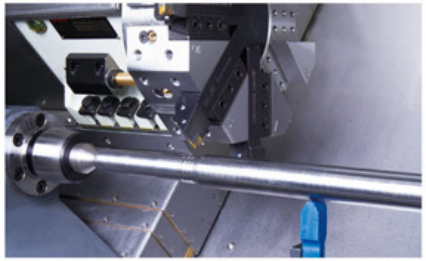
项 目	ITEM		NL501	NL502	NL503
加工能力	machining capacity				
床身最大旋径	max body rotate diameter	mm	500	500	500
最大车削直径	max turning diameter	mm	360	360	360
最大车削长度	max turning length	mm	300	500	800
棒料最大直径	max bar diameter	mm	Ø50	Ø50	Ø50
行程	travel				
X轴	X aris	mm	195	195	195
Z轴	Z aris	mm	330	550	850
主轴	spindle				
主轴转速	speed of spindle	rpm	3500	3500	3500
卡盘直径	chuck diameter	inch	8	8	8
主轴鼻端	fore of spindle		A2-6	A2-6	A2-6
主轴功率	spindle power	kw	11/15	11/15	11/15
刀塔	turret				
刀座数量	tool stations	pcs	8	8	8
外圆方刀尺寸	OD shank size	mm	25	25	25
镗刀刀杆直径	boring bar diameter	mm	Ø32	Ø32	Ø32
分度时间	indexing time	s	0.3	0.3	0.3
进给速度	feed rate				
X/Z 快速位移	rapid X/Z	m/min	18/24	18/24	18/24
X 轴	X axis	KW	1.5	1.5	1.5
Z 轴	Z axis	KW	1.5	1.5	1.5
尾座	tailstock				
套筒直径	bushing diameter	mm	75	75	75
尾座行程	tailstock travel	mm	300	500	800
套筒锥孔	tapered hole of bushing	M.T	5	5	5
容量	capacity				
切削液	cutting fluid	L	100	100	200
润滑油	lube	L	2	2	2
机床	machine				
机床重量	weight	kg	3500	4000	4500
占地面积（长 x 宽）	length x width	mm	1900 x 1600	2088 x 1600	2500 x 1600
电力容量	power capacity	KVA	30	30	30

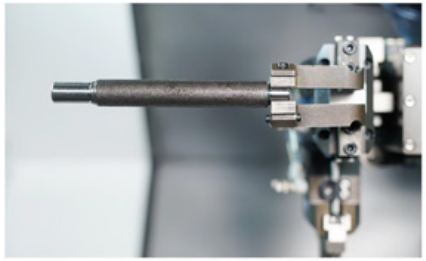
车床 & 双头车床 Lathe & double head lathe

数控车床 CNC lathe



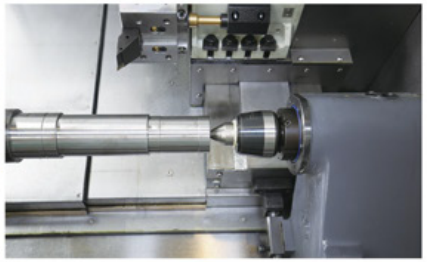
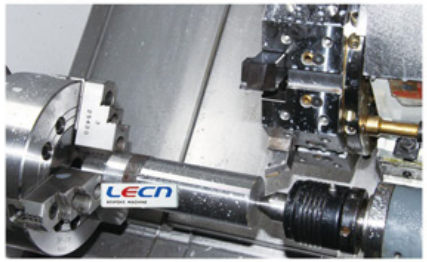


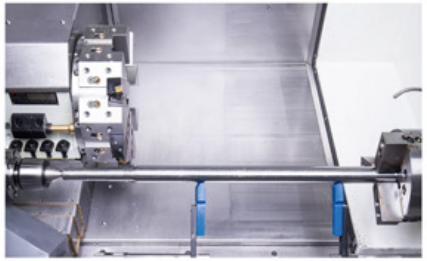


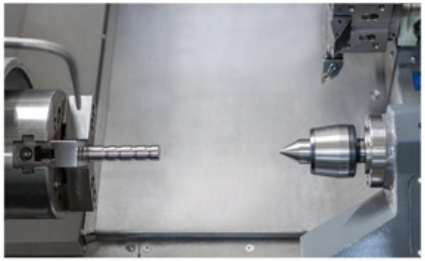
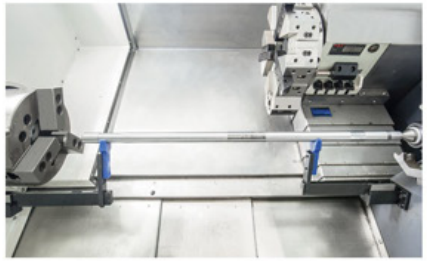
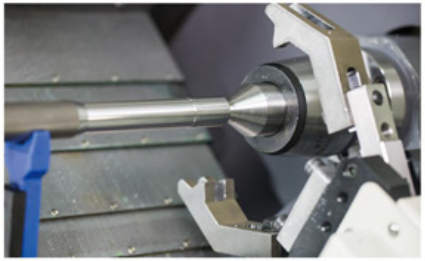



Lathe & double head lathe 车床 & 双头车床

Example 应用范例



智能搓齿 立卧全系 3

ROLLING MACHINE VERTICAL & HORIZONTA

无论立式还是卧式，无论伺服还是油压，从单机到自动化，从单段到多段成形；从13英寸到60英寸，全系列完美呈现；百种案例，千台业绩。

Whether vertical or horizontal, servo or hydraulic, from single machine to automation, single to multi-section forming. From 13 inches to 60 inches, LECN can perfectly present the full range. Hundreds of cases, thousands of achievements.

搓齿机行业标准制定者

Rolling machine industry standard marker

周累Fp、跨棒距M自动调整 Fp,M automatic adjustment
模具破损在线检测 Online detection of mold damage
全闭环控制 Fully closed loop control
油压、伺服可选 Hydraulic & CNC optional
对话式界面 Conversational interface

2mm
最大模数 MAX MODULE

300mm
最大装刀宽度 MAX INSTALLING TOOL WIDTH

70mm
最大外径 MAX OUT DIAMETER

13-60inch
装刀规格 TOOL SIZE

力成搓齿技术优势
LECN production advantages for rolling machine



- ◎ 2003年力成自主开发的首台花键冷成形产品GZ730-A搓齿机开发成功并正式向客户介绍。
- ◎ 2004年推出经全面优化的GZ730-A1型搓齿，并拓展出适于长轴类任意位置花键成型的A2型搓齿机。
- ◎ 2005年LC系列精密搓齿机LC1000问世，及全面升级的GZ730-B系列搓齿产品，备受主机配套客户青睐，并普及国内市场，力成也由此成为国内花键冷成型设备的领先制造商。

- ◎ 2006年与高校正式合作，对LC系列品种覆盖能力、功能范围及模块可拓展进行了全面的规划，LC500/LC800/LC1500相继开发完成，当年获得出口台湾及马来西亚订单。
- ◎ 2007年LECN在多工位一次成型及大模数成型技术上的探索上进展顺利，LC1500多工位搓齿机验收成功并交付使用。
- ◎ 2008年批量投入全新的加工设备和检测设备。

- ◎ 2009年引入咨询机构建设质量管理体系和流程梳理，同年推出首款立式搓齿产品。
- ◎ 2011年安徽公司建成投产，同年推出全电动搓齿机。
- ◎ 2012年LC系列卧式油压精密搓齿机全面升级为A型，整机质量和性能有较大提升。
- ◎ 2013年LC系列卧式伺服搓齿机问世，全面推向市场。
- ◎ 2014年研发检测中心破土动工。
- ◎ 2015年搓齿机自动化全面上线。
- ◎ 2016年推出智能化搓齿机。
- ◎ 2018年由搓齿机制造商向智能制造解决方案集成供应商迈进。
- ◎ 2019年推出双主轴双头数控车床、高精度数控外圆磨床。
- ◎ 2022年车削自动线、搓齿自动线、磨削自动线等全面应用于新能源汽车行业。

- ◎ In 2003, the first spline cold forming GZ730-A rolling machine was successfully developed by LECN and introduced to the customer
- ◎ In 2004, Lecn launched the fully optimized GZ730-A1 type rolling machine , and expanded the A2 type rolling machine which are suitable for long axis class arbitrary position spline molding
- ◎ In 2005, LC series precision rolling machine LC1000 came out, and comprehensively upgraded GZ730-B series rolling products, which were favored by the mainframe supporting customers and popularized in the domestic market, LECN also became the leading manufacturer of spline cold forming equipment in China
- ◎ In 2006, LECN formally cooperated with universities and colleges to make a comprehensive plan for the covering capacity, functional range and module expansion of LC series. LC500 / LC800 / LC1500 were developed in succession, which won export orders to Taiwan and Malaysia
- ◎ In 2007, LECN made good progress in the exploration of multi-station primary molding and large-module molding technology, and the LC1500 multi-station rolling machine was successfully accepted and put into use
- ◎ In 2008, LECN bought new processing equipment and testing equipment
- ◎ In 2009, LECN used the quality management system and process management established by consulting institutions , and launched the first vertical rolling product in the same year
- ◎ In 2011, LECN ANHUI CO.,LTD was built and put into production. In the same year, it launched the all-electric rolling machine
- ◎ In 2012, LC series horizontal oil pressure precision rolling machine was upgraded to type A, and the quality and performance of the whole machine were greatly improved
- ◎ In 2013, LC series horizontal servo rolling machine came into being and was fully promoted to the market
- ◎ In 2014, the r&d and testing center started construction
- ◎ In 2015, the automatic rolling machine was put into operation
- ◎ In 2016,LECN launched the intelligent rolling machine
- ◎ In 2018, LECN moved forward from a manufacturer of rolling machines to an integrated supplier of intelligent manufacturing solutions
- ◎ In 2019,LECN launched double-spindle double-head CNC lathe andhigh-precision CNC cylindrical grinder
- ◎ In 2022, automatic turning line, automatic rolling machine line and automatic grinding line fully applied to the new energy automobile industry.

力成搓齿技术优势
LECN production advantages for rolling machine

力成在二十多年的经营中一直秉持在少数领域为客户提供最专业的服务和最全面的产品选择的理念，花键冷成形技术一直是力成深度研发的重要领域，在二十多年来为3000余家海内外用户提供了近1000台的搓齿机设备，遍及汽车摩托车的变速箱、发动机、传动轴、方向机、起动机、制动器、弹簧扭杆，纺织罗拉，洗衣机、电机、升降器、减速机等诸多领域。

LECN has been adhering to provide the most professional service and the most comprehensive product selection for customers in a few fields in more than 20 years of operation,spline cold forming technology has been an important field of deep research and development of LECN,and we provided nearly 1000 sets of rolling machine equipment for more than 300 customers at home and abroad in more than 20 years，throughout the automobile and motorcycle gearbox, engine, transmission shaft, direction machine, starter, brake, spring torsion bar, textile roller, washing machine, motor, lifter, reducer and many other fields.

在和用户多年的相互学习和交流中，丰富了LECN不断的将用户的需求付诸现实的实战经验，并将这些需求整理规划后细分展现在LECN目前立式、卧式两大系列搓齿机产品。

Through years of mutual learning and communication with users, LECN has enriched its practical experience of constantly putting user demands into reality, and showed into LECN's current two series of vertical and horizontal rolling machines after sorting out and planning these demands.

卧式搓齿机系列 Horizontal rolling machines


自动化联线
车床&双头车床
搓齿机
深孔钻床
外圆磨床
等速万向节专机
铣端面钻中心孔机床
定制专机

力成搓齿技术优势
LECN production advantages for rolling machine

立式搓齿机系列 Vertical rolling machines

1）无论立式机还是卧式机，力成都有全系列的可以搭载油压驱动或伺服驱动的机型可供您选择。
Whether vertical or horizontal, LECN has a full range of models that can be equipped with hydraulic drive or servo drive for your choice.

2）无论何种油压机型，LECN均选择同步齿轮机构保证精密同步。
No matter what type of hydraulic model, LECN chooses synchronous gear mechanism to ensure precision synchronization.

3）无论立式或卧式的伺服搓齿机，LECN均采用双伺服电机+滚珠丝杆+精度补偿的全闭环专利技术，从而有效地避免了传动时因滚珠丝杆磨损及温升伸长而导致搓齿模具安装基准的偏差和搓齿精度的丧失，摆脱了搓齿精度依赖滚珠丝杆的困扰。
Either vertical or horizontal servo rolling machine, LECN adopts double servo motor + ball screw + precision compensation of the whole closed-loop patent technology, thus effectively avoid the the rolling mold's deviation of installation datum and the loss of precision which caused by the wear of ball screw and the lengthen by temperature increase, get rid of the trouble that the precision of rolling depends on ball screw.

4）无论立式或卧式的伺服搓齿机,LECN均采用中空丝杆，配独立油冷机，丝杆恒温，精度稳定。
No matter the vertical or horizontal servo rolling machine,LECN adopts hollow ball screw , equipped with independent oil cooler, the screw is constant temperature, and the precision is stable.

5）无论新老客户，LECN所拥有日本知名模具制造商在中国的特权代理以及与国内外搓齿模具制造商的合作背景，都能在用户紧急需求的情况下，最快在4周内提供全新搓齿模具，2周提供修磨模具，可减少客户采购和维护时间。
No matter for the new and old customers, LECN has the privileged agent of the famous Japanese mold manufacturers in China and the cooperation background with the domestic and foreign makers of rolling mold, which enables us to provide the new rolling mold within 4 weeks at the soonest and the mending mold within 2 weeks in case of the urgent needs of users, which can reduce the purchase and maintenance time of customers.

6）无论客户的花键冷成形技术需求如何，LECN在搓齿领域拥有二十多年制造经验的专业化团队都可以为您提供最佳解决方案或建议。
LECN's professional team with more than 20 years of manufacturing experience in the rolling field can provide you with the best solution or advice, no matter what your customer's demand for spline cold forming technology.

7）LECN拥有多项搓齿关键技术的专利，主导定制了搓齿机行业标准。
LECN owns a number of patents on key technologies of rolling, leading the customization of the industry standard of rolling machine.

在此基础上，我们积累了为用户提供的扩展服务：
On this basis, we have accumulated extended services for users:

- 单机自动化 Single machine automation
- 多机联线 Multiple machines automatic production line
- 搓齿成本估算 Cost estimate for rolling machines
- 花键搓齿工艺的编排 The arrangement of spline rolling technology
- 搓齿模具的短期调剂 Stort-term adjusted for rolling moulds
- 用户小批量样件免费试制 Users free trial-manufacture small batch sample piece
- 国内外各种花键标准的查询、测绘 Inquiry and mapping of various spline standards at home and abroad
- 搓齿模具的快速交付、修磨（多家协议供应商） Rolling moulds fast delivery, repair moulds

LECN
Bespoke Machine

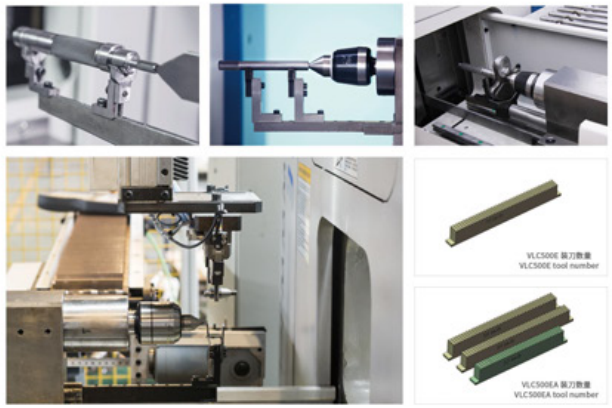
MINI 立式搓齿机

MINI Vertical rolling machine

- 采用特殊材质的耐磨铸件和框架预紧式刚性机身；
- 丰富的模具组合方式，可逆向搓齿节省模具；
- 一次装夹，可往复多段搓齿(VLC500EA)；
- 双伺服电机全闭环同步驱动，实现低噪音精确成形过程；
- 智能全伺服前后顶技术，有效解决装夹安全识别；
- 智能导轨润滑检知功能、工件成形大流量冷却；
- 合理的结构设计，宜人的操控高度，节省占地面积；
- 可搭载桁架式或关节式机器人，支持自动化联线。

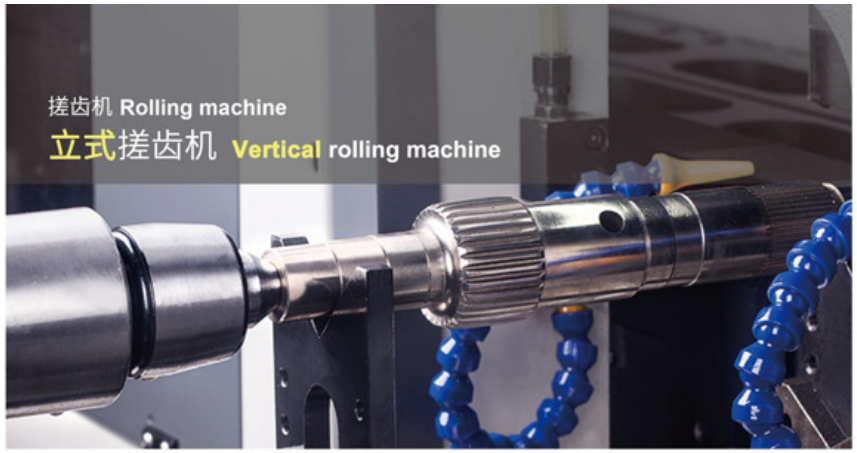
- Use special materials wear-resistant castings and pretensioners rigid frame body;
- Rich mold combination, can save reverse roll forming mold;
- Clamping one time can forming few steps(VLC500EA);
- Double servo motor full closed-loop drive, low noise and precise forming process;
- Intelligent all-around top servo technology to effectively solve clamping secure identification;
- Intelligent rail war lubrication detector function,workpiece forming with big colling flow;
- Reasonable structure design, pleasant handling height, small footprint;
- Can carry with truss or joint robot and automatical line.

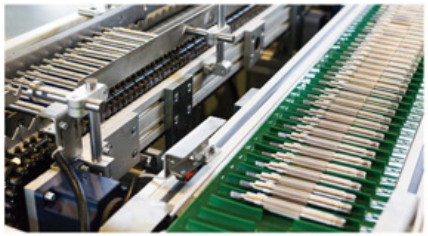
Machine video

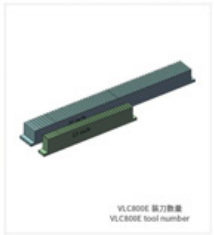


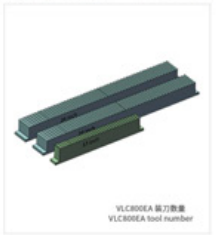
主要参数 The main parameters

项 目	ITEM		VLC500E	VLC500EA
最大模数	max module	mm	1.0	1.0
最大外径	max outer diameter	mm	Ø20	Ø20
最大搓齿宽度	max tool width	mm	40	40
最大工件长度	max workpiece length	mm	400	600
最大装刀宽度	max installing tool width	mm	90	300
开口尺寸	the open part size	mm	139.7	139.7
装刀规格	tool size	inch	13 或 16	13 或 16
最大行程	max travel	mm	500	500
机床重量	weight	kg	3200	4200
占地面积	length x width	mm	950 x 2000	1150 x 2600
驱动方式	drive way		伺服（CNC）	伺服（CNC）
特殊规格可定制 special specifications can be customized				









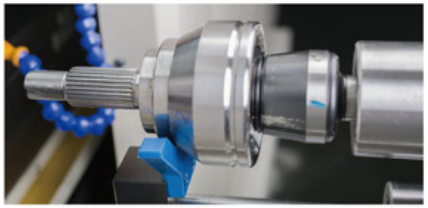
性能特点 Function features

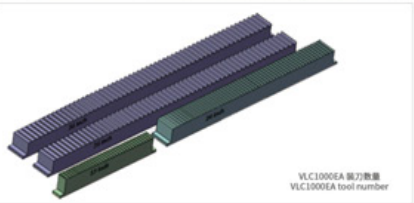
- 采用特殊材质的耐磨铸件和框架预紧式刚性机身；
- 丰富的模具组合方式，可逆向搓齿节省模具；
- 一次装夹，可往复多段搓齿；
- 双伺服电机全闭环同步驱动，实现低噪音精确成形过程；
- 智能全伺服前后顶技术，有效解决装夹安全识别；
- 智能导轨润滑检知功能、工件成形大流量冷却；
- 合理的结构设计，宜人的操控高度，节省占地面积；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Use special materials wear-resistant castings and pretensioners rigid frame body;
- Rich mold combination, can save reverse roll forming mold;
- Clamping one time can forming few steps;
- Double servo motor full closed-loop drive, low noise and precise forming process;
- Intelligent all-around top servo technology to effectively solve clamping secure identification;
- Intelligent rail war lubrication detector function, workpiece forming with big colling flow;
- Reasonable structure design, pleasant handling height, small footprint;
- Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		VLC800E	VLC800EA
最大模数	max module	mm	1.3	1.3
最大外径	max outer diameter	mm	Ø40	Ø40
最大搓齿宽度	max tool width	mm	80	80
最大工件长度	max workpiece length	mm	1000	1000
最大装刀宽度	max installing tool width	mm	120	300
开口尺寸	the open part size	mm	139.7	139.7
装刀规格	tool size	inch	24 或 16 或 13	24 或 16 或 13
最大行程	max travel	mm	760	760
机床重量	weight	kg	7500	9000
占地面积	length x width	mm	1420 x 3000	1580 x 3200
驱动方式	drive way		伺服（CNC）	伺服（CNC）
特殊规格可定制 special specifications can be customized				





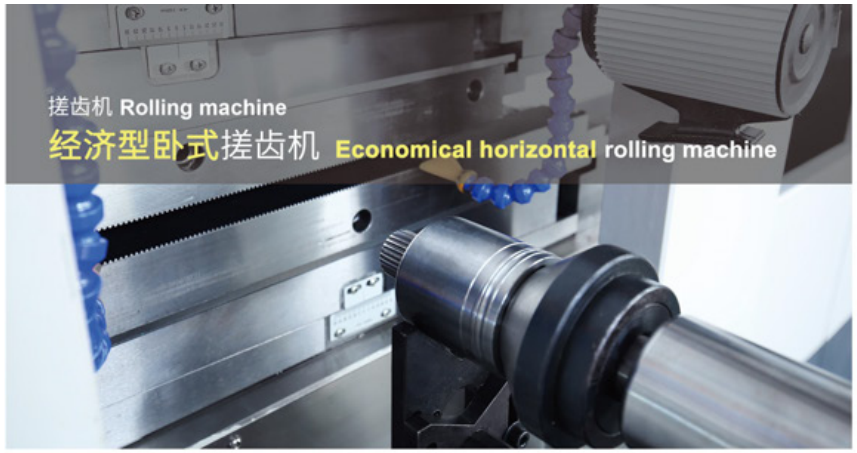
性能特点 Function features

- 采用特殊材质的耐磨铸件和框架预紧式刚性机身；
- 丰富的模具组合方式，可逆向搓齿节省模具；
- 一次装夹，可往复多段搓齿；
- 双伺服电机全闭环同步驱动，实现低噪音精确成形过程；
- 智能全伺服前后顶技术，有效解决装夹安全识别；
- 智能导轨润滑检知功能、工件成形大流量冷却；
- 合理的结构设计，宜人的操控高度，节省占地面积；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Use special materials wear-resistant castings and pretensioners rigid frame body;
- Rich mold combination, can save reverse roll forming mold;
- Clamping one time can forming few steps;
- Double servo motor full closed-loop drive, low noise and precise forming process;
- Intelligent all-around top servo technology to effectively solve clamping secure identification;
- Intelligent rail war lubrication detector function, workpiece forming with big colling flow;
- Reasonable structure design, pleasant handling height, small footprint;
- Can carry with truss or joint robot and automatical line.

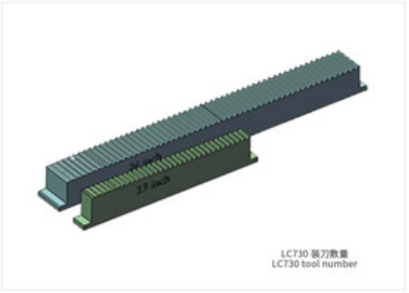
主要参数 The main parameters

项 目	ITEM		VLC1000EA
最大模数	max module	mm	1.5
最大外径	max outer diameter	mm	Ø50
最大搓齿宽度	max tool width	mm	100
最大工件长度	max workpiece length	mm	1000
最大装刀宽度	max installing tool width	mm	300
开口尺寸	the open part size	mm	139.7
装刀规格	tool size	inch	36 或 24、13
最大行程	max travel	mm	1160
机床重量	weight	kg	12000
占地面积	length x width	mm	1580 x 3200
驱动方式	drive way		伺服（CNC）
特殊规格可定制 special specifications can be customized			



搓齿机 Rolling machine

经济型卧式搓齿机 Economical horizontal rolling machine



性能特点 Function features

- 采用铸件整体C型框架机身，刚性强；
- 镶钢导轨液压滑台，耐磨，导向精度好；
- 丰富的模具组合方式，可逆向搓齿节省模具；
- 国产品牌油压原件及风冷却机，双油缸驱动平稳成形；
- 智能导轨润滑检知功能、工件成形大流量冷却；
- 合理的结构设计，宜人的操控高度，节省占地面积；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- C-shaped casting body , high rigid;
- Hydraulic sliding table with steel guide rail ,wear-resistant , good guiding accuracy;
- Rich mold combination, can save reverse roll forming mold;
- Chinese brand hydraulic unit and air coolers, double cylinder driving forming steady;
- Intelligent guide rail lubrication detector function, workpiece forming with big cooling flow;
- Reasonable structure design, pleasant handling height, small footprint;
- Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		LC730
最大模数	max module	mm	1.3
最大外径	max outer diameter	mm	Ø40
最大搓齿宽度	max tool width	mm	60
最大工件长度	max workpiece length	mm	1000
最大装刀宽度	max installing tool width	mm	90
开口尺寸	the open part size	mm	139.7
装刀规格	tool size	inch	24 或 16 或 13
最大行程	max travel	mm	800
机床重量	weight	kg	9000
占地面积	length x width	mm	3100 x 4000
驱动方式	drive way		油压 (hydraulic)
特殊规格可定制 special specifications can be customized			

搓齿机 Rolling machine
卧式搓齿机 Horizontal rolling machine

性能特点 Function features

- 采用特殊材质的耐磨铸件和C型闭式框架机身；
- 丰富的模具组合方式，可逆向搓齿节省模具；
- 一次装夹，可往复多段搓齿；
- 智能导轨润滑检知功能，工件成形大流量冷却；
- 合理的结构设计，宜人的操控高度，节省占地面积；
- 可搭载桁架式或关节式机器人，支持自动化联线。

LC800EA/LC1000EA伺服机型

- 双伺服电机全闭环同步驱动，实现低噪音精确成形过程；
- 智能全伺服前后顶技术，有效解决装夹安全识别。

LC800A/LC1000A油压机型

- 进口油压原件，双油缸驱动平稳成形；
- 独特的同步齿轮齿条和间隙微调技术，使同步精度提升至极。

- Using special materials wear-resistant castings and C-shaped frame body;
- Rich combination of mold, can reverse twist save teeth mold;
- Clampig one time can forming few steps;
- Intelligent guide rail lubrication detecting function, forming a large flow of cooling the workpiece;
- Reasonable structure design, pleasant handling height, small footprint;
- Can carry with truss or joint robot and automatical line.

LC800EA/LC1000EA CNC model

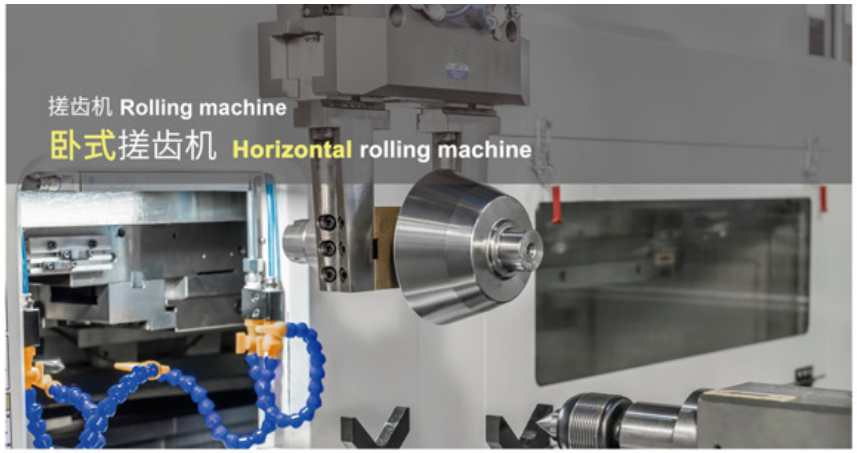
- Double servo motor full closed-loop drive, low noise and precise forming process;
- Intelligent all-around top servo technology to effectively solve clamping secure identification.

LC800A/LC1000A hydraulic model

- Original hydraulic parts imported, double cylinder driving,forming steady;
- Unique synchronous gear rack and clearance technique to make synchronization precision ascend to the utmost.

主要参数 The main parameters

项 目	ITEM		LC800A	LC800EA	LC1000A	LC1000EA
最大模数	max module	mm	1.3	1.3	1.5	1.5
最大外径	max outer diameter	mm	Ø40	Ø40	Ø50	Ø50
最大搓齿宽度	max tool width	mm	80	80	100	100
最大工件长度	max workpiece length	mm	1000	1000	1000	1000
最大装刀宽度	max installing tool width	mm	300	300	300	300
开口尺寸	the open part size	mm	139.7	139.7	139.7	139.7
装刀规格	tool size	inch	24 或 16 或 13	24 或 16 或 13	36 或 24、13	36 或 24、13
最大行程	max travel	mm	800	800	1160	1160
机床重量	weight	kg	10000	10000	13000	13000
占地面积	length x width	mm	2400 x 4400	3700 x 3400	3200 x 4400	4800 x 3400
驱动方式	drive way		油压（hydraulic）	伺服（CNC）	油压（hydraulic）	伺服（CNC）
特殊规格可定制 special specifications can be customized						



搓齿机 Rolling machine

卧式搓齿机 Horizontal rolling machine

性能特点 Function features

- 采用特殊材质的耐磨铸件和C型闭式框架机身；
- 丰富的模具组合方式，可逆向搓齿节省模具；
- 一次装夹，可往复多段搓齿；
- 智能导轨润滑检知功能、工件成形大流量冷却；
- 合理的结构设计，宜人的操控高度，节省占地面积；
- 可搭载桁架式或关节式机器人，支持自动化联线。

LC1500EA/LC2000EA伺服机型

- 双伺服电机全闭环同步驱动，实现低噪音精确成形过程；
- 智能全伺服前后顶技术，有效解决装夹安全识别。

LC1500A油压机型

- 进口油压原件，双油缸驱动平稳成形；
- 独特的同步齿轮齿条和间隙微调技术，使同步精度提升至极。

- Using special materials wear-resistant castings and C-shaped closed frame body;
- Rich combination of mold, can reverse twist save teeth mold;
- Clampig one time can forming few steps;
- Intelligent guide rail lubrication detecting function, forming a large flow of cooling the workpiece;
- Reasonable structure design, pleasant handling height, small footprint;
- Can carry with truss or joint robot and automatical line.

LC1500EA/LC2000EA CNC model

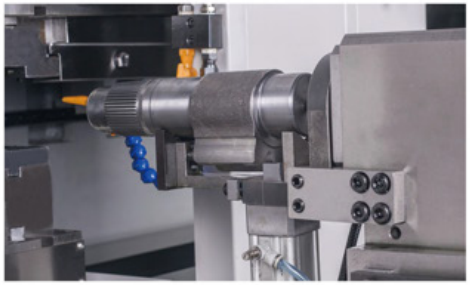
- Double servo motor full closed-loop drive, low noise and precise forming process;
- Intelligent all-around top servo technology to effectively solve clamping secure identification.

LC1500A hydraulic model

- Original hydraulic parts imported, double cylinder driving,forming steady;
- Unique synchronous gear rack and clearance technique to make synchronization precision ascend to the utmost.

Rolling machine 搓齿机

Horizontal rolling machine 卧式搓齿机



LC1500A/LC1500EA 装刀数量
LC1500A/LC1500EA tool number

LC2000EA 装刀数量
LC2000EA tool number

主要参数 The main parameters

项 目	ITEM		LC1500A	LC1500EA	LC2000EA
最大模数	max module	mm	1.75	1.75	2.0
最大外径	max outer diameter	mm	Ø60	Ø60	Ø70
最大搓齿宽度	max tool width	mm	120	120	150
最大工件长度	max workpiece length	mm	1000	1000	1000
最大装刀宽度	max installing tool width	mm	300	300	300
开口尺寸	the open part size	mm	152.4	152.4	177.8
装刀规格	tool size	inch	48 或 24、24 或 13、36	48 或 24、24 或 13、36	60 或 36、36 或 24、48
最大行程	max travel	mm	1560	1560	2100
机床重量	weight	kg	18000	18000	23000
占地面积	length x width	mm	4000 x 4600	5600 x 3800	6400 x 3800
驱动方式	drive way		油压（hydraulic）	伺服（CNC）	伺服（CNC）
特殊规格可定制 special specifications can be customized					

搓齿技术及选型
Rolling technology and selection

冷成形搓齿因其精密、高效、经济、节能的出色工艺优势，搓齿机及其相关模具技术在制造业发达国家得到长足发展，搓齿机的制造商有德国EXCELLO公司，美国MARBAIX公司，美国ANDERSON-COOK公司，日本的NACHI\NHK公司等。历经多年，搓齿机已经普遍使用。台湾也是精密搓齿机在工业制造中使用较早的地区。

直至上个世纪九十年代，国内开始有少数院校将精密搓齿机及相关技术作为专门的研究课题，进行理论及其制造工艺研究，达到一定高度，但精密搓齿机及模具的精度要求高、工艺复杂，在国内未能得到很好的发展，也未有正式生产厂家。

LECN作为国内首家制造搓齿机专业公司，在上世纪九十年代末国内传统加工工艺精度低、效率低、进口搓齿机床价格昂贵的迫切形势下，以替代进口，全面国产化为己任，综合国内外同类产品，取其精华，舍其不足，结合自身的开发研制能力，全身心的投入到搓齿机的开发研制。

经过多年的艰苦奋斗，LECN已成功开发了两大系列十多个品种的搓齿机产品，并在实践中摸索和总结了丰富模具经制经验，改写了国内精密搓齿机及模具依靠进口的历史。

The precision, high efficiency,economy and energy saving technology of cold forming make the rolling machine and its related die technology develop rapidly in the manufacturing countries.The manufacturers of the machine include EXCELLO company of Germany, MARBAIX company of the United Kingdom,ANDERSON-COOK company of the United States,NACHI \ NHK company of Japan,etc.After many years,rolling machine has been widely used.Taiwan is also a precision rolling machine in industrial manufacturing in the early use of the region.

Until the 1990s,a few colleges and universities in China began to take the precision rolling machine and related technology as the specialized research topic to conduct theoretical and manufacturing process research and made a leap to a certain extent.However,the high precision requirements and complex technology of precision rolling machine and mold make it fail to develop well in China,and there is no official manufacturers.

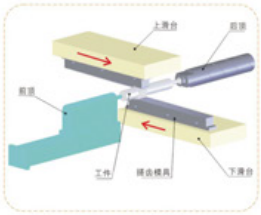
LECN as the first domestic professional company manufacturing rolling machine,under the urgent situation of low precision, low efficiency and high price of imported rolling machine tools at the end of 1990s,to replace imported, to replace imported machine tools,omprehensive localization as its own responsibility,combined with similar products in domestic and overseas,take the essence and discard the dross, combined with our own development ability,devoted to the development of the rolling machine.

After years of hard work,LECN has successfully developed two series of more than ten varieties of rolling machine products, and in the practice of exploration and summary of the rich experience in the mold system,rewriting the history of domestic precision tooth rubbing machine and mold rely on import.

◆ 搓齿机的成形原理 Forming principles of rolling machine

安装在滑台上的对置的两副搓齿模具，在经同步齿轮同步后由油压和伺服电机驱动作相对直线运动，模具被修磨成逐渐切入的齿形，工件由前后顶尖支撑，并可以通过前后顶尖的位移功能方便地调整工件加工部位，模具相对运动驱动工件选择并逐渐得将工件挤压成形，经整形后最终推出。花键的成形精度及稳定性是由搓齿模具的预制刚性距离而获得，数秒钟内完成无屑成形。

Two opposed pairs of toothed rubbing dies installed on the sliding table move in a relative straight line after synchronization of synchronous gears by oil pressure and servo motor. The die is ground into a gradually penetrating toothed shape. The workpiece is supported by the front and rear apex, and the processing position of the workpiece can be conveniently adjusted by the displacement function of the front and rear apex. The relative movement of the die drives the workpiece to select and gradually extrude the workpiece, which is finally put out after shaping. The forming accuracy and stability of splines are obtained from the prefabricated rigid distance of the toothed mold, which completes the chip-free forming in seconds.



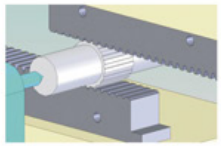
花键冷成形实际上是一次齿根材料被逐渐挤压替换到齿顶的一个无屑加工过程

Spline cold forming is actually a chip-free process in which the root material is gradually extruded and replaced to the crown of the tooth.

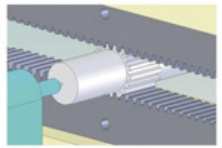
通过我们为您提供的计算程序，可以在计算机上方便地计算出成形需要的材料理论直径。经过修正即可得到最终的材料直径。

Through the calculation program we provide for you, you can easily calculate the theoretical diameter of the material needed for forming on the computer.The final material diameter can be obtained after modification.

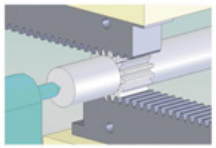
搓齿技术及选型
Rolling technology and selection



工件由前后顶尖支撑并导入模具内
The workpiece is supported by front/rear tail stocks and guided to molds



工件齿形在与搓齿模具啮合过程中完成
The tooth shape of the workpiece are formed during the engagement process of roll forming molds



工件整形完成后退出模具
Drop out molds after restricking the workpiece

冷搓成形的工艺优点
（与传统的切削加工相比）

◆ 效率提高30倍以上（约10~20秒/件
◆ 工件承载能力提高40%
◆ 粗糙度可达Ra0.4以下
◆ 节约材料9%-15%
◆ 齿形的疲劳强度、扭转强度和耐磨性均有较大改善

Process advantages of cold rubbing
(Compared with traditional cutting)

◆ Efficiency increase more than 30 times (about 10-20 seconds/piece)
◆ 40% increase in workpiece load-carrying capacity
◆ Roughness below Ra0.4
◆ Material savings 9% - 15%
◆ Greater improvement in fatigue strength, torsional strength and wear resistance of toothed profile

应用范畴

◎ 适用汽车变速箱齿轮轴、球笼等速万向节、花键轴、电机轴、纺织罗拉、弹簧扭杆、方向机、曲轴等各式轴类零件上的直齿、斜齿（花键）、螺纹、蜗杆、直纹、油槽的精确无屑冷成形加工。

◎ 材料要求：拉伸系数不低于8%，常用C45、40Cr、Cf53、20Cr、20CrMnTi、Q235及其他合金材料，需进行退火处理。

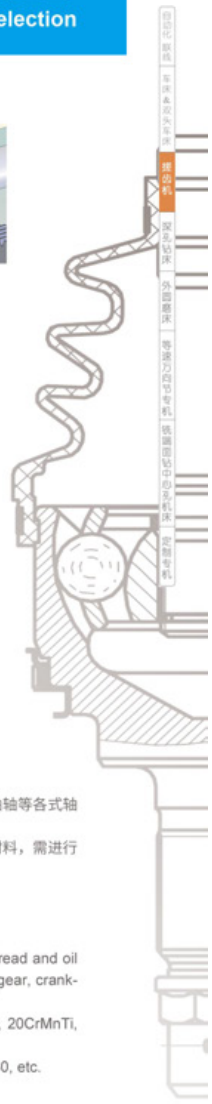
◎ 可加工花键标准：GB/T 3478.1、ISO-4156、DIN-5480、SASI-92.1、SNSIB 92.2、M-1980等。

Application scope

◎ Precise chipless cold forming of straight teeth, bevel teeth (splines), threads, worm, straight thread and oil groove on gear shaft, CV joint, spline shaft, motor shaft, textile roller, spring torsion bar, steering gear, crankshaft and other shaft parts of automobile.

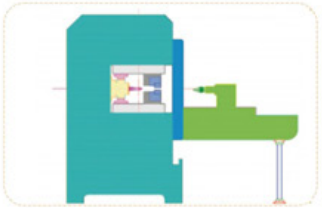
◎ Material requirements: Tensile coefficient not less than 8%, common C45, 40Cr, Cf53, 20Cr, 20CrMnTi, Q235 and other alloy materials, need to be annealed.

◎ Machinable spline standard: GB/T 3478.1, ISO-4156, DIN-5480, SASI-92.1, SNSIB 92.2, M-1980, etc.



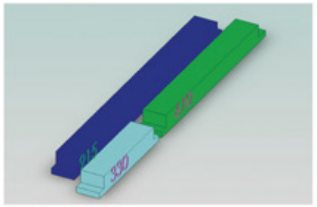
搓齿机功能剖析
Function profile of rolling machine

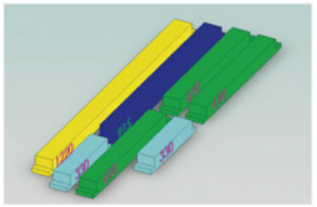
1 C形框式结构机身可使精度长久保持稳定。
The C-frame structure body can keep the precision stable for a long time.



2 精确的模具装夹模块，更换简便快捷，无需对齿。
Precise mold clamping module makes mold replacement easier and faster, no need for tool pre-set.

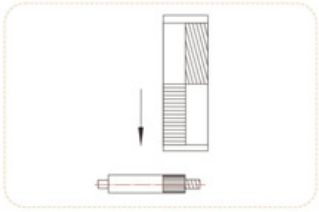
3 模具装夹模块富有变化的组合功能。
Clamping module is full of variable combination functions.

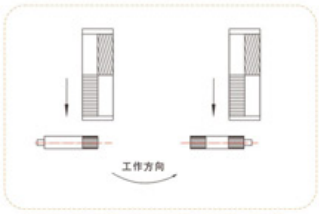


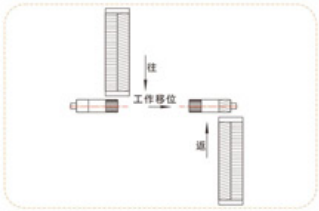


4 具有可以逆向加工及工件轴向精确位移定位功能。
It has the function of reverse machining and precise axial displacement location of workpiece.

5 通过工件位移、逆向加工、模具组合等方式可以一次装夹多部位加工。
The clamping of multi-part processing can be done by the displacement, reverse.

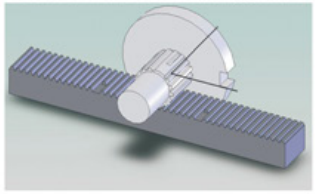






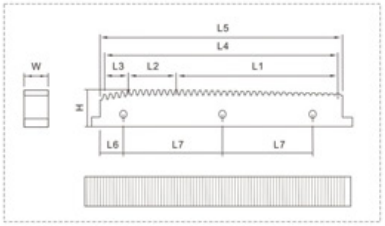
6 具有工件需要定向加工或不完整齿加工的功能。
It has the function of directional machining or incomplete machining of workpiece.

7 独到的成形原理及精确定位机构可以将花键加工到台肩的最近处，不需要退刀距离。
The unique forming principle and the precise positioning mechanism can process the spline to the nearest part of the shoulder without the need of backcutting distance.

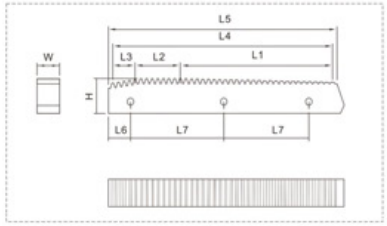


搓齿技术及选型
Rolling technology and selection

平压紧式 Platen-clamp type



楔压紧式 Wedge-clamp type

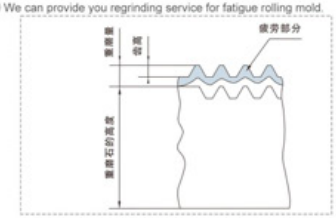


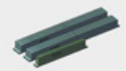
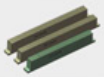
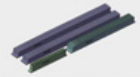
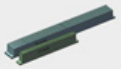
搓齿模具适用机器 Applicable machines of roll forming mold	平压紧式 Platen-clamp type	楔压紧式 Vertical or horizontal roll forming machine
	立式或卧式搓齿机 Wedge-clamp type	立式搓齿机 Vertical roll forming machine

磨具型号 Mold Model No.	搓齿模具尺寸 Sizes of roll forming mold			
	平压紧式 Platen-clamp type		楔压紧式 Wedge-clamp type	
	齿形部分长度 Length of gear shape	全长 Overall length	齿形部分长度 Length of gear shape	全长 Overall length
7	178	210	178	195
9	229	261	229	245
11	280	312	280	295
13	330	361	330	345
16	407	439	407	422
20	508	540	508	523
24	610	642	610	623
28	712	744	712	725
32	813	845	813	826
36	915	947	915	928
42	1067	1099		
48	1220	1252		

1 定制全新的精密搓齿模具最快可在四周内交付。
Customized new precision rolling die can be delivered within 4 weeks at the earliest.

2 搓齿模具的使用寿命及修磨。
The service life and grinding of the rolling die.
- 材料大于 220HB 硬度及工件压力角越小时搓模具的寿命受其影响而降低，搓齿模具一般可进行3-5次的重磨。
- 重磨后的模具寿命约相当于全新模具的80%。
- 我们为您提供疲劳后的搓齿模具重磨服务。
- When the hardness of the material is greater than 220HB and the pressure angle of the workpiece is smaller, the life of the die is reduced, the mould can be regrinded 3-5 times.
- The life of the die after regrinding is about 80% of the new die.
- We can provide you regrinding service for fatigue rolling mold.



机床型号	刀具组合方式	机床型号	刀具组合方式
VLC500E		VLC800EA LC800A LC800EA	
VLC500EA		VLC1000EA LC1000A LC1000EA	
LC730 VLC800E		LC1500A LC1500EA	

搓齿技术及选型
Rolling technology and selection

力成拥有立式、卧式、油压驱动、伺服驱动全系列多品种搓齿机，具有多年制造及服务经验，为了让用户在选型之时能明辨良莠，我们将各类搓齿机的相关信息罗列出来，以期用户可根据自身目标零件的需求理性选型。当然所有比较仅限在卧式机和立式机、油压机和伺服机的同规格机型之间进行，同时因限于我们的经验，粗浅之处望同行指正。

LECN has a vertical, horizontal, oil pressure driven, servo driven full series of various kinds of rolling machine, with many years of manufacturing and service experience, in order to make users in the selection can distinguish good from bad, we will list all kinds of rolling machine related information , so users can select the model rationally according to the demand of the target parts.Of course, all comparisons can only be made between horizontal machines and vertical machines, hydraulic machines and servo machines of the same specification. Meanwhile, due to our limited experience, we hope that our peers can correct us where we are shallow.

卧式VS立式 Horizontal VS vertical	优点 Advantage	缺点 Disadvantage
卧式机 Horizontal 	1）机着地面积大、重心低，整体刚性好，加工过程中吸震动能力好，加工能力和噪音要优于立式机，机器耐久性更好。 2）日常的装料、装刀、机器调整高度均在 1000 mm，无需登高作业，作业安全性及操作便利性较好。但较小规格的机型与立式差异不明显（小于24INCH的机型）。 3）卧式机多数采用可拆卸的镶钢导轨维护便利。维修维护都不必登高作业（机器总高一般不超过1700mm）。 4）运输便捷，安装及调整方便。 1) The main machine has large floor area, low center of gravity and good overall rigidity, good vibration absorption ability in the processing process, better processing ability and noise than the vertical machine, and better durability. 2) Daily loading, loading dies and machine height adjustment are all in 1000mm, no need to climb the height operation, operation safety and operation convenience is better.However, the difference between the smaller models and vertical models is not obvious (Models smaller than 24 inches). 3) Most of the horizontal machines are equipped with detachable steel guide rails for easy maintenance.No need to climb the height for maintenance (the total height of the machine generally does not exceed 1700mm). 4) Convenient transportation, easy installation and adjustment.	1）占地面积较大（仅在24INCH以上规格机型，机型越大越明显），不利于场地紧张的用户选用。 2）联线时跨距较大，但如果搓齿作为联线末尾工序时则无此忧。 1) It covers a large area (models of 24INCH or above, the larger the model, the more obvious), which is not conducive to the users who are short of space to choose. 2) When connecting the line, the span is large, but if rolling are at the end of the connectring line.
立式机 Vertical 	1）立式机型的占地面积较小，对于场地紧张的用户是不错的选择。 2）联线时跨距相对较短，可降低传递节拍。 1) The vertical model covers a small area and is a good choice for users who are short of space; 2) When connecting the line, the span is relatively short, which can reduce the transmission cycle time.	1）整体刚性和加工吸震能力不如卧式机，基于这两个条件，加工能力一般要稍逊于卧式同规格机型。 2）日常进行的装料、装刀、机器调整均因操作高度超出宜人高度（需登高作业），不如卧式机便利、安全、快捷（机型越大越明显）。 3）大规格机型运输、安装都相对麻烦（机型越大越明显）。 1) Overall rigidity and the ability of processing shock absorption are not as good as the horizontal machine.Based on these two conditions, the processing capacity is generally slightly inferior to the horizontal model of the same specification 2) The daily loading, loading dies and machine adjustment all need to climb because the operating height exceeds the pleasant height, which is not as convenient, safe and fast as the horizontal machine(The bigger the machine, the more obvious it is.). 3) Large model transport, installation are relatively troublesome(The bigger the machine, the more obvious it is.).

搓齿技术及选型
Rolling technology and selection

油压驱动VS伺服驱动 Hydraulic drive & CNC	优点 Advantage	缺点 Disadvantage
油压驱动 hydraulic 	1）采用的油缸驱动，由于没有机械摩擦副（滚珠丝杆），驱动件的寿命长，很少需要维护。 2）由于油压驱动的良好过载性能，在被加工零件较大或某些条件下需要过载时，很易实现。 3）油压设计合理时，在承受搓齿尤其在大模数成形时的交变受力具有不可比拟的驱动平稳性。 4）由于油压遇阻减速这一特性，在某些时候对于减少搓齿模具的损伤有利。 5)）相对经济。 1) The oil cylinder drive is adopted, because there is no mechanical friction (compared with ball screw), the drive has a long life and requires little maintenance. 2) Due to the good overload performance of hydraulic drive, it is easy to realize when the processed parts are large or under certain conditions need to overload. 3) When the oil pressure design is reasonable, the alternating stress has incomparable driving stability in bearing of rolling especially when the large modulus is formed. 4) Due to the characteristics of the oil pressure decelerates when it encounters resistance, in some cases it is advantageous to reduce the damage of the rolling die. 5) Relative economic.	1）由于油液的需要量，通常需要600L以上的油压站，使机器的占地面积增大； 2）不可避免的存在少量的滴漏现象和油压站产生的60分贝左右的噪音； 3）不可避免的存在油液升温的问题，一般油路不可编程。 1) Due to the oil requirement, more than 600L oil pressure station is usually needed, which increases the machine's floor area. 2) It is inevitable that there will be a small amount of dripping and the noise generated by the oil pressure station is about 60 decibels. 3) It is inevitable to have the problem of oil temperature rise , in general oil circuit cannot be programmed.
伺服驱动 CNC 	1）没有油站作为驱动源，设备周边环境整洁、占地面积缩小。 2）一般工作噪音不超过40分贝，基本没有噪音污染。 3）搓齿过程可以通过编程获得合适的速度曲线。 4）伺服驱动可以在机器不工作时节约能源（但由于搓齿机属于高频率产出机种，除长时间待机外这一优势并不明显）。 1) There is no oil station as the driving source, the surrounding environment of the equipment is clean and the floor area is reduced. 2) General working noise does not exceed 40 decibels, basically no noise pollution. 3) The rolling process can be programmed to obtain the appropriate speed curve. 4) The servo drive can save energy when the machine is not working (however, as the rolling machine is a kind of high frequency production machine, this advantage is not obvious except for long standby time).	1）在没有同步齿轮齿条的机型上，同步精度依赖的滚珠丝杆作为摩擦副作用相对于油压件来说，更容易磨损失效。 2）由于搓齿机的通过能力预置的特性，在某些情形下造成的卡机现象时，不如油压机可以无损伤脱困。 3）在零件模数大、齿数多、花键长、硬度高时，很难提供持续过载能力。 4)）零件更换的成本较高。 1) In the machine without synchronous rack and pinion, the ball screw which depends on the synchronous precision is more likely to wear and fail than the hydraulic parts as the friction side effect. 2) Due to the presetting characteristics of the passing capacity of the rolling machine, in some cases, when the phenomenon of the stuck machine is caused, it is not as good as the oil hydraulic machine can escape without damage. 3) It is difficult to provide continuous overload capability when the component modulus is large, the number of teeth is large, the spline is long, and the hardness is high. 4) Part replacement costs are high.

国内外搓齿机制造的状况 The present situation of the rolling machine manufactruing

相对于其他加工机器来说，搓齿机在国内外制造厂家并不多，主要与这一机型的高效产出和制造难度较大有关。我们将全球知名厂家罗列如下，从中我们似乎不难看出，德国、美国、英国、台湾地区厂家均偏好于卧式搓齿机制造，这可能是在于他们对设备刚性及耐久性的追求，也可能是因为其他长期制造经验的驱动，而日本、韩国偏好于立式搓齿机，这有可能得益于他们的环保意识。

Compared with other processing machines,there are not many manufacturers of rolling machine at home and abroad, which is mainly related to the high efficiency and manufacturing difficulty of this machine.We will be listed below the global well-known manufacturers, from which we are not hard to see,Germany, the United States,Britain and Taiwan manufacturers have preference in horizontal rolling machine, this may be because they pursuit of equipment rigidity and durability, It may also be due to other long - term manufacturing experience,and Japan, South Korea prefer vertical rolling machine,this is likely to benefit from their environmental awareness.

公司名称	生产机床	Company	Machine type
德国 EXCELLO	主要生产卧式搓齿机，很少有立式机型	EXCELLO, Germany	The main production is horizontal rolling machine, few vertical models
英国 MARBAIX 和 LAPOINTE	生产卧式搓齿机，未见有立式机型	MARBAIX and LAPOINTE, UK	Horizontal rolling machine, no vertical machine
美国 ANDERSONCOOK	主要生产卧式搓齿机，有小规格立式机型，市场并不多见	ANDERSONCOOK, USA	It mainly produces horizontal rolling machines with small vertical models, which are seldom available in the market.
西班牙 ROTO-FLO	主要生产立式搓齿机，但大规格的（36 inch 以上）仍采用卧式机型	ROTO-FLO, Spain	The main production is vertical rolling machine, but the large size (over 36 inch) still uses horizontal type.
中国台湾某公司	生产卧式、立式系列机型	One company in Taiwan, China	Production of horizontal and vertical series.

搓齿技术及选型
Rolling technology and selection

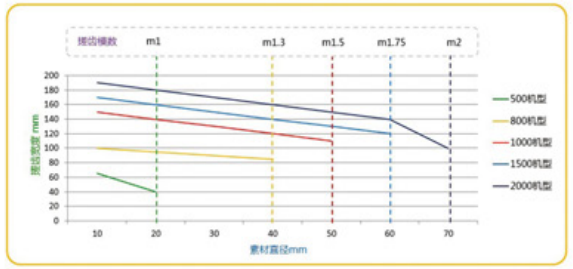
公司名称	生产机床	Company	Machine type
日本 NACHI	主要生产立式搓齿机，但大规格的（36 inch 以上）仍采用卧式机型	NACHI, Japan	The main production is vertical rolling machine, but the large size (over 36 inch) still uses horizontal type.
日本 NHK	生产 36 inch 以下的立式搓齿机	NHK, Japan	Production of vertical rolling machines under 36 inch.
韩国某公司	生产 36 inch 以下的立式搓齿机	One Company, Korean	Production of vertical rolling machines under 36 inch.
中国 LECN	生产卧式、立式全系搓齿机	LECN, China	Production of horizontal and vertical full-system rolling machines.

小结 Summary

▲ 各有优势
无论是立式、卧式、油压、伺服搓齿机，主要是在于占地面积、操作便利、加工能力、设备耐久、维护维修、环境友好等方面的差异，在不同的机型上各有优势。
▲ 设计细节、工艺能力决定加工精度
无论何种机型、驱动方式，除了以上的几点区别外，其对于产品精度、加工效率影响并不十分明显，在机器载荷范围内产品的加工精度取决机器的设计细节和制造厂家的能力。
▲ 卧式可以覆盖立式机型所有规格
24inch以下非自动化机型立式有占地面积小、操作更便利的优势。卧式可以覆盖立式机型所有规格和功能，反之，立式不能。

▲ Each has its advantages
Whether it is vertical, horizontal, hydraulic, servo rubbing machine, the main differences are in the floor area, easy to operate, processing capacity, equipment durability, maintenance, maintenance, environmental friendly,and different models have their advantages.
▲ Design details and process capacity determine the machining accuracy
No matter what type of machine, driving mode, in addition to the above differences, its impact on product precision and processing efficiency is not very obvious, in the range of machine load of the product processing precision depends on the design details of the machine and the ability of the manufacturer.
▲ Horizontal type can cover all specifications of vertical type
Non-automatic vertical models under 24 inches have the advantages of small footprint and convenient operation.Horizontal type can cover all specifications and functions of vertical type, whereas vertical type cannot.

LECN搓齿机型选型表



根据以上比较，用户可根据自身需求理性选择，我们就此提出以下建议
Based on the above comparison, users can choose rationally according to their own needs, and we propose the following suggestions

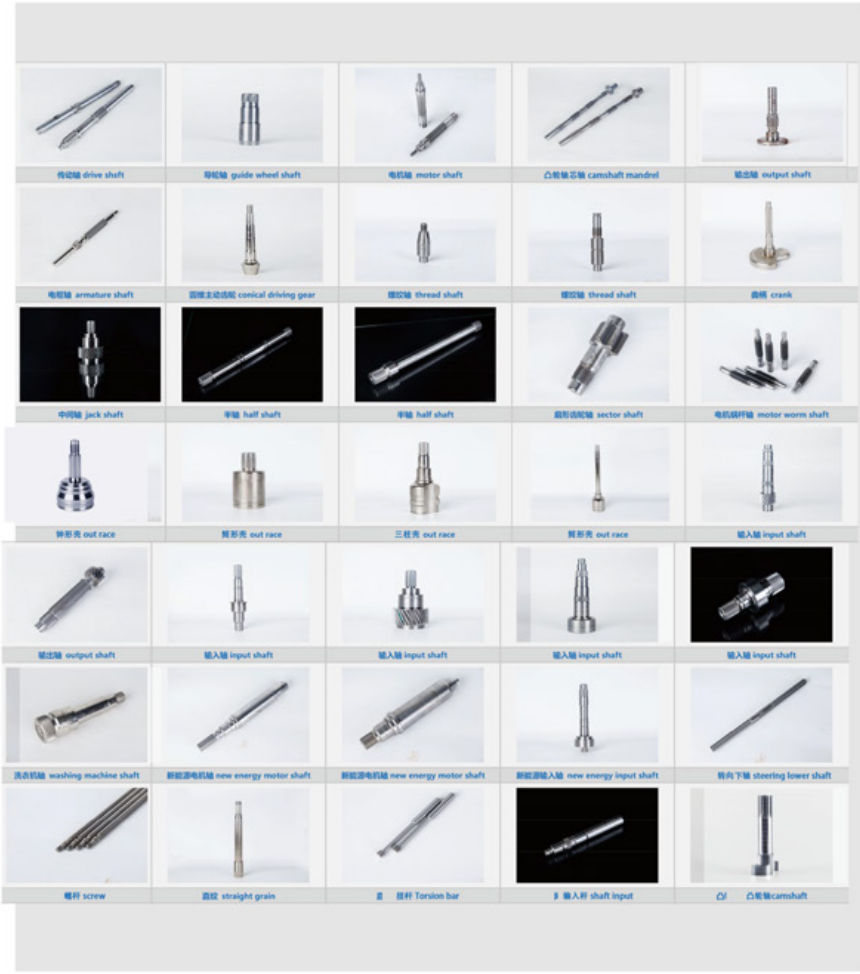
用户在如下情形下，建议选用卧式机型，反之可选择立式机型	用户在如下情形下，建议选择油压搓齿机，反之可选择伺服搓齿机
1）目标零件的花键有效长度可能超过80mm的； 2）目标零件花键模数可能大于1.27mm的； 3）目标零件花键部位直径可能超过40mm的； 4）目标零件花键模数可能有较大变更的； 5）目标零件可能用到24inch以上的机型的； 6）对于占地面积不是寸土必争的或介意登高作业的； 7）操作者习惯及维护人员熟悉卧式机型的；	1）目标零件属于模数大、齿数多、花键长、硬度高的类别的； 2）对占地面积不是很敏感的； 3）可以接受油压可能存在的少量滴漏及存在的60分贝左右的噪音的； 4）对于购机和维修成本要求相对经济的； 5）对于机型超过36inch的（超过36inch时，立式机已经难以实现，卧式机丝杆传动长度受限）。
In the following cases, users are advised to choose horizontal models,in the opposite users case can choose the vertical	In the following case, it is recommended that the user choose the hydraulic rolling machine, on the contrary, the servo rolling
1) The effective spline length of the target part may exceed 80mm; 2) Target parts' spline modulus may be greater than 1.27mm; 3) The diameter of spline of target part may exceed 40mm; 4) The spline modulus of the target part may change significantly; 5) The target parts may need models of 24 inches or more; 6) To cover an floor area of the request is not high or mind to climb the operation; 7) The operator is used to the horizontal model and the maintenance personnel are familiar with the horizontal model.	1) The target part belongs to the category of large modulus, large number of teeth, long spline and high hardness; 2) no mind for floor area; 3) Can accept the oil pressure type may be a small amount of leakage and the existence of 60 decibels of noise; 4) For the purchase and maintenance cost requirements are relatively economical; 5) When asking for models larger than 36 inches (when more than 36 inches, the vertical machine has been difficult to achieve, horizontal machine screw transmission length is limited).

搓齿机 Rolling machine

加工实例 Sample show

Rolling machine 搓齿机

Sample show 零件展示



4 深孔钻床

DEEP HOLE DRILLING MACHINE

深孔钻床 Deep hole drilling machine

深孔钻床是一种高精度、高效率、高自动化的深孔加工专用机床，依靠先进的孔加工技术（枪钻、BTA钻、喷吸钻等），通过一次连续的钻削即可达到一般需钻、扩、铰工序才能达到的加工精度和表面粗糙度。

Deep hole drilling machine is a kind of special machine tool for deep hole processing with high precision, high efficiency and high automation. Depending on advanced hole processing technology (gun drill, BTA drill, jet suction drill, etc.), the processing accuracy and surface roughness can be achieved by one continuous drilling process, which generally requires drilling, expanding and reaming processes.

枪钻系统

主要用于小直径（一般小于35mm）深孔的钻削加工，属于内冷外排屑方式。切削液通过中空的钻杆内部到达钻头头部进行冷却润滑，切屑从钻头及钻杆外部的V型槽排出。

Gun drill system

Mainly used for drilling small diameter (generally less than 35 mm) deep holes, which belongs to the internal cooling and external chip removal mode. Cutting fluid is cooled and lubricated by reaching the bit head through the hollow drill pipe, and chips are discharged from the V-groove outside the bit and the drill pipe.

BTA单管钻系统

主要用于直径大于12mm的深孔钻削加工，属于外冷内排屑方式。切削液通过授油器从钻杆外壁与工件已加工表面之间进入刀具头部进行冷却润滑，切屑由钻杆内部推出。授油器具有导向功用并向切削区提供输油通道。与喷吸钻相比，高的切削液压力使得单管钻系统更加可靠，更适合难以断屑的材料（如低碳钢和不锈钢等）加工。

BTA Single Pipe Drilling System

It is mainly used for deep hole drilling with diameter greater than 12 mm, and belongs to external cooling and internal chip removal mode. The cutting fluid enters the tool head through the oil feeder from the outer wall of the drill pipe to the machined surface of the workpiece for cooling and lubrication, and the chips are pushed out from the inside of the drill pipe. The oil feeder has the guiding function and provides the oil transportation channel to the cutting area. Compared with spray suction drill, the high cutting hydraulic pressure makes the single pipe drilling system more reliable, and more suitable for processing materials that are difficult to break chips, such as low carbon steel and stainless steel.

喷吸钻系统

主要用于直径大于18mm深孔钻削加工，属于内排屑深孔钻削加工。切削液由联结器上输油口进入，其中大部分的切削液向前进入内外钻杆之间的环形空间，到达刀具头部进行冷却润滑，并将切屑推入内钻杆内腔向后排出。较BTA系统所需的切削液压力更低，并降低了钻削系统的密封要求。

Jet suction drilling system

It is mainly used for deep hole drilling with diameter greater than 18 mm, and belongs to deep hole drilling with internal chip removal. The cutting fluid enters through the oil feeding port on the coupling. Most of the cutting fluid enters the annular space between the inner and outer drill pipes forward, reaches the tool head for cooling and lubrication, and pushes the chips into the inner drill pipe cavity and discharges backwards. Compared with the BTA system, the cutting hydraulic pressure required is lower and the sealing requirement of the drilling system is reduced.

深孔钻床
Deep hole drilling machine

性能特点 Function features

- 框架式刚性机身、线性导轨，经久耐用；
- 立式结构，排屑容易；
- 特殊结构的高刚性主轴，抗震性好，寿命长；
- 专用液压组合夹具，特殊结构的液压夹头，夹紧可靠，精度稳定；
- 多种夹具可选，应对不同工件定位方式；
- 枪钻、BTA钻切削、内喷式高压冷却过滤，效率块、精度高；
- 左右加工参数独立设置，可独立加工；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Frame type rigid body , linear guide rail , durable;
- Vertical structure, remove chips easily;
- Special high rigidity spindle structure, seismic resistance, long life;
- Special hydraulic combination fixture, special structure of the hydraulic chuck, clamping reliable, stable accuracy;
- Various of fixtures optional respond to different workpiece positioning;
- Gun or BTA dill cutting, high pressure spray cooling filtration efficiency block, high precision;
- Set processing parameters independently,and operate independently;
- Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		VSMGD0445D	VSMGD0445F
最大钻孔直径	max drilling diameter	mm	Ø18-Ø40	Ø18-Ø40
最大夹持直径	max clamping diameter	mm	Ø60	Ø60
最大工件长度	max workpiece length	mm	450	450
工位数	number stations		2	4
机床重量	weight	kg	4000	5700
占地面积	length x width	mm	3000 x 2500	3200 x 2500

5 外圆磨床

CYLINDRICAL GRINDING MACHINE

提供轴类、盘类零件的外圆与端面磨削加工全套解决方案，可搭载桁架式或关节式机器人。

欢迎垂询定制专用磨床。

Provide a complete solution for cylindrical and end face grinding of shaft and disc parts, which can be equipped with truss or joint robots.

Welcome to inquire and customize bespoke grinding machine.

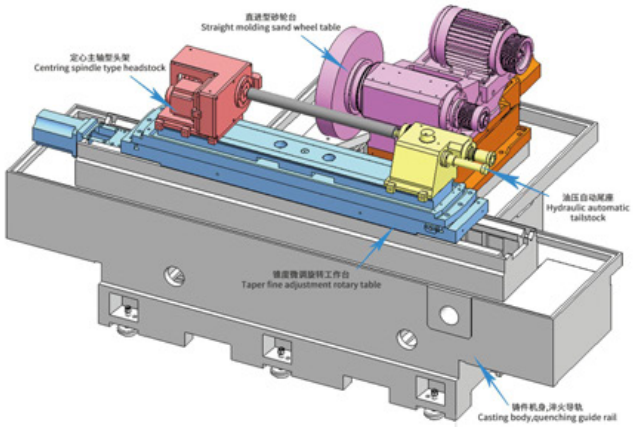
LECN

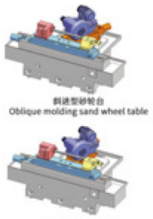
Bespoke Machine

Cylindrical grinding machine 外圆磨床

CNC cylindrical grinding machine 数控外圆磨床

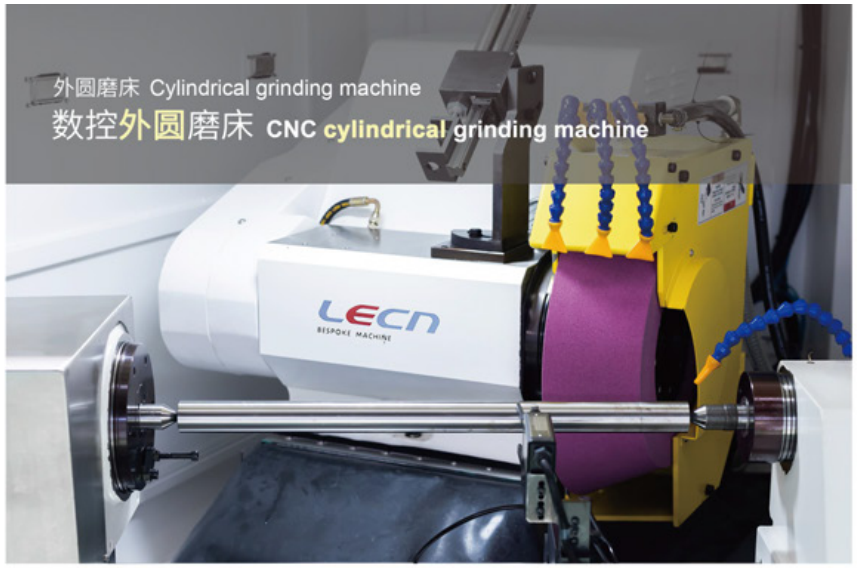
丰富、稳定、可靠的功能模块
Rich, stable and reliable functional modules



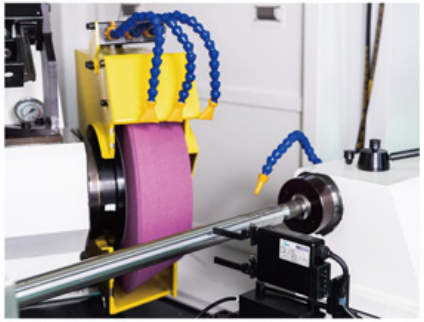


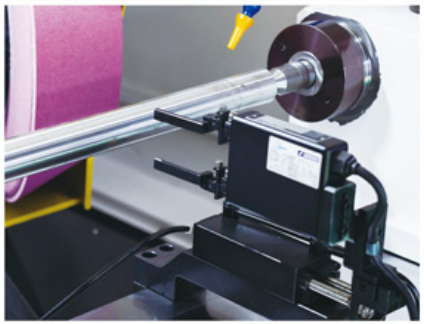
主要参数 The main parameters

项 目	ITEM		GA 斜进式/ GP 直进式 GA oblique/GP straight			
			GA2530	GP2530	GA2560	GP2560
最大加工直径	max processing diameter	mm	Ø 200		Ø 200	
两顶尖最大距离	maximum distance between two tips	mm	300		600	
最大荷重	max loading	kg	80		80	
最大旋径	max rotate diameter	mm	Ø 260		Ø 260	
X/Z 行程	X/Z axis travel	mm	180/300		180/600	
X/Z 电机功率	X/Z servo motor power	kw	1.5/1.5		1.5/1.5	
主轴电机	spindle motor power	kw	5.5		5.5	
最大砂轮	max grinding wheel	mm	Ø 450x Ø 127x120		Ø 450x Ø 127x120	



Cylindrical grinding machine 外圆磨床
CNC cylindrical grinding machine 数控外圆磨床



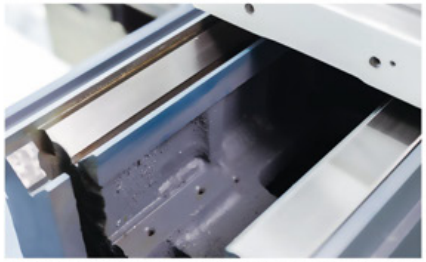


主要参数 The main parameters

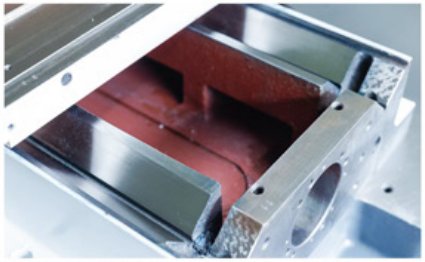
项 目	ITEM		GA 斜进式/GP 直进式 GA oblique/GP straight			
			GA3560	GP3560	GA35100	GP35100
最大加工直径	max processing diameter	mm	Ø 300		Ø 300	
两顶尖最大距离	maximum distance between two tips	mm	600		1000	
最大荷重	max loading	kg	150		150	
最大旋径	max rotate diameter	mm	Ø 360		Ø 360	
X/Z 行程	X/Z axis travel	mm	210/600		210/1000	
X/Z 电机功率	X/Z servo motor power	kw	2.2/2.2		2.2/2.2	
主轴电机	spindle motor power	kw	7.5		7.5	
最大砂轮	max grinding wheel	mm	Ø 600x Ø 152.4x150		Ø 600x Ø 152.4x150	

外圆磨床 Cylindrical grinding machine

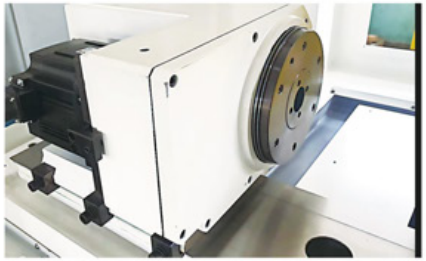
功能模块 Functional module



Z轴导轨：床身V-平整体淬火导轨，工作台滑动面贴塑并精密铲刮，滑动平稳，耐磨，抗振，进给精度持久、稳定，易防护。
Z-axis guide rail: V-flat overall quenching guide rail for the machine bed, the sliding surface of the workbench is pasted with plastic and precisely scraped, with smooth sliding, wear resistance, vibration resistance, lasting and stable feeding accuracy,easy protection.

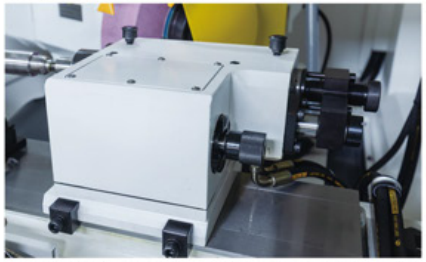


X轴导轨：滑鞍双V整体淬火导轨，滑台滑动面贴塑并精密铲刮，导向准确，翻转力矩承载能力强，耐磨，抗振，定位精度高，易防护。
X-axis guide rail: Saddle double V integral quenching guide rail, sliding surface of sliding table is pasted with plastic and precisely scraped, with accurate guidance, strong overturning moment bearing capacity, wear resistance, vibration resistance, high positioning accuracy ,easy protection.

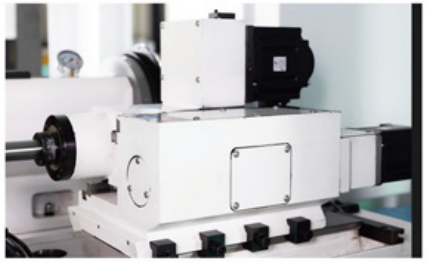


头架：定心主轴或定心同动互换主轴可选。伺服电机驱动，精密P4级角接触轴承支撑，无极变速，精度高，刚性强，适合重切削。顶尖与夹头夹持快速互换。
Headstock: Centering spindle or centring concentric interchangeable spindle are optional. Servo motor drive, precision P4 angular contact bearing support, infinitely variable speed, high precision, strong rigidity, suitable for heavy cutting. Tip and clamp clamps interchange quickly.

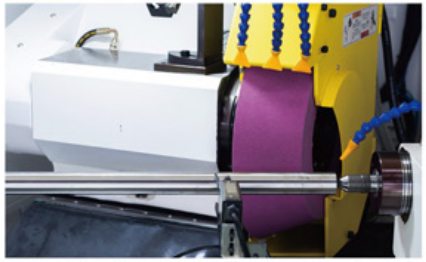
手动尾座（标配）或油压自动尾座（选配）：旋钮弹簧调整工件夹紧力，手动或油压自动顶紧可选。合金钢主轴，耐磨、高刚性。
Manual tailstock (standard) or hydraulic automatic tailstock (optional): Knob spring adjusts workpiece clamping force, manual or hydraulic automatic tightening optional. Alloy steel spindle, wear-resistant, high rigidity.



中心高微调油压自动尾座（选配）：手动旋钮微调尾座中心高，工件同轴度高；旋钮弹簧调整工件夹紧力、油压自动夹紧，满足自动化需求。
Center high fine-tuning hydraulic automatic tailstock(optional): Manual knob fine-tunes tailstock center high to improve workpiece coaxiality; The knob spring adjusts the clamping force and hydraulic of the workpiece to meet the requirements of automation.



伺服主轴式自动尾座（选配）：伺服驱动、C3级丝杆传动、P级线轨导向、力矩控制自动顶紧；同动主轴P4级角接触轴承支撑，无极变速，精度高，刚性强，适合重切削，满足高效、精密磨削及自动化需求。
Servo spindle automatic tailstock (optional): Servo drive, C3 screw drive, P-level rail guidance, torque control automatic tightening; The P4 angular contact bearing of the co-rotating spindle is supported with infinite speed change, high precision and rigidity, which is suitable for heavy cutting and meets the requirements of high efficiency, precision grinding and automation.



静压主轴：高刚性前后径向静压轴承支撑，回转精度高，刚度高，转动平稳，无振动，寿命长。电机皮带传动，无极变速，恒线速度。
Static spindle: High rigidity front and rear radial hydrostatic bearings, with high rotary accuracy, high rigidity, stable rotation, no vibration and long life. Motor belt drive, infinitely variable speed, constant line speed.

砂轮修整：金刚笔或伺服驱动金刚滚轮修整器，应对不同需求。
Grinding wheel dressing: Diamond pen or servo driven diamond roller dresser to meet different needs.

测量装置（选配）：端面、外径等量仪根据工件磨削要求可选。
Measuring device (optional): End face, outer diameter equal gauge can be selected according to grinding requirements of workpiece.

工件带动装置（选配）：自动牵引器、带动环、夹头等根据工件磨削要求可选。
Workpiece driving device(optional): Automatic tractor, driving ring, clamp, etc. can be selected according to grinding requirements of workpiece.

液压系统：恒温冷却、精密筒式过滤、蓄能器压力保持，检知压力与主轴互锁，实现静压主轴液压自动控制。
Hydraulic system: Constant temperature cooling, precision cylindrical filter, accumulator pressure maintenance, check the interlock between pressure and spindle, and realize automatic hydraulic control of hydrostatic spindle.

冷却过滤：强力磁性分离器+纸袋过滤系统，实现切削液精密过滤，改善工件磨削质量。
Cooling filtration: Strong magnetic separator + paper bag filtration system to achieve precise filtration of cutting fluid and improve grinding quality of workpiece.

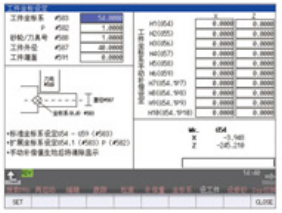
外圆磨床 Cylindrical grinding machine

人机对话界面 Human-computer dialogue interface

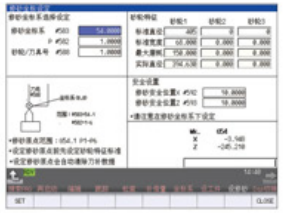
简单快捷、易于操作的人机对话界面
Simple, fast and easy to operate human-computer dialogue interface

主界面及坐标系设定界面 Main interface and coordinate system setting interface

主界面
Main interface



工件坐标系设定界面
Workpiece coordinate system setting interface



修砂坐标系设定界面
Dressing wheel coordinate system setting interface

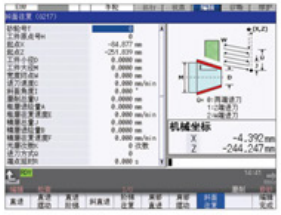
磨削、修砂及量仪主界面 Grinding, dressing wheel and measuring instrument main interface

磨削主界面
Grinding main interface

修砂主界面
Dressing wheel main interface

量仪主界面
Measuring instrument main interface

磨削、修砂及量仪型式参数设定界面 Grinding, dressing wheel and measuring instrument type parameter setting interface



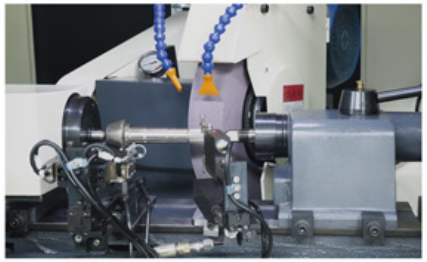
磨削型式参数设定界面
Grinding type parameter setting interface

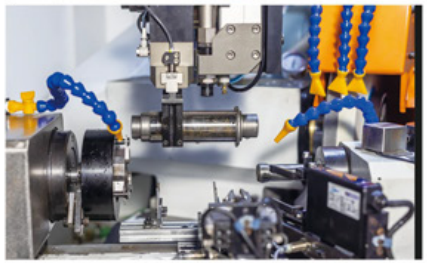
修砂型式参数设定界面
Dressing wheel type parameter setting interface

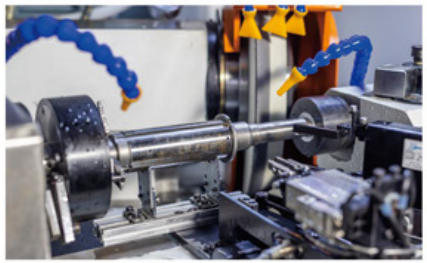
量仪型式参数设定界面
Measuring instrument type parameter setting interface

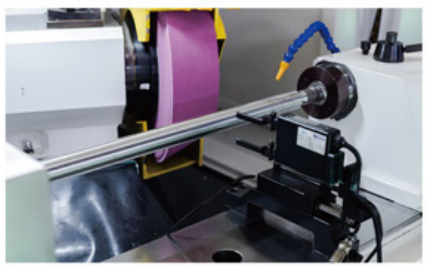
Cylindrical grinding machine 外圆磨床

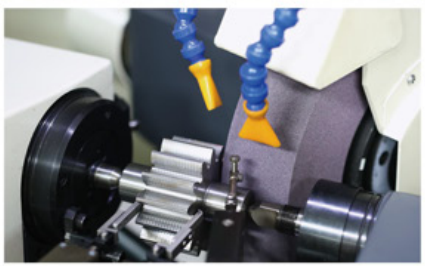
Example 应用范例

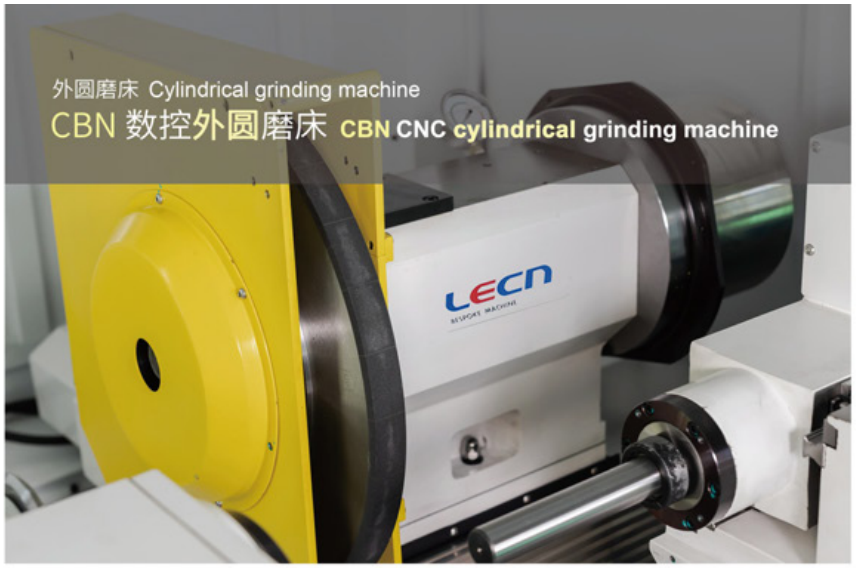












Cylindrical grinding machine 外圆磨床

CBN CNC cylindrical grinding machine CBN 数控外圆磨床

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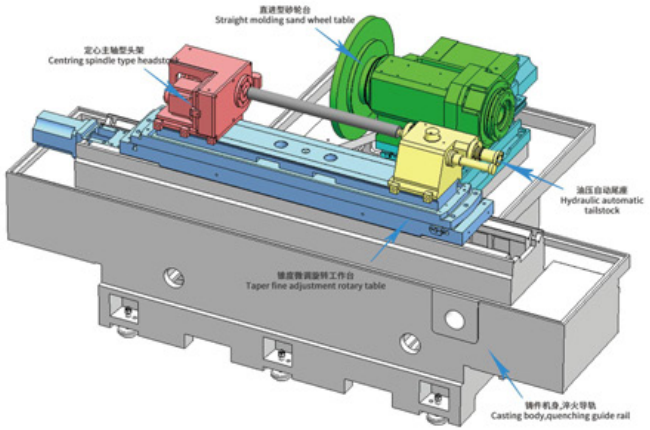
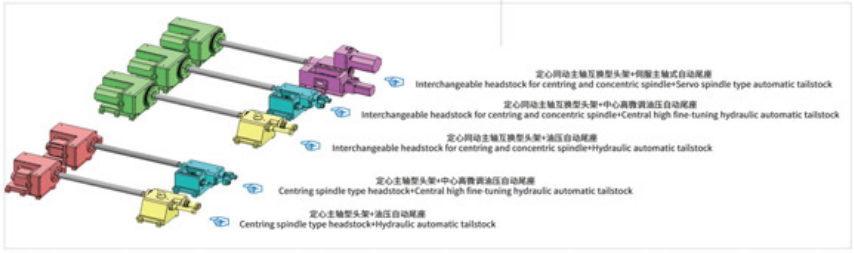
Rich, stable and reliable functional modules





主要参数 The main parameters

项 目	ITEM		GP 直进式/H CBN GP straight/H CBN	
			GP2560H	GP3560H
最大加工直径	max processing diameter	mm	Ø 200	Ø 300
两顶尖最大距离	maximum distance between two tips	mm	600	600
最大荷重	max loading	kg	80	150
最大旋径	max rotate diameter	mm	Ø 260	Ø 360
X/Z 行程	X/Z axis travel	mm	250/600	300/600
X/Z 电机功率	X/Z servo motor power	kw	2.2/1.5	2.2/2.2
主轴电机	spindle motor power	kw	15	22
最大砂轮	max grinding wheel	mm	Ø 500x Ø 180x50	Ø 600x Ø 180x50

外圆磨床 Cylindrical grinding machine

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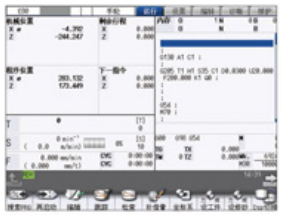
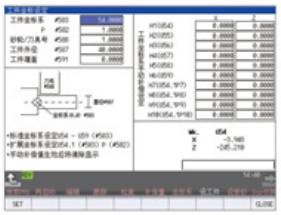
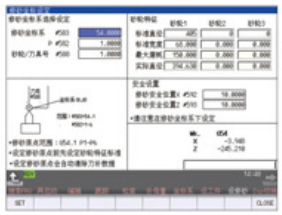


主界面
main interface



工件坐标系设定界面
Workpiece coordinate system setting interface



修砂坐标系设定界面
Dressing wheel coordinate system setting interface

磨削、修砂及量仪主界面 Grinding, dressing wheel and measuring instrument main interface

磨削主界面
Grinding main interface

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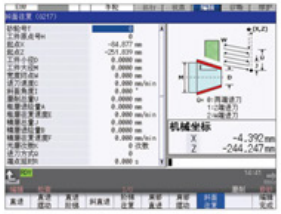
量仪主界面
Measuring instrument main interface

磨削、修砂及量仪型式参数设定界面 Grinding, dressing wheel and measuring instrument type parameter setting interface



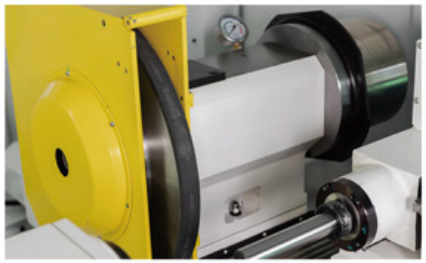
磨削型式参数设定界面
Grinding type parameter setting interface

修砂型式参数设定界面
Dressing wheel type parameter setting interface

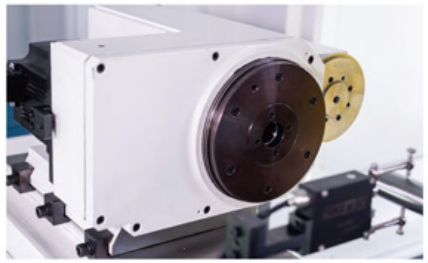
量仪型式参数设定界面
Measuring instrument type parameter setting interface

Functional module 功能模块

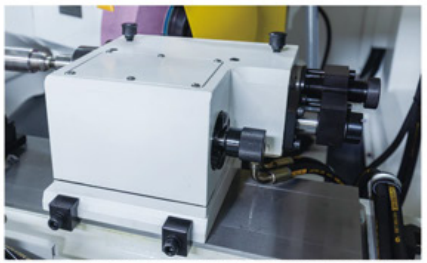
X轴导轨：P级高刚性滚柱导轨，导向准确，翻转力矩承载能力强，定位精度高，高速，寿命长。
X-axis guide rail: P-level high rigid roller guide rail, with accurate guidance, strong overturning torque bearing capacity, high positioning accuracy, high speed and long service life.



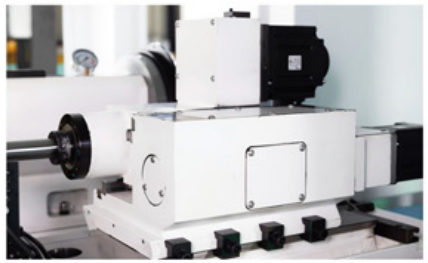
静压电主轴：高刚性前后径向静压轴承支撑，回转精度高，刚度高，转动平稳，无振动，寿命长。大扭矩外置电主轴直接驱动，响应迅速，恒线速度，高转速。
Hydrostatic electric spindle:High rigidity front and rear radial hydrostatic bearings, with high rotary accuracy, high rigidity, stable rotation, no vibration and long service life. Large torque external electric spindle directly drives, fast response, horizontal line speed, high speed.



砂轮修整：伺服电机驱动，P4级角接触轴承支撑，金刚滚轮修整，高精、高效。
Grinding wheel dressing: Driven by servo motor, supported by P4 angular contact bearing, diamond roller dressing, high precision and efficiency.

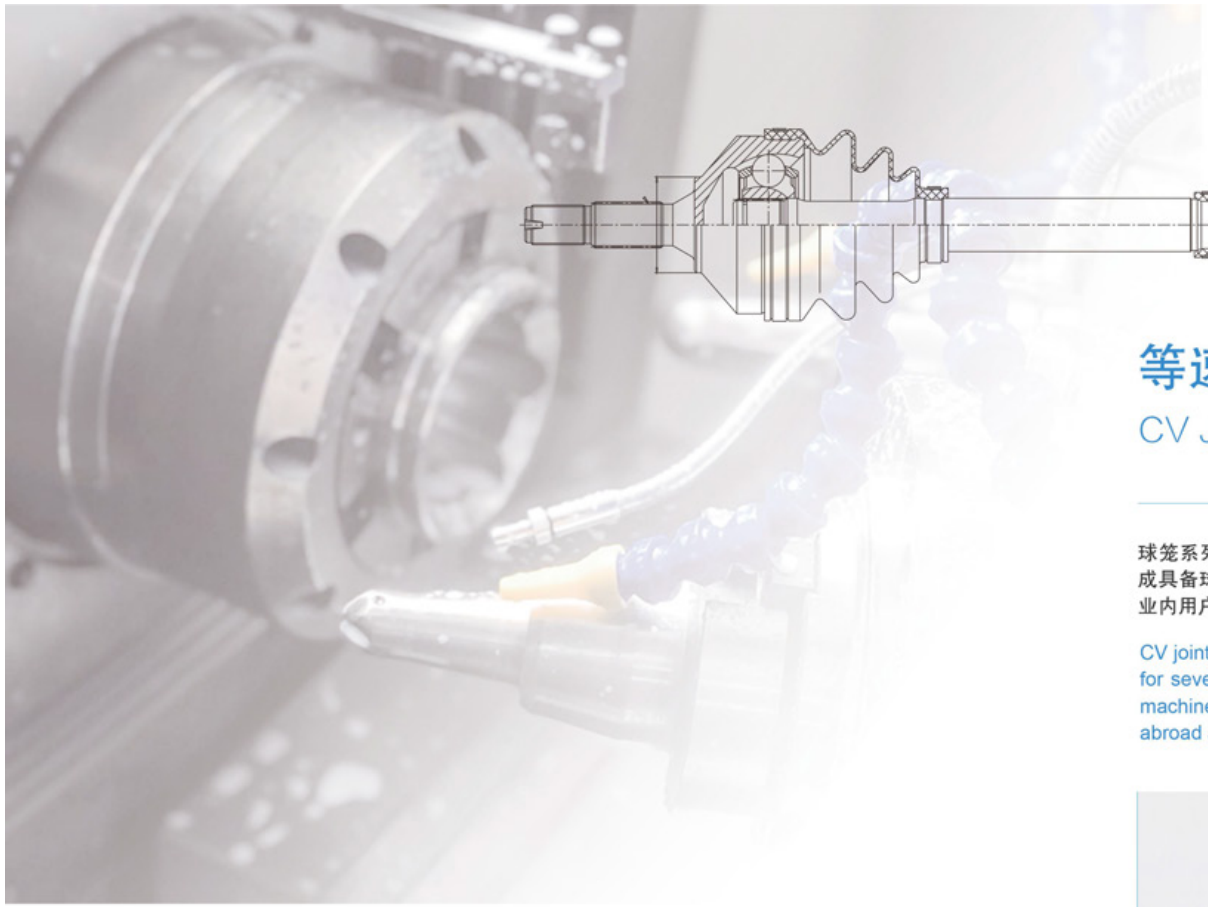


中心高微调油压自动尾座（选配）：手动旋钮微调尾座中心高，工件同轴度高；旋钮弹簧调整工件夹紧力、油压自动夹紧，满足自动化需求。
Center high fine-tuning hydraulic automatic tailstock(optional): Manual knob fine-tunes tailstock center high to improve workpiece coaxiality; The knob spring adjusts the clamping force and hydraulic of the workpiece to meet the requirements of automation.



伺服主轴式自动尾座（选配）：伺服驱动、C3级丝杆传动、P级线轨导向、力矩控制自动顶紧；同动主轴P4级角接触轴承支撑，无极变速，精度高，刚性强，适合重切削，满足高效、精密磨削及自动化需求。
Servo spindle automatic tailstock (optional): Servo drive, C3 screw drive, P-level rail guidance, torque control automatic tightening; The P4 angular contact bearing of the co-rotating spindle is supported with infinite speed change, high precision and rigidity, which is suitable for heavy cutting and meets the requirements of high efficiency, precision grinding and automation.

液压冷却系统：恒温油冷机、精密筒式过滤、蓄能器压力保持，检知压力与主轴互锁，实现静压主轴液压自动控制。恒温水冷机，确保电主轴高速稳定运转。
Hydraulic cooling system: thermostatic hydraulic cooler, precision cartridge filter, accumulator pressure maintenance, detection of pressure and spindle interlocking, to achieve hydrostatic spindle hydraulic automatic control. Constant temperature water cooler ensures the high-speed and stable operation of the motorized spindle.



6

等速万向节专机及整线输出

CV JOINT MACHINE AND THE WHOLE PRODUCTION LINE

球笼系列专机是力成积多年生产等速万向节的基础上逐步发展起来的。历经多年，力成具备球笼产品全套设备制造能力,设备遍及于国内外众多等速万向节制造企业，深受业内用户信赖。

CV joint bespoke machine is gradually developed based on the production of CV joint for several years. LECN has the ability to manufacture the complete set of CV joint machines, the equipment is widely used in many CV joint manufacturers at home and abroad and is highly trusted by users in the industry.

LECN Bespoke Machine

等速万向节专机 CV joint machine

球笼硬车硬铣复合机床 CV joint hard turning and hard milling compound machine

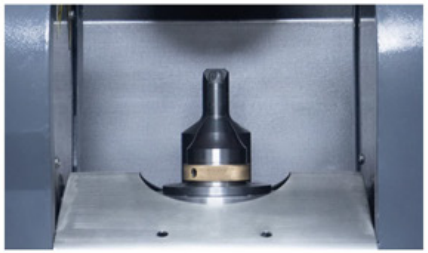
钟形壳沟道的硬铣及球面的硬车削加工 Hard milling groove and hard turning sphere of outer race

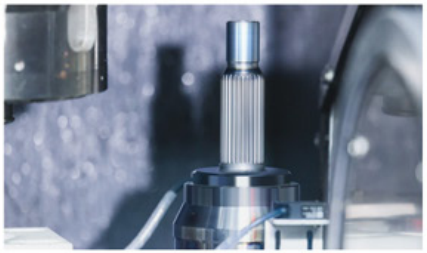
性能特点 Function features

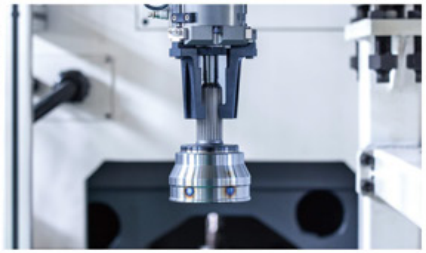
- 一次装夹可完成钟形壳的沟道硬铣及球面硬车削加工；
- 整体框架式铸件或大理石机身，经久耐用；
- 多序复合加工，以车铣代磨，效率高；
- 端齿分度、伺服旋转或力矩电机复合主轴，精度高；
- 伺服或力矩电机摇摆转台配角度光栅，运行平稳、精度稳定；
- Y轴双丝杆双滚柱线轨配双光栅尺，高精高刚性、寿命长；
- 专用液压弹性夹具，夹紧可靠，精度稳定；
- 干式切削、空气冷却，节能环保；
- 全自动料机、模块式夹爪及定位装置，操作简单、换型方便；
- 全防护，加工区域与料机隔离，维护方便。

- Clapming one time can complete hard milling groove and hard turning sphere of outer race;
- Whole frame casting or marble body, durable;
- Multi-sequence compound processing, turning and milling instead of grinding, high efficiency;
- End tooth indexing, servo rotation or torque motor composite spindle, high precision;
- Servo or torque motor rotary table with angle grating, smooth operation, stable accuracy;
- Y-axis double ball screw and roller track with grating ruler, high precision high rigidity, long life;
- Special hydraulic elastic clamp, clamping reliable, accuracy stability;
- Dry cutting, air cooling, energy saving and environmental protection;
- Automatic feeder, modular gripper and positioning device, easy to operate and change type;
- Full protection, the processing area and the material machine isolation, easy maintenance.

Bespoke Machine

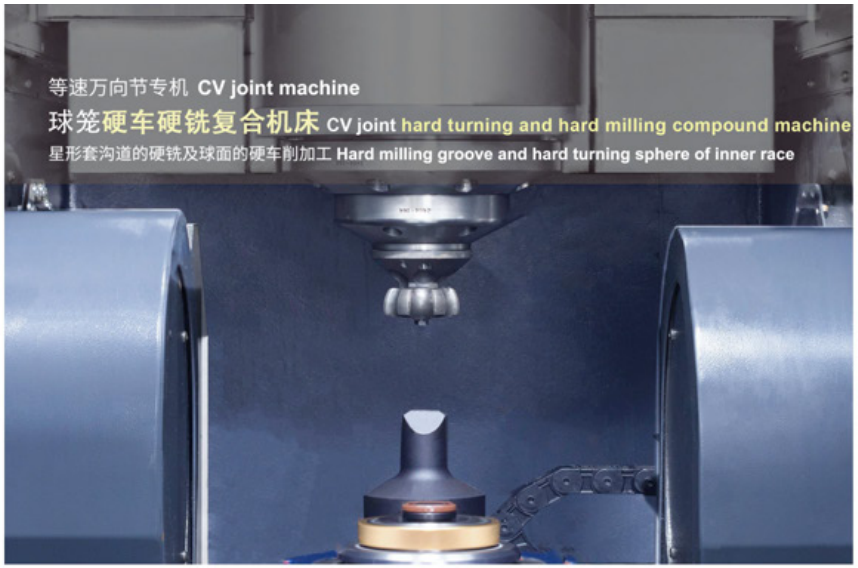






主要参数 The main parameters

沟 道	GROOVE		BJ/UFJ/SX/DOJ	VL
项 目	ITEM		VQXA125	VQXC125
最大夹持直径	max clamping diameter	mm	Ø110	Ø110
最大工件长度	max workpiece length	mm	260	260
加工沟道直径范围	groove diameter scope	mm	Ø45-Ø100	Ø45-Ø100
工件所配钢球直径范围	diameter of steel ball scope	mm	Ø12.7-Ø22	Ø12.7-Ø22
工件最大柄部直径	max workpiece handle diameter	mm	Ø38	Ø38
机床重量	weight	kg	10000	11000
占地面积	length x width	mm	4000 x 4700	4000 x 4700



等速万向节专机 **CV joint machine**

球笼硬车硬铣复合机床 CV joint hard turning and hard milling compound machine

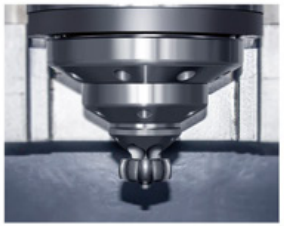
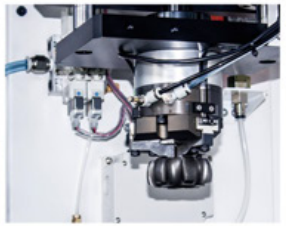
星形套沟道的硬铣及球面的硬车削加工 **Hard milling groove and hard turning sphere of inner race**

性能特点 Function features

- 一次装夹可完成星形套的沟道硬铣及球面硬车削加工；
- 整体框架式铸件或大理石机身，经久耐用；
- 多序复合加工，以车铣代磨，效率高；
- 端齿分度、伺服旋转或力矩电机复合主轴，精度高；
- 伺服或力矩电机摇摆转台配角度光栅，运行平稳、精度稳定；
- Y轴双丝杆双滚柱线轨配双光栅尺，高精高刚性、寿命长；
- 专用液压弹性夹具，夹紧可靠，精度稳定；
- 干式切削、空气冷却，节能环保；
- 全自动料机、模块式夹爪及定位装置，操作简单、换型方便；
- 全防护，加工区域与料机隔离，维护方便。

- Clapming one time can complete hard milling groove and hard turning sphere of inner race;
- Whole frame casting or marble body, durable;
- Multi-sequence compound processing, turning and milling instead of grinding, high efficiency;
- End tooth indexing, servo rotation or torque motor composite spindle, high precision;
- Servo or torque motor rotary table with angle grating, smooth operation, stable accuracy;
- Y-axis double ball screw and roller track with grating ruler, high precision high rigidity, long life;
- Special hydraulic elastic clamp, clamping reliable, accuracy stability;
- Dry cutting, air cooling, energy saving and environmental protection;
- Automatic feeder, modular gripper and positioning device, easy to operate and change type;
- Full protection, the processing area and the material machine isolation, easy maintenance.

Bespoke Machine


主要参数 The main parameters

沟 道	GROOVE		BJ/UFJ/SX/DOJ	VL
项 目	ITEM		VQXB125	VQXD125
最大夹持直径	max clamping diameter	mm	Ø35	Ø35
最大工件长度	max workpiece length	mm	60	60
加工沟道直径范围	groove diameter scope	mm	Ø20-Ø65	Ø20-Ø65
工件所配钢球直径范围	diameter of steel ball scope	mm	Ø12.7-Ø22	Ø12.7-Ø22
机床重量	weight	kg	10000	11000
占地面积	length x width	mm	4000 x 4700	4000 x 4700

性能特点 Function features

- 一次装夹可依次完成钟形壳沟道的软铣削加工；
- 整体铸件机身、高刚性矩形淬硬导轨，经久耐用；
- 双工位结构，粗、精铣一次加工，精度高。
- 端齿式油压分度，精度高；
- 专用液压弹性夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性主轴，抗震性好，寿命长；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Clamping one time can soft milling outer race groove;
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Dual-station structure, rough and finish milling once, high precision;
- Hydraulic end tooth indexing,high precision;
- Special hydraulic elastic clamp, clamping reliable, stable accuracy ;
- Special high rigidity spindle ,seismic resistance,long life;
- Can carry with truss or joint robot and automatical line.

Bespoke Machine

主要参数 The main parameters

沟 道	GROOVE		BJ/UFJ/SX/DOJ	VL/CG
项 目	ITEM		QXA125D	QXC125D
最大夹持直径	max clamping diameter	mm	Ø110	Ø110
最大工件长度	max workpiece length	mm	260	260
加工沟道直径范围	groove diameter scope	mm	Ø45-Ø100	Ø45-Ø100
工件所配钢球直径范围	diameter of steel ball scope	mm	Ø12.7-Ø22	Ø12.7-Ø22
工件最大柄部直径	max workpiece handle diameter	mm	Ø40	Ø40
机床重量	weight	kg	5500	4300
占地面积	length x width	mm	2700 x 1800	2600 x 1900

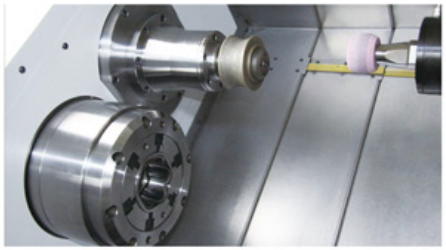
等速万向节专机 CV joint machine

球笼内孔磨床 CV joint internal grinding machine

钟形壳或保持架内孔的磨削加工 Grinding outer race or cage's inner bore

性能特点 Function features

- 45度斜背式高刚性机身、高速线性导轨，经久耐用；
- 专用夹具，夹紧可靠，精度稳定；
- 高刚性电主轴，抗震性好，寿命长；
- 伺服驱动金刚滚轮修整器，支持曲面任意变形；
- 可搭载桁架式或关节式机器人，支持自动化联线。
- 45 degrees hatchback body with high rigidity, high-speed linear guide rail, durable;
- Special clamp, clamping reliable, stable accuracy ;
- High rigidity spindle, seismic resistance, long life;
- Servo drive diamond roller dresser, support any surface deformation;
- Can carry with truss or joint robot and automatical line.



主要参数 The main parameters

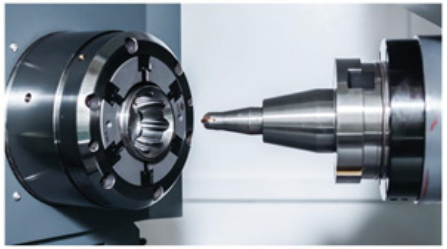
项 目	ITEM		QMH125	
			钟形壳(outer race)	保持架(cage)
最大夹持直径	max clamping diameter	mm	Ø115	Ø210
最大工件	max workpiece	mm	260(长度 length)	200（高度 height)
加工内孔直径范围	inner hole diameter scope	mm	Ø45- Ø100	Ø25- Ø120
工件最大柄部直径	max workpiece handle diameter	mm	Ø40	------
砂轮直径范围	grinding wheel diameter scope	mm	Ø30- Ø50	Ø30- Ø60
机床重量	weight	kg	2800	2800
占地面积	length x width	mm	2000 x 1600	2000 x 1600

CV joint machine 等速万向节专机

CV joint groove milling machine 球笼沟道铣床

Hard milling outer race groove 钟形壳沟道的硬铣加工

性能特点 Function features



- 一次装夹可依次完成钟形壳沟道的硬铣削加工；
- 整体铸件机身、高刚性矩形淬硬导轨，经久耐用；
- 具热后硬铣，以铣代磨，可简化工艺、强化零件表面质量；
- 蜗轮蜗杆式低重心转台；
- 端齿式油压分度，精度高；
- 专用液压弹性夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性主轴，抗震性好，寿命长；
- 可搭载桁架式或关节式机器人，支持自动化联线。
- Clapming one time can hard milling outer race groove;
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Milling instead of grinding,simplify process,strengthen work piece surface quality;
- Worm type low gravity table;
- Hydraulic end tooth indexing,high precision;
- Special hydraulic elastic clamp, clamping reliable, stable accuracy ;
- Special high rigidity spindle , seismic resistance ,long life;
- Can carry with truss or joint robot and automatical line.

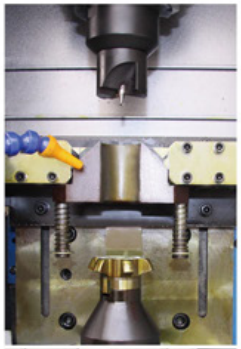
主要参数 The main parameters

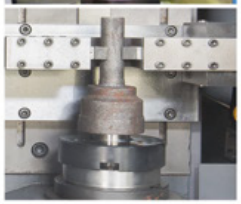
沟 道	GROOVE		BJ/UFJ/SX/DOJ	VL/CG
项 目	ITEM		QYXA125	QYXC125
最大夹持直径	max clamping diameter	mm	Ø110	Ø110
最大工件长度	max workpiece length	mm	260	260
最大回转角度	max rotating angle	°	110	±16
加工沟道直径范围	groove diameter scope	mm	Ø45-Ø100	Ø45-Ø100
工件所配钢球直径范围	diameter of steel ball scope	mm	Ø12.7-Ø22	Ø12.7-Ø22
工件最大柄部直径	max workpiece handle diameter	mm	Ø40	Ø40
机床重量	weight	kg	4100	4100
占地面积	length x width	mm	2500 x 1800	2500 x 1800

等速万向节专机 CV joint machine

双工位球笼立式刮打机 Dcuplex CV joint horizontal scraping and milling machine

钟形壳柄部刮端面钻中心孔的加工 Scraping and drilling outer race handle part





性能特点 Function features

- 一次装夹可完成球笼钟形壳柄部刮端面钻中心孔加工；
- 框架式刚性机身、高刚性矩形淬硬导轨，经久耐用；
- 立式结构，排屑容易；
- 特殊结构的高刚性主轴，抗震性好，寿命长；
- 专用液压夹具，夹紧可靠，精度稳定；
- 多种夹具可选，应对不同工件定位方式；
- 左右加工参数独立设置，可独立加工；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Clamping one time can scraping and drilling outer race handle part;
- Rigid body frame, high rigidity rectangular hardened rails, durable;
- Vertical structure, chip easily;
- Special high rigidity spindle structure, seismic resistance, long life;
- Special hydraulic clamp, clamping reliable, stable accuracy ;
- Clamp can be choosed, respond to different workpiece fix position;
- Set parameters independently,and can operate independently;
- Can carry with truss or joint robot and automatical line.

主要参数 The main parameters

项 目	ITEM		VQG0430D
最大加工直径	max process diameter	mm	Ø40
工件长度范围	workpiece length scope	mm	50-300
中心钻最大夹持直径	max center drilling clamping diameter	mm	Ø16
机床重量	weight	kg	2200
占地面积	length x width	mm	1400 x 1200

CV joint machine 等速万向节专机

CV joint handle drilling machine 球笼柄部钻孔机

Drilling outer arce handle part's holes 钟形壳柄部插销孔的加工

性能特点 Function features

- 一次装夹可完成球笼钟形壳柄部四个中心孔及两个通孔的加工；
- 油压驱动的钻孔动力头，维护简单，寿命长；
- 专用液压夹具，分度夹紧可靠，精度稳定。

- Clamping one time can drilling outer arce handle part's four centre holes and two through holes;
- Hydraulic drive drilling power head , easy maintenance, long life;
- Special hydraulic clamp, indexing clamping reliable, stable accuracy.

主要参数 The main parameters

项 目	ITEM		SMD0110T
工件柄部长度范围	workpiece handle length scope	mm	80-120
工件柄部直径范围	workpiece handle diameter scope	mm	Ø10- Ø40
最大加工中心孔	max drilling center hole	mm	A6.3 (B5)
机床重量	weight	kg	2200
占地面积	length x width	mm	2000 x 1800

性能特点 Function features

- 一次装夹可依次完成星形套沟道的铣削加工；
- 整体铸件机身、高刚性矩形淬硬导轨，经久耐用；
- 端齿式油压分度，精度高；
- 专用液压弹性夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性主轴，抗震性好，寿命长；
- 可搭载桁架式或关节式机器人，支持自动化联线。

QYXB125/QYXD125 球笼沟道铣床

- 具热后硬铣，以铣代磨，可简化工艺、强化零件表面质量。
- 蜗轮蜗杆式低重心转台。

QXB125D/QXD125D 双工位球笼沟道铣床

- 双工位结构，粗、精铣一次加工，精度高。

- Clamping one time can milling inner race groove;
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Hydraulic end tooth indexing,high precision;
- Special hydraulic elastic clamp, clamping reliable,stable accuracy;
- Special high rigidity spindle ,seismic resistance,long life;
- Can carry with truss or joint robot and automatical line.

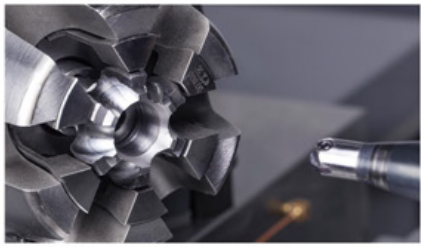
QYXB125/QYXD125 CV joint groove milling machine

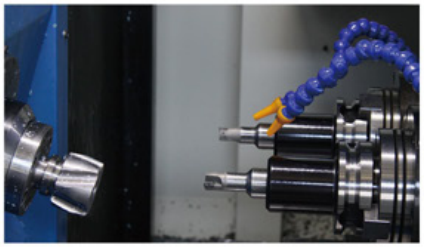
- Milling instead of grinding,simplify process,strengthen work piece surface quality;
- Worm type low gravity table.

QXB125D/QXD125D Duplex Cv joint groove milling machine

- Dual-station structure, rough and finish milling once, high precision.

CV joint machine 等速万向节专机
CV joint groove milling machine 球笼沟道铣床
Milling inner race groove 星形套沟道的铣削加工





主要参数 The main parameters

球 道	GROOVE		BJ/UFJ/SX/DOJ		VL/CG	
项 目	ITEM		QYXB125	QXB125D	QYXD125	QXDI25D
最大夹持直径	max clamping diameter	mm	Ø35 (内胀 internal inflation)	Ø35 (内胀 internal inflation)	Ø35 (内胀 internal inflation)	Ø35 (内胀 internal inflation)
最大工件长度	max workpiece length	mm	60	60	60	60
最大回转角度	max rotating angle	°	110	-------	±16	-------
加工沟道直径范围	groove diameter scope	mm	Ø20-Ø65	Ø20-Ø65	Ø20-Ø65	Ø20-Ø65
工件所配钢球直径范围	diameter of steel ball scope	mm	Ø12.7-Ø22	Ø12.7-Ø22	Ø12.7-Ø22	Ø12.7-Ø22
机床重量	weight	kg	4100	5500	4100	4300
占地面积	length x width	mm	2500 x 1800	2700 x 1800	2500 x 1800	2600 x 1900

等速万向节专机 CV joint machine

保持架窗口铣床/磨床 Cage milling /grinding machine

保持架窗口的铣削/磨削加工 Milling / grinding cage window

性能特点 Function features

- 一次装夹可依次完成球笼保持架窗口的铣削或磨削加工；
- 整体铸件机身、高刚性矩形淬硬导轨，经久耐用；
- 主轴垂直调整结构，可调整窗口面的铣削量和高度误差；
- 伺服驱动的工件轴，可高频来回旋转和精确圆周等分；
- 专用气动夹具，夹紧可靠，精度稳定；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- Clamping one time can milling or grinding window cage in order;
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Milling axis perpendicular adjust structure, can adjust window's upper and lower milling surface's milling quantity and height tolerance;
- Servo-driven workpiece axis can rotate back and forth with highfrequency and precise circumfer -ence equal devision.
- Special pneumatic clamps, clamping reliable, accuracy stability;
- Can carry with truss or joint robot and automatical line.

CV joint machine 等速万向节专机

Cage milling /grinding machine 保持架窗口铣床/磨床

Milling / grinding cage window 保持架窗口的铣削/磨削加工

主要参数 The main parameters

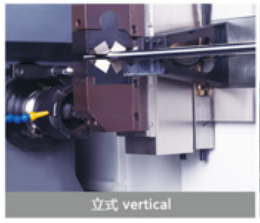
项 目	ITEM		QXGA125	QMGA125	QMGA135
夹持直径范围	clamping diameter scope	mm	Ø40-Ø120	Ø40-Ø70	Ø70-Ø135
最大工件高度	max workpiece height	mm	60	50	70
加工窗口高度范围	window height scope	mm	12-50	12-40	40-50
刀具直径范围	tool diameter scope	mm	Ø6-Ø12	Ø6-Ø12	Ø6-Ø16
机床重量	weight	kg	3000	3500	3600
占地面积	length x width	mm	3200 x 2200	3650 x 2500	3650 x 2500

铣端面钻中心孔机床
FACING AND CENTERING MACHINE

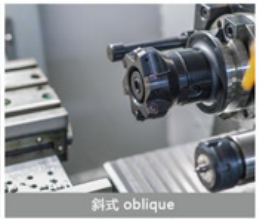
7

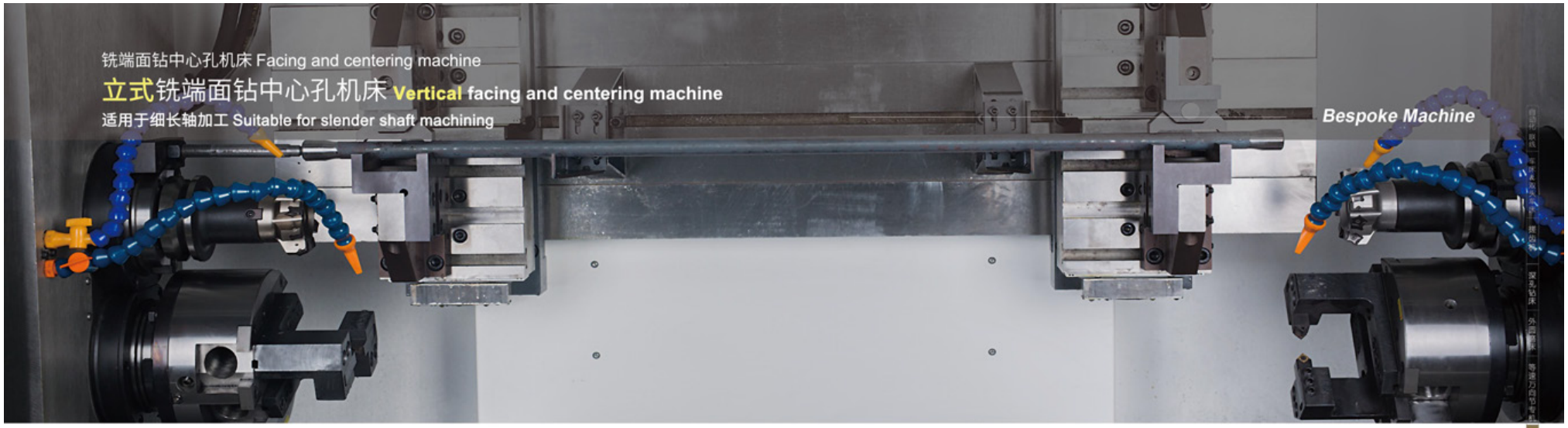
关于3米以下轴端的铣削、套车、钻中心孔、钻孔、攻牙、镗孔、铰孔、切槽等一揽子解决方案，适用于桁架式或关节式机器人的全系列立式、卧式、斜式机型。二十年专注，上千种案例。

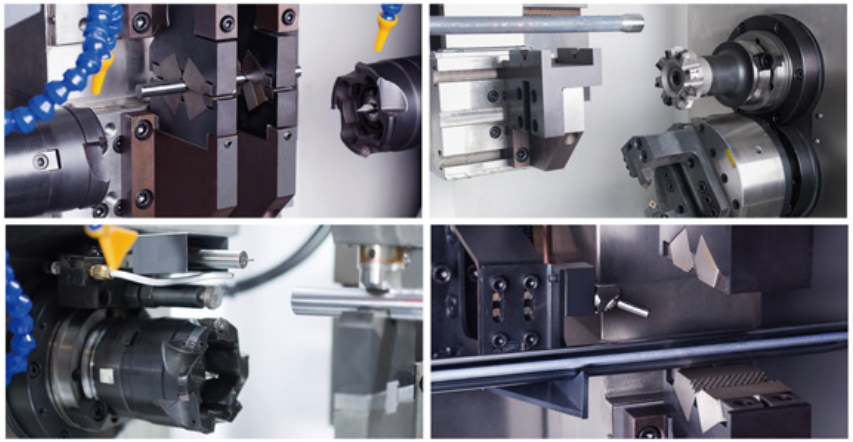
About three meters below the shaft surface milling, outer turning, drilling center hole, drilling, tapping, boring,reaming, grooving and other package of solutions for a full range of vertical,horizontal and oblique models of truss or joint robots. Twenty years focused, thousands of cases.


立式 vertical


卧式 horizontal


斜式 oblique





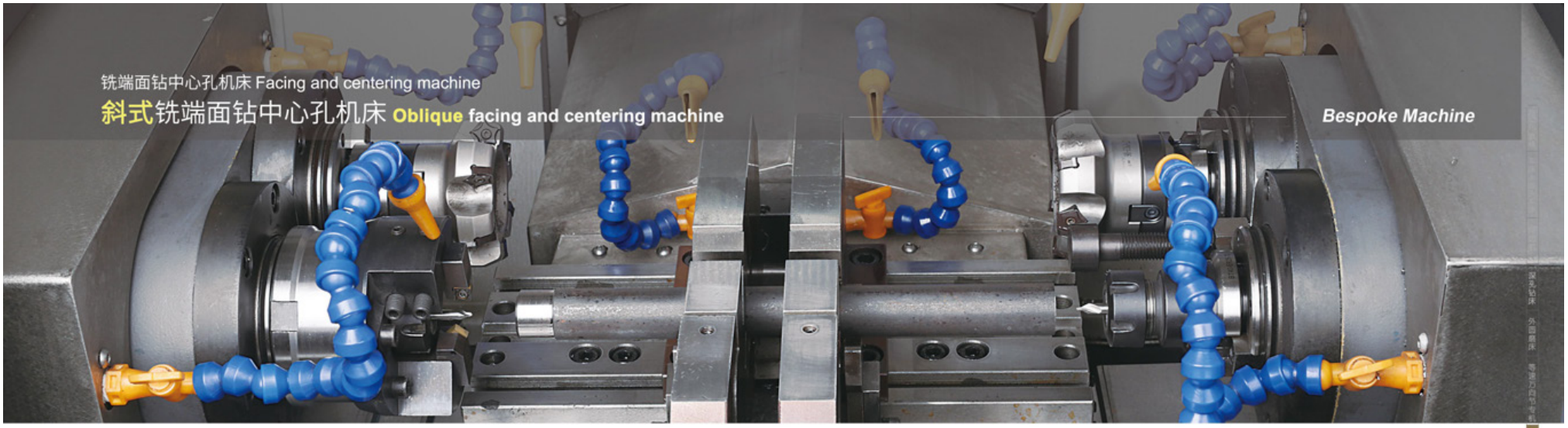
性能特点 Function features

- 一次装夹可完成轴类件铣端面、钻中心孔、套车外圆、倒角等加工加工；
- 框架式刚性机身、高刚性矩形淬硬导轨，经久耐用；
- 液压自定心夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性耐用主轴，使用寿命长；
- 立式结构，排屑容易，较卧式节省占地面积；
- 较卧式上料距离短，调整维护方便；
- 可搭载桁架式或关节式机器人，支持自动化联线；
- 特别适合于关节式机器人自动线。

- Clamping one time can milling face, drilling hole,roping,chamfer etc.;
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Hydraulic self-centering jig, clamping reliable, stable accuracy ;
- Special high rigidity spindle ,long life;
- Vertical structure, remove chips easily,save floor area compared to horizontal ;
- Shorter distance than horizontal, maintenance is simple;
- Can carry with truss or joint robot and automatical line;
- Especially suitable for joint robot automatic line.

主要参数 The main parameters

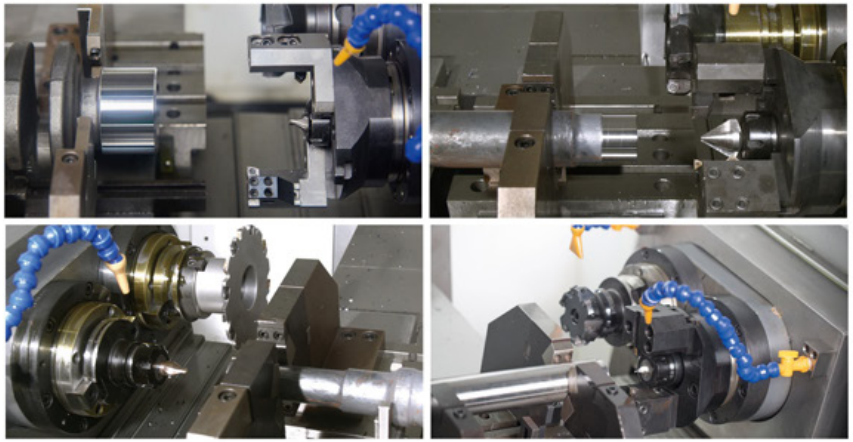
项 目	ITEM		VZ820550	VZ8205100	VZ8205130
夹持直径范围	clamping diameter scope	mm	Ø15- Ø50	Ø15- Ø50	Ø15- Ø50
加工长度范围	workpiece length scope	mm	100-500	100-1000	100-1300
中心钻最大夹持直径	max center drilling clamping diameter	mm	Ø16	Ø16	Ø16
最大铣削量（单边）	max milling amount (one side)	mm	4	4	4
机床重量	weight	kg	2600	3600	4500
占地面积	length x width	mm	2500 x 1500	2800 x 1500	3400 x 1500



铣端面钻中心孔机床 Facing and centering machine

斜式铣端面钻中心孔机床 Oblique facing and centering machine

Bespoke Machine



性能特点 Function features

- 一次装夹可完成轴类件铣端面、钻中心孔、套车外圆、倒角等加工；
- 框架式刚性机身、高刚性矩形淬硬导轨，经久耐用；
- 液压自定心夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性耐用主轴，使用寿命长；
- 斜式结构，排屑容易；
- 较卧式上料距离短，调整维护方便；
- 可搭载桁架式或关节式机器人，支持自动化联线；
- 特别适合于桁架式机器人自动线。

- Clamping one time can milling face, drilling center hole,outer turning excircle,chamfer etc.;
- Rigid body frame, high rigidity rectangular hardened rails, durable;
- Hydraulic self-centering jig, clamping reliable, stable accuracy ;
- Special high rigidity spindle ,long life;
- Oblique structure, remove chips easily;
- Shorter distance than horizontal, maintenance is simple;
- Can carry with truss or joint robot and automatical line;
- Especially suitable for truss robot automatic line.

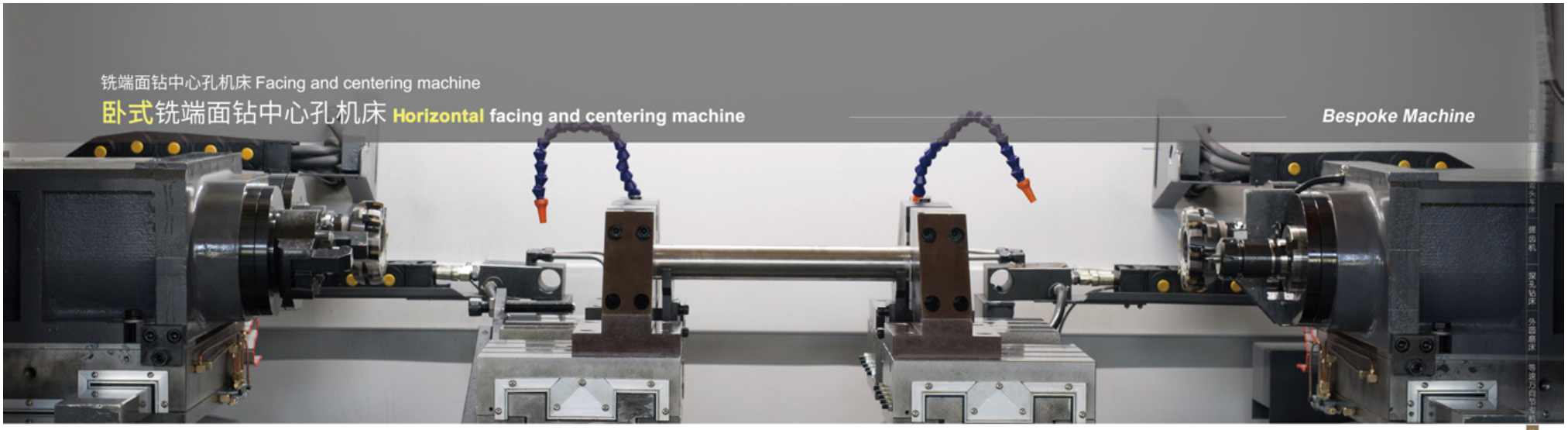
主要参数 The main parameters

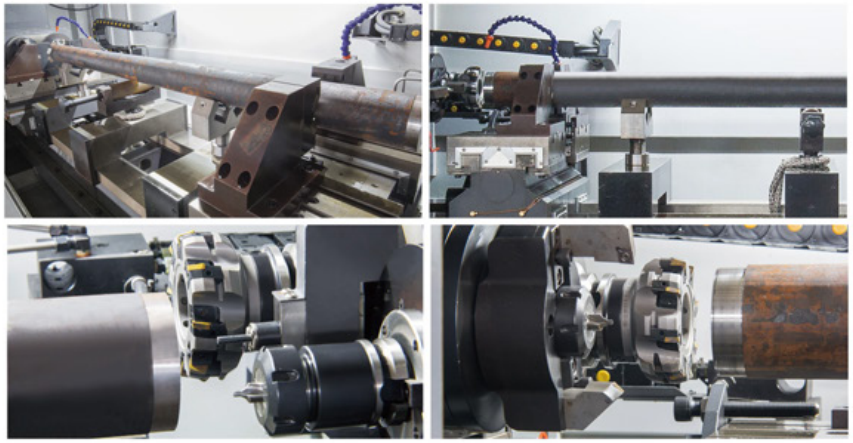
项 目	ITEM		SZ820530	SZ820550	SZ821060	SZ821080	SZ8210120	SZ8210150
夹持直径范围	clamping diameter scope	mm	Ø10-Ø50	Ø15-Ø50	Ø15-Ø100	Ø15-Ø100	Ø15-Ø100	Ø15-Ø100
加工长度范围	workpiece length scope	mm	100-300	200-500	200-600	200-800	300-1200	300-1500
中心钻最大夹持直径	max center drilling clamping diameter	mm	Ø20	Ø20	Ø26	Ø26	Ø26	Ø26
最大铣削量（单边）	max milling amount (one side)	mm	4	4	5	5	5	5
机床重量	weight	kg	2800	3000	5000	5000	7500	8500
占地面积	length x width	mm	2400 x 1400	2800 x 1400	3200 x 1600	3200 x 1600	3600 x 1700	4000 x 2000

铣端面钻中心孔机床 Facing and centering machine

卧式铣端面钻中心孔机床 Horizontal facing and centering machine

Bespoke Machine





性能特点 Function features

- 一次装夹可完成轴类件铣端面、钻中心孔、套车外圆、倒角等加工；
- 卧式整体铸件机身，较立式刚性更强；
- 高刚性淬硬导轨，经久耐用；
- 液压自定心夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性耐用主轴，使用寿命长；
- 可搭载桁架式或关节式机器人，支持自动化联线；
- 特别适合于桁架式机器人自动线。

- Clamping one time can milling face, drilling center hole,outer turning excircle,chamfer etc.;
- Horizontal integral casting body, stronger rigidity than vertical;
- High rigidity rectangular hardened rails, durable;
- Hydraulic self-centering jig, clamping reliable, accuracy stability;
- Special high rigidity spindle ,long life;
- Can carry with truss or joint robot and automatical line;
- Especially suitable for truss robot support automatic line.

主要参数 The main parameters

项 目	ITEM		Z8220150	Z8220200	Z8220300
夹持直径范围	clamping diameter scope	mm	Ø100-Ø200	Ø100-Ø200	Ø100-Ø200
加工长度范围	workpiece length scope	mm	300-1500	400-2000	1500-3000
中心钻最大夹持直径	max center drilling clamping diameter	mm	Ø26	Ø26	Ø26
最大铣削量（单边）	max milling amount (one side)	mm	6	6	6
机床重量	weight	kg	11000	13000	16000
占地面积	length x width	mm	4000 x 2200	5000 x 2300	7000 x 2300

铣端面钻中心孔机床技术
Facing and centering machine technology

应用

铣端面钻中心孔机床是一种专用镗铣数控机床，主要用于汽车半轴、曲轴、凸轮轴、变速箱轴、弹簧扭杆等各种细长轴、阶梯轴、异形毛坯件的首序加工。

APPLICATION

Facing and centering machine is a special boring and milling CNC machine tool, which is mainly used for the first processing of various slender shafts, stepped shafts, special-shaped blanks, such as automobile half-shaft, crankshaft, camshaft, transmission shaft, spring torsion bar, etc.

结构

■ *机床结构*，有立式、斜式和卧式多种不同机型。主要是在占地面积、排屑效果以及加工能力等方面的差异，在不同的机型上各有优势。

STRUCTURE

■ Machine tool structure, vertical, oblique and horizontal models. Mainly in the area occupied, chip removal effect and processing capacity, there are advantages in different models.

特点

■ *专用性强*，需要根据用户需求定制工装夹具、刀具、检具等，一般用于大批量产零件加工。
■ *工序集中、高效、同轴度高*，可一次装夹对零件的两端同时进行铣削、套车、钻中心孔、钻孔、攻牙、镗孔、铰孔、切槽等加工，能够较好的保证两端中心孔、外圆及孔的同轴度。

CHARACTERISTIC

■ Strong specificity, which requires customizing tooling fixtures, cutters, checking fixtures, etc. according to user needs, are generally used for mass production parts processing.
■ Procedures are centralized, efficient and highly concentric. Milling, turning, drilling center holes, drilling, tapping, boring, reaming and grooving can be carried out simultaneously on both ends of the part with one clamp, which can better guarantee the concentricity of the center holes, outer circles and holes at both ends.

力成技术优势
LECN technical advantages

■ *全系铣端面钻中心孔机床*，无论立式、斜式、卧式机，都有全系列单主轴或双主轴机型供您选择。
■ *油压自定心夹钳*，实现细长轴、阶梯轴、异形件毛坯快速装夹定位，效率高，换产方便。
■ *伺服展刀车削*，实现零件外圆锥度、圆弧、倒角及其它曲线展车车削加工，可编程，精度高。
■ *套车机构*，独特复合式外圆倒角套车机构，调整方便、效率高。
■ *在线检测*，提供中心孔深度、工件长度、主轴断带等在线检测，保证加工可靠，防止撞刀。
■ *全封闭铣削空间*，无论立式、斜式还是卧式机型均采用全封闭的内外防护结构。
■ *自动化无缝对接*，无论桁架式机器人还是关节式机器人，所有机型均预留有自动化接口，随时无缝对接。
■ *全面解决方案*，无论加工还是自动化方案需求，力成在铣削和相关自动化领域拥有10多年制造经验的专业化团队都可以提供全面解决方案或建议。

■ Whether vertical, oblique or horizontal, a full range of single or double spindle machine types are available for your selection.
■ Oil pressure self-centring clamp realizes quick clamping and positioning of slender shaft, step shaft and special-shaped blank, with high efficiency and convenient production change.
■ Servo spreader turning realizes turning of outer conicity, arc, chamfer and other curves with high accuracy and programmability.
■ Trailing mechanism, unique compound round chamfered traversing mechanism, convenient adjustment and high efficiency.
■ On-line inspection provides on-line inspection of center hole depth, workpiece length, main shaft broken strip, etc. to ensure reliable processing and prevent tool collision.
■ Fully enclosed milling space, whether vertical, oblique or horizontal, adopts fully enclosed inner and outer protective structure.
■ Automated seamless docking, whether truss or joint robots, all models have automatic interfaces reserved for seamless docking at any time.
■ Overall solutions, whether for processing or automation solutions, are available to specialized teams with more than 10 years of manufacturing experience in milling and related automation.
■ Automated seamless docking, whether truss or joint robots, all models have automatic interfaces reserved for seamless docking at any time.

有关铣端面钻中心孔机床的技术信息，请访问 www.lecn.cn/facing-and-centering-machine/

铣端面钻中心孔机床技术及选型
Facing and centering machine technology and selection

如何选型铣端面钻中心孔机
How to select facing and centering machine

各有优势： 无论是立式、斜式和卧式，主要是在于占地面积、排屑效果以及加工能力等方面的差异，在不同的机型上各有优势。

设计细节、工艺能力决定加工精度：无论何种机型，除了以上的几点区别外，其对于产品精度、加工效率影响并不十分明显，在机型能力范围内工件的加工精度取决机型的设计细节和制造厂家的工艺能力。

斜式机型可以覆盖立式所有规格：1300mm 以下的机型立式具有占地面积小、操作便利的优势；斜式机型可以覆盖立式所有规格，反之，立式不能。

Each has its own advantages: whether vertical, oblique or horizontal, mainly due to the differences in occupied area, chip removal effect and processing capacity, and has its own advantages in different models.

Design details and process capability determine the machining accuracy: Regardless of the machine type, except for the differences mentioned above, its influence on product accuracy and processing efficiency is not very obvious. Within the scope of machine capability, the processing accuracy of the workpiece depends on the design details of the machine type and the process capability of the manufacturer.

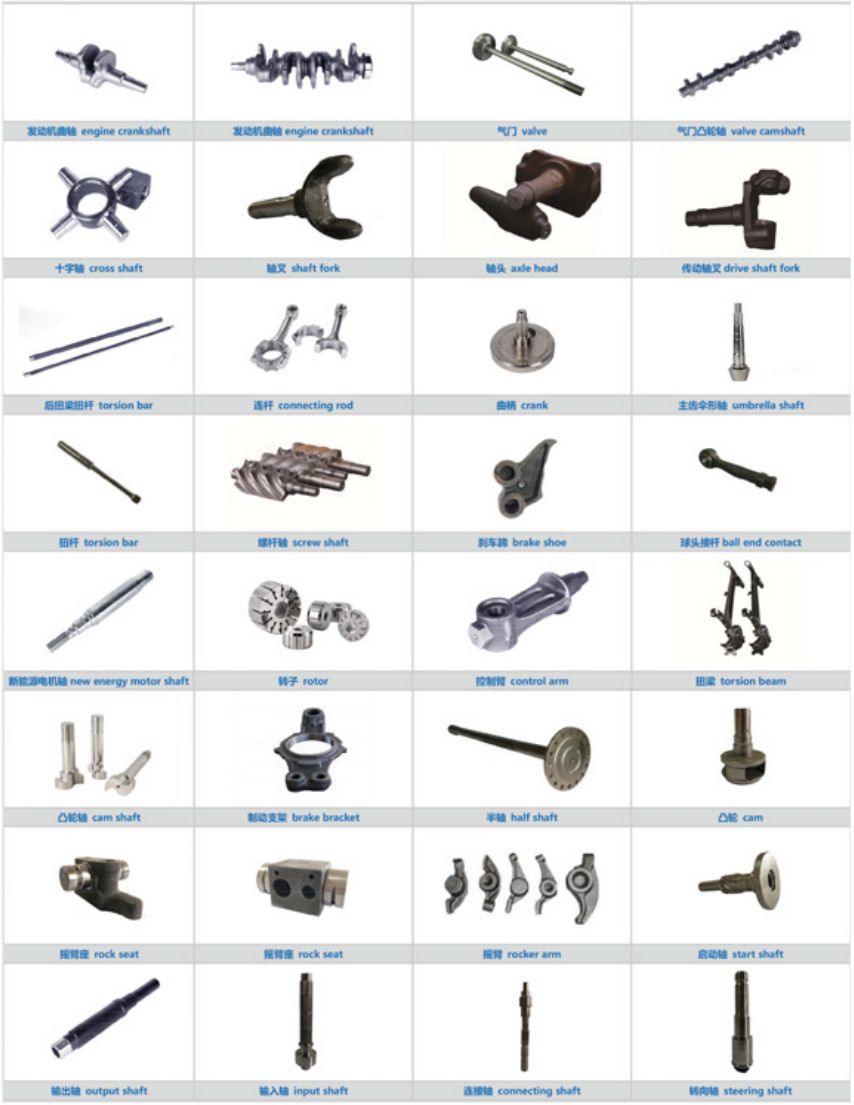
Oblique models can cover all vertical specifications: Vertical models under 1300mm have the advantages of small footprint and convenient operation; The tilt type can cover all vertical specifications, whereas the vertical type cannot.

机床型式 Machine type	优点 Advantage	缺点 Disadvantage
立式 Vertical 	1）占地面积较小，对于场地紧张的用户是不错的选择。 2）排屑效果好。 3）手动装夹工件位置与外防护距离短，操作便利。 1) Small area is a good choice for users with tight space. 2) Good debris removal effect. 3) Manual clamping of workpiece has short distance from external protection and is convenient to operate.	1）整体刚性不如斜式和卧式； 2）搭载桁架式机器人时抓手与夹具易产生干涉； 3）工件长度范围有限，一般在 1300mm 以内； 3）配双主轴时主轴刚性有限，单边铣削量一般在 4mm以内。 1) Integral rigidity is not as good as oblique type and horizontal type; 2) The gripper and clamp are prone to interfere when carrying the truss-type robot; 3) The length range of the workpiece is limited, generally within 1300 mm. 3) When equipped with double spindles, the rigidity of the spindle is limited, and the milling quantity on one side is generally within 4mm.
斜式 Oblique 	1）斜式整体框架床身，整体刚性较立式强。 2）排屑比卧式效果好。 3）手动装夹工件位置与外防护距离适中，较卧式操作便利。 4）配双主轴时主轴刚性好，单边铣削量可超过在 5mm。 5）可搭载桁架式和关节式机器人。 1) Oblique integral frame bed, with stronger overall rigidity than vertical one. 2) The effect of chip removal is better than that of horizontal type. 3) The position of manual clamping workpiece is moderate to external protection, which is more convenient than horizontal operation. 4) When equipped with double spindles, the rigidity of the spindle is good and the milling quantity on one side can exceed 5 mm. 5) It can carry truss robot and joint robot.	1）占地面积较立式大，不利于场地紧张用户选用。 2）排屑比立式差。 3）工件长度范围有限，一般在 1500mm 以内。 4）成本高于立式和卧式机型。 1) The area is larger than that of vertical type, which is unfavorable for users with tight site. 2) Chip removal is worse than vertical type. 3) The length range of work piece is limited, generally within 1500mm. 4) Cost is higher than vertical and horizontal models.
卧式 Horizontal 	1）整体框架床身，整体刚性最好。 2）配双主轴时主轴刚性强，单边铣削量可超过 6mm。 3）工件长度范围可超过 3000mm。 4）特别适合大型零件加工，装夹起吊方便。 5）可搭载桁架式和关节式机器人。 11) The overall frame bed has the best rigidity. 2) When equipped with double spindles, the rigidity of the spindle is strong and the single-sided milling can exceed 6mm. 3) The length range of the workpiece can exceed 3000mm. 4) It is especially suitable for processing large parts and is easy to install, clamp and lift. 5) It can carry truss robot and joint robot.	1）占地面积较立式和斜式大，不利于场地紧张的用户选用。 2）排屑效果较立式和斜式差。 3）手动装夹工件位置与外防护距离远，操作不便。 1) Cover area is larger than vertical and oblique type, which is unfavorable for users with tight site. 2) The effect of chip removal is worse than that of vertical and oblique type. 3) Manual clamping of workpiece is far away from external protection and inconvenient to operate.

铣端面钻中心孔机床 Facing and centering machine

加工实例 Sample show

Sample show 加工实例



定制专机

CUSTOMIZED BESPOKE MACHINE

8

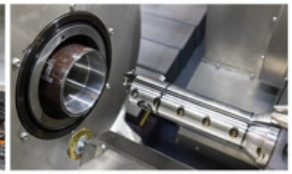
更多专机，欢迎垂询。

More bespoke machines, welcome contact.

定制专机 Customized bespoke machine

石油射孔短枪盲孔铣槽专机 Oil perforation blind hole milling bespoke machine

石油射孔枪钻盲孔、铣键槽加工 Oil perforating effort drilling blind hole and milling keyway



性能特点 Function features

- 一次装夹可完成石油射孔枪钻盲孔、铣键槽加工；
- 整体铸件机身、高刚性矩形淬硬导轨，经久耐用；
- 立式伺服分度转台+从动旋转转台，液压弹性夹具，分度精确，夹紧可靠，刚性强；
- 左右专用直角动力头，中间钻铣动力头，刚性强，对刀便捷；
- 特殊结构的高刚性耐用主轴。

- One clamping can complete oil perforating, gun drilling,blind hole and milling keyway pro-cessing
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Vertical servo indexing table + driven rotary table, hydraulic elastic fixture, accurate indexing, reliable clamping and strong rigidity;
- Special right-angle power head for right and left, drilling and milling power head for middle, strong rigidity and convenient tool alignment;
- High rigidity and durability spindle of special construction.

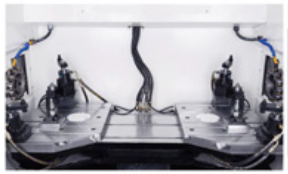
主要参数 The main parameters

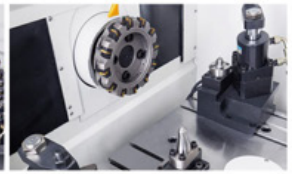
项 目	ITEM		X8212130
夹持直径范围	clamping diameter scope	mm	Ø70-Ø120
工件长度范围	workpiece length scope	mm	400-1300
盲孔加工	blind hole machining	mm	≤40
机床重量	weight	kg	7500
占地面积	length x width	mm	4200 x 1700

Customized bespoke machine 定制专机

Automobile torsion beam milling machine 汽车扭梁端面铣床

Milling face 汽车后扭梁焊接总成左、右轮毂安装端面的铣削





性能特点 Function features

- 一次装夹可完成汽车后扭梁焊接总成左、右轮毂安装端面的铣削；
- 整体铸件机身、高刚性矩形淬硬导轨，经久耐用；
- 专用液压夹具，夹紧可靠，精度稳定；
- 特殊结构的高刚性耐用主轴。

- Clamping one time can milling of left and right hub mounting end faces of automobile rear torsion beam welding assembly of automobile;
- Whole casting body, high rigidity rectangular hardened rails, durable;
- Special hydraulic self-centering, clamping reliable stable, stable accuracy;
- High rigidity and durability of special construtions.

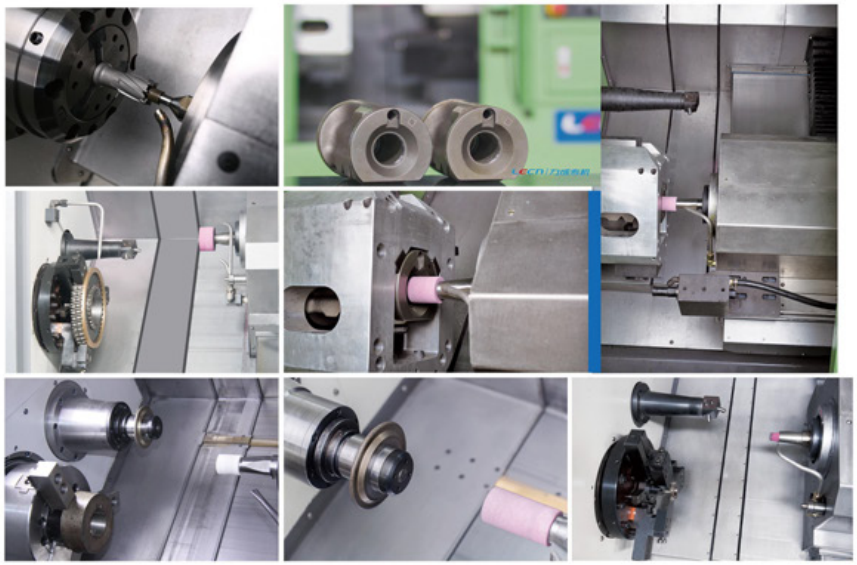
主要参数 The main parameters

项 目	ITEM		X8220125
工件长度范围	workpiece length scope	mm	1250-1550
前束调整量（单边）	toe-in adjustment (one side)	°	±3
外倾调整量（单边）	toe-out adjustment (one side)	°	±3
机床重量	weight	kg	7500
占地面积	length x width	mm	3500 x 1500

性能特点 Function features

- 45度斜背式高刚性机身、高速线性导轨，经久耐用；
- 专用夹具，夹紧可靠，精度稳定；
- 高刚性电主轴，抗震性好，寿命长；
- 伺服驱动金刚滚轮或金刚笔修整器，支持任意曲面；
- 可搭载桁架式或关节式机器人，支持自动化联线。

- 45 degrees hatchback body with high rigidity, high-speed linear guide rail, durable;
- Special fixtures, clamping reliable, stable accuracy ;
- High rigidity spindle, seismic resistance, long life;
- Servo-driven diamond wheel or diamond dresser to support any surface;
- Can carry with truss or joint robot and automatical line.



Machine video

主要参数 The main parameters

项 目	ITEM		MK2112
最大夹持直径	max clamping diameter	mm	Ø115
最大工件长度	max workpiece length	mm	150
最大磨削内孔直径	max grinding hole diameter	mm	Ø120
工件最大柄部直径	max workpiece handle diameter	mm	Ø40
砂轮直径范围	grinding wheel diameter scope	mm	Ø30- Ø50
机床重量	weight	kg	2800
占地面积	length x width	mm	2000 x 1600

专用机床发展及趋势
Development and trend of bespoke machine

背景

专用机床是一种专门适用于特定零件和特定工序加工的机床，是自动生产线生产制造系统中不可缺的机床品种。组合机床是专用机床的一种，它以标准化部件为基础，配以少量的专用部件组成。专用机床是一种“量体裁衣”产品，具有高效、工序集中等优点，是大批量生产企业理想的加工装备。

BACKGROUND

Bespoke machine is a kind of machine which is specially suitable for processing specific parts and processes and is an indispensable machine variety in the production and manufacturing system of automatic production line. Combination machine is a bespoke machine, which is based on standardized components and consists of a small number of bespoke components. Bespoke machine is a "tailored" product with advantages of high efficiency and centralized process. It

难点

■*技术难度大。*其集加工工艺、刀具、夹具、治具、检具、检验、测量、物流等于一体，一般为交钥匙工程，涉及技术领域宽且复杂，要一次性制造、一次成功，技术难度大。

■*经营风险事高。*专用机床一般根据用户订单“量体裁衣”制造，试制探索过程短，有较大的技术风险。包括技术方案不当，造成局部或整体报废；制造调试过程中出现问题，影响货期用户索赔；装备为某一用户定制，用户不能按时付款，造成制造企业资金压力；用户跑约，产品无法转让给人等。

■*协作困难大。*由于是小批量或单件制造，且货期短，难以寻找合适供应或协作商。

■*技术依赖性强。*专用机床从设计、工艺编制、生产制造到装配调试的全过程，都需要一批有经验的技术人员、管理人员和技术工人。

■*利润空间小。*如国外的某种产品价格为1，对通用机床国内的价格约为0.7左右，而国内专用机床的价格仅约为0.4-0.5。

■*技术成长期长。*专用机床的设计制造涉及专业面广，培养熟练的设计师，要花多年时间。

■*人员流动困难。*由于订单不均衡，会引起生产的不均衡，很难随时就地招聘到合适的技工。

■*技术引进困难，与国外合作难。*专用机床是定制设计制造，引进技术若仅供一次使用，则成本高。

DIFFICULTY

■Technical difficulties. It integrates processing technology, cutters, fixtures, fixtures, checking tools, inspection, measurement and logistics. It is generally a turnkey project, involving a wide and complex technical field. It is difficult to manufacture and succeed once.

■High operational risk rate. Special purpose machine tools are usually manufactured according to the customer order "tailor-made clothes", which has short trial-production exploration process and great technical risk. Including inappropriate technical solutions resulting in partial or total scrap; Problems occur during manufacturing commissioning, which will affect customer claims for due dates; The equipment is customized for a certain user and the user can not pay on time, which results in the financial pressure of the manufacturing enterprise. Users break contracts, products can not be transferred to others, etc.

特征

■*集成性。*集加工工艺（含工艺方法及工艺参数），机床、刀具、夹具、治具及检具的开发设计与选择，检验测量（包括毛坯、加工中及成品的检验测量），物流输送，切屑、冷却及防护与处理等于一体。它不仅仅解决其中的某一问题，而是要解决好涉及较宽的技术领域可能遇到的每一个问题。

■*单一性。*专用机床几乎都是单台性生产，要根据用户提出的要求，进行一次性开发，一次性制造，而且还要保证一次性成功。

FEATURES

■Integrated. Set processing technology (including process methods and process parameters), development, design and selection of machines, cutters, fixtures, fixtures and inspection tools, inspection and measurement (including inspection and measurement of blanks, processing and finished products), logistics transportation, chips, cooling and protection and treatment are all in one. It not only solves one of these problems, but also solves every possible problem involving a wide range of technical areas.

■Uniformity. Bespoke machines are almost single-set production. According to the requirements of users, one-time development and one-time manufacturing should be carried out, and one-time success must be guaranteed.

LECN

■Collaboration is difficult. It is difficult to find suitable suppliers or collaborators due to small batches or one-piece manufacturing and short lead times.

■Strong technical dependence. A batch of experienced technicians, managers and technicians are required for the whole process of special machine tools from design, process preparation, production and manufacturing to assembly and commissioning.

■Low margin. If the price of a foreign product is 1, the domestic price for general purpose machine tools is about 0.7, while the domestic price for special purpose machine tools is only about 0.4-0.5.

■Technology has a long history of growth. The design and manufacture of special machine tools involves a wide range of specialties. It takes many years to train skilled designers.

■ Difficult movement of personnel. Unbalanced orders can lead to uneven production, making it difficult to recruit the right mechanics anywhere and anytime.

■It is difficult to import technology and cooperate with foreign countries. The special machine tool is designed and manufactured by customization. If the introduced technology is used only once, the cost is high.

定制专机技术及选型
Customized bespoke machine technology and selection

专机定制
Bespoke machine customization

用户定制专机前提

▲用户能够提供加工零件完整图纸和技术要求。
▲用户对加工零件加工内容及加工要求要明确。
▲用户对加工零件的毛坯或前序尺寸、公差及热处理状态能够控制。
▲用户最好对加工零件的加工工艺有较为全面的了解或能提供成熟或类似案例。
▲用户最好对加工零件的夹具、刀具等有较为全面了解或能提供成熟或类似案例。
▲用户对是否配置或后续是否配置自动化要明确。
▲用户对单机生产还是联线其它设备在自动线生产要明确。

CUSTOMIZED PREREQUISITE

▲Users can provide complete drawings and technical requirements for machined parts.
▲Users should be clear about the processing content and requirements of the processed parts.
▲The user can control the blank or pre-order size, tolerance and heat treatment status of the processed parts.
▲It is best for the user to have a comprehensive understanding of the processing technology of the processed parts or to provide mature or similar cases.
▲Users are better to have a comprehensive understanding of the fixtures, cutters, etc. of the machined parts or to provide mature or similar cases.
▲Users need to be clear about whether to configure or whether to configure automation later.
▲Users should be clear about whether to produce on single machine or on automatic production line of several machines.

力成专机制造优势

■力成拥有二十多年专机制造经验，拥有机、电、液及自动化专业技术团队，能够提供交钥匙工程和全面解决方案。

■力成拥有模块化专机部件并批量库存，一般只需定制夹具、刀具即能快速投产，快速交付。

■力成拥有多种功能模块可供选择，如单或双主轴动力头，油压或伺服分度头，皮带式主轴或电主轴，桁架式或关节式机器人等，提供简单、实用、性价比高的专机以满足用户需求。

■力成拥有较为完善数控系统、功能部件以及外协加工配套商，可第一时间组织物料，快速装配。

■力成定制专机基本都能配置力成原厂自动化，桁架式或关节式机器人可选。

■力成可提供成本估算、工艺策划、试样、查询测绘、产线规划等延伸服务。

MANUFACTURING ADVANTAGE OF LECN BESPOKE MACHINE

■ LECN has more than 20 years of specialized manufacturing experience and a team of specialized technical teams in mechanics, electronics, hydraulics and automation to provide turnkey engineering and comprehensive solutions.

■ LECN owns modular dedicated machine parts and batch inventory. Generally, only customized fixtures and tools are needed to put them into production and deliver them quickly.

■ LECN has a variety of functional modules to choose from, such as single or dual spindle power head, oil pressure or servo indexing head, belt spindle or spindle, truss or articulated robot, etc., to provide a simple, practical and cost effective dedicated machine to meet user needs.

■ LECN has relatively perfect CNC system, functional components and processing aids, so it can organize materials and assemble quickly in the first time.

■ LECN customized special machines can basically be configured with factory automation, truss or articulated robots are optional.

■ LECN provides extended services such as cost estimating, process planning, sample plotting, inquiry mapping, production line planning, etc.

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