HDMECH
海德马克

数控径碾环机生产线
CNC Radial forging machine production line

青岛海德马克智能装备有限公司
Qingdao HDMECH Intelligent Equipment Co.,LTD.

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HDMECH
QINGDAO HDMECH INTELLIGENT EQUIPMENT CO.,LTD

精细化的产品 国际化的海德马克

www.hdmech.com

公司简介 Company Profile

青岛海德马克智能装备有限公司（“海德马克”或“公司”）原青岛华东工程机械有限公司，成立于1994年10月28日，注册资金6166万元，位于青岛市高新技术产业开发区春阳路北侧、思源路西侧，公司厂区占地面积13.9万平方米（208亩），总资产3.57亿，现有员工170余人。

海德马克，是一家从事智能化生产线、机器人、物联网技术研发、设计、制造、销售、服务于一体的国家高新技术企业。主要产品包括：冰箱（冷柜）智能化生产线、洗衣机智能化生产线、油烟机智能化生产线、热水器智能化生产线、工业机器人、智能无人高精密锻造操作装备、径锻机、智能数控碾环机、智能数控热处理装备等。

海德马克，先后服务于海尔、海信、美的、澳柯玛、TCL、GE、格力、倍科、一重、二重、上重、太重、沈重、大连华瑞、无锡叶片、马钢、宝钛以及德国罗特艾德等知名企业。

Qingdao HDMECH Intelligent Equipment Co. Ltd. (“HDMECH") Qingdao Huadong Engineering Machinery Co. Ltd., founded in October 28, 1994, registered capital of 61.66 million yuan, is located in Qingdao high tech Industrial Development Zone, between the north of Chunyang Road, and the west of Siyuan Road, the company covers an area of 139 thousands square meters (208 acres), with total assets of 357 million and enrolled employees more than 170.

HDMECH, is a national high-tech enterprise engaged in the R&D, designing, manufacturing, sales of home appliance intelligent production line, robot, internet of things technology. The main products include: refrigerator (freezer) intelligent production line, wash machine intelligent production line, kitchen ventilator intelligent machine production line, heater intelligent production line, intelligent unmanned-operation high precision forging equipment, industrial robots, intelligent CNC ring rolling machine, radial forging machine, intelligent CNC heat treatment equipment etc..

HDMECH has been supplied production line for Arcelik, Haier, Hisense, Midea, AUCMA, GREE, TCL, GE, and CFHI , CNEG, TAYOR,TYHI,NHI, DHHI, WTB, MIS, BaoTi and Germany Rothe Erde and other famous enterprises.

国家高新技术企业
山东省企业技术中心
青岛市液力装备工程技术研究中心
多个创新研发项目列入国家、省市重点技术创新项
60t数控重载锻造操作机技术被列入2010年度国家火炬计划
1000kg全液压重载机器人项目列入国家扩大内需重点资金支持项目
智能无人高精密锻造操作装备（800KN）被评为2015年度山东省首台套技术装备
260t锻造操作机项目获得青岛市重点技术攻关项目
数控精密锻造基层技术研发，被列入青岛市关键技术攻关计划
“18MN径向锻造压机、径向锻造操作机”被认定为2014青岛市企业技术创新重点项目
冷柜全自动钣金铆接线开发被列入青岛市企业技术创新重点项目计划
对开门冰箱门壳自动化生产线的开发被列入青岛市企业技术创新重点项目计划
洗衣机全自动内筒成型线的开发被列入青岛市企业技术创新重点项目计划

National high-tech enterprise
Shandong Enterprise Technology Center
Qingdao hydraulic equipment Engineering Technology Research Center
A number of innovative R & D projects included in the national, provincial key technological innovation projects
60t CNC heavy duty forging manipulator technology was included in the 2010 National Torch Program
1000kg all hydraulic heavy duty robot project included in the national expansion of domestic demand key funding projects
Intelligent unmanned operation high precision forging equipment (800KN) was named the 2015 annual Shandong province first sets of technical equipment
The project of 260t forging machine has been awarded the key technical project of Qingdao
CNC precision forging technology research and development, has been included in the key technology projects in Qingdao
"18MN radial forging press, radial forging manipulator" was identified as the 2014 Qingdao enterprise technology innovation key projects
Refrigerator automatic sheet metal rivet line development was included in the key projects of Qingdao city enterprise technology innovation plan
The development of the automatic door shell production line of the French door refrigerator was included in the key project of Qingdao enterprise technology innovation
The development of full automatic washing machine drum forming line of was included in the key project of enterprise technology innovation in Qingdao

技术专利
Technology Patents

装料取料伺服仿真机械手发明专利
生产线传输对中机构及其方法发明专利
金属板料滚边装置及其方法发明专利
机械手及其夹持方法发明专利
钣金件复合加工模具及其方法发明专利
装出料机及其控制方法发明专利
机械手控制系统及控制方法发明专利
自动对中装置、对中方法及带有此装置的仿真手柄发
冰箱隐形门折弯模具及其折弯方法发明专利
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Patent of loading and reclaiming servo simulation manipulator
Patent of production line transmission centering mechanism and method
Patent of sheet metal rolling device and method
Patent of manipulator and its clamping method
Patent of sheet metal part composite machining die method
Patent of charging and discharging machine and its control method
Patent of Robot control system and its control method
Patent of automatic centering device, centering method, and simulation handle with this device
Patent of refrigerator invisible door bending die and its bending method

荣获100多项国家发明专利及实用新型专利 Won more than 100 national invention patents and utility model

合作与交流
Cooperation and Exchange

公司一直与上海交通大学、燕山大学、中国海洋大学、济南铸锻所、中国重型机械研究院、马钢设计院等高校及科研院所保持着长期战略合作关系，通过与高校和科研院所的交流与合作提高技术创新能力。

HDMECH has maintained long term strategic relationship with Shanghai Jiao Tong University, Yanshan University, Ocean University of China, Ji'nan JFMMRI, Chinese Heavy Machinery Research Institute, Maanshan Institute and other universities and research institutes, and to improve the technological innovation capability through the exchange and cooperation with universities and research institutes

卧式数控辗环机
Horizontal CNC ring rolling machine

Perfect Product / International Hdmech
精细化的产品 / 国际化的海德马克

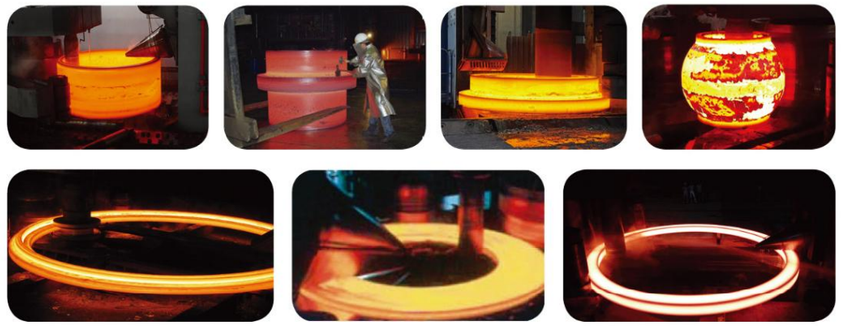
HDMECH 海德马克

应用条件 Application：

当所需辗扩的环件直径范围较大、需要径轴向同时轧制，建议采用卧式数控辗环机。
When the diameter of the ring is large and the ring is needed to be rolled simultaneously, it is suggested to adopt the horizontal CNC ring rolling machine.

技术特点Technical features：

该种辗环机具备可辗扩范围广的特点，尤其是超大直径范围的环件。
This ring rolling machine has the characteristics of wide range of rolling, in particular to a ring with a large diameter range.



分类Classification：

卧式数控辗环机分为上抽式数控辗环机和上盖式数控辗环机。
Horizontal CNC ring rolling machine is divided into the upper extracting and the top covering ring rolling machine.

结构形式如下Structure as followed:

上抽式数控辗环机 Upper extracting ring rolling machine

上盖式数控辗环机 Top covering ring rolling machine

机器类型 Machine Size	轧制环件尺寸 Ring Data				机器参数 Machine Data			
型号 T ype D53k	直径 范围 OD Standard mm	最大 壁厚 WT Max. mm	环件 高度 Hight mm	最大 重量 Weight Max. kg	轧制力 Roling Force		驱动功率 Drive power	
					径向 Radial KN	轴向 axial KN	径向 Radial KW	轴向 axial KW
250/200-4000/600	630-4000	300	80-600	5000	2500	2000	2×315	2×315
315/250-5000/800	800-5000	350	80-800	8000	3150	2500	2×400	2×400
400/315-6300/1000	1000-6300	400	100-1000	10000	4000	3150	2×500	2×500
500/400-7000/1200	1200-7000	500	100-1200	15000	5000	4000	2×630	2×630
630/500-8000/1600	1600-8000	630	120-1600	20000	6300	5000	2×800	2×800
800/630-9000/2000	1600-9000	800	120-2000	30000	8000	6300	2×1000	2×1000
1000/800-10000/2500	2000-10000	900	120-2500	50000	10000	8000	2×1250	2×1250
1250/1000-12000/3000	2500-12000	1000	160-3000	63000	12500	10000	2×1500	2×1500
1600/1250-15000/4000	2500-15000	1250	160-4000	80000	16000	12500	2×2000	2×2000

规格系列（上抽式） Specification series （Upper extracting ring rolling machine）

机器类型 Machine Size	轧制环件尺寸 Ring Data				机器参数 Machine Data			
型号 T ype D53k	直径 范围 OD Standard mm	最大 壁厚 WT Max. mm	环件 高度 Hight mm	最大 重量 Weight Max. kg	轧制力 Roling Force		驱动功率 Drive power	
					径向 Radial kn	轴向 axial kn	径向 Radial kw	轴向 axial kw
50/40-630/200	250-630	100	60-200	100	500	400	125	125
63/50-800/250	250-800	125	60-250	200	630	500	160	160
80/63-1250/300	300-1250	160	70-300	500	800	630	200	200
100/80-1600/350	350-1600	200	70-350	800	1000	800	250	250
125/100-2000/400	400-2000	220	80-400	1250	1250	1000	315	315
125/125-2500/450	500-2500	250	80-450	2000	1600	1250	400	400
125/160-3000/500	600-3000	280	80-500	3000	2000	1600	500	500

规格系列（上盖式）Specification series（Top covering ring rolling machine）

立式数控辗环机

Vertical CNC ring rolling machine

Perfect Product / International Hdmech

精细化的产品 / 国际化的海德马克

HDMECH 海德马克

应用条件 Application condition：

当所需辗扩的环件直径范围较小、不需要轴向轧制，建议采用立式数控辗环机。
When the diameter of the ring is small and the axial rolling is not needed, it is suggested to adopt the vertical CNC ring rolling machine.

技术特点Technical features：

该种辗环机具备操作灵活、占地面积小的特点。
This kind of ring rolling machine has the advantages of flexible operation and small occupation area.

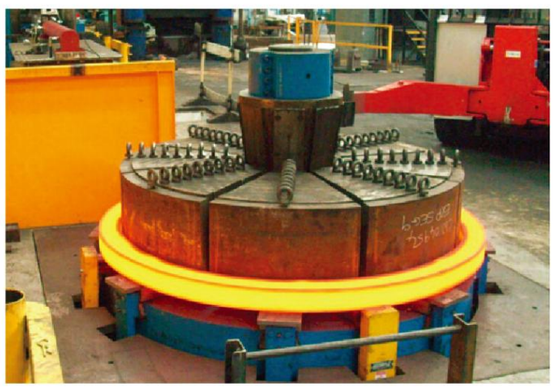
结构形式Structure as followed：

生产线上的辅助设备Auxiliary equipment on production line

液压机 Hydraulic press

精整机 Ring expanders

精整机 Ring expanders



数控径向锻造压机生产线

CNC Radial forging machine production line

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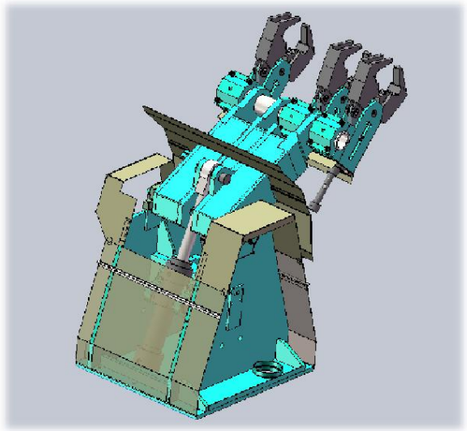
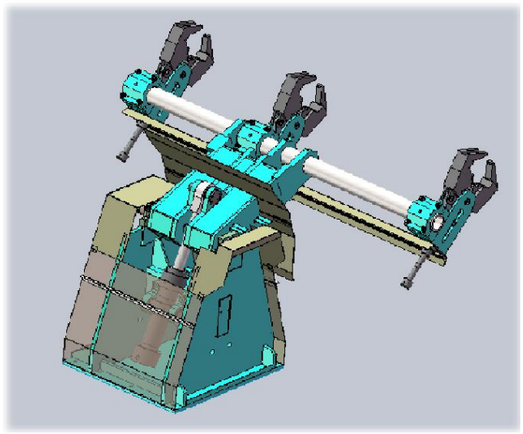
上下料装置 Loading/unloading



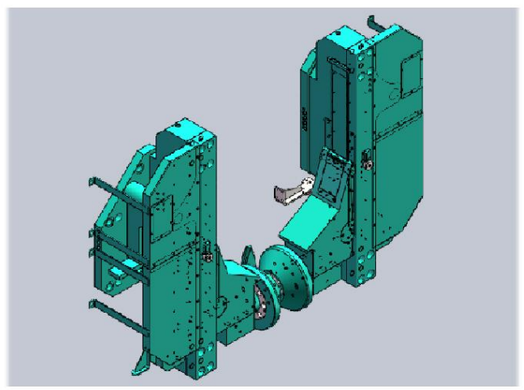


工件自动上下料装置包括上料装置及下料装置。
上料装置将锻造坯料从专用辊道台翻转到设备轴线上，工件由夹头“A”夹持。
锻造操作结束后，下料装置将工件从夹头“B”中卸下并将其存放到专用辊道台上。
工件的最大和最小重量和长度根据工艺数据而定。
对于超长工件的横向下料，工件可以穿过夹头”B”的空心轴用天车手动下料。

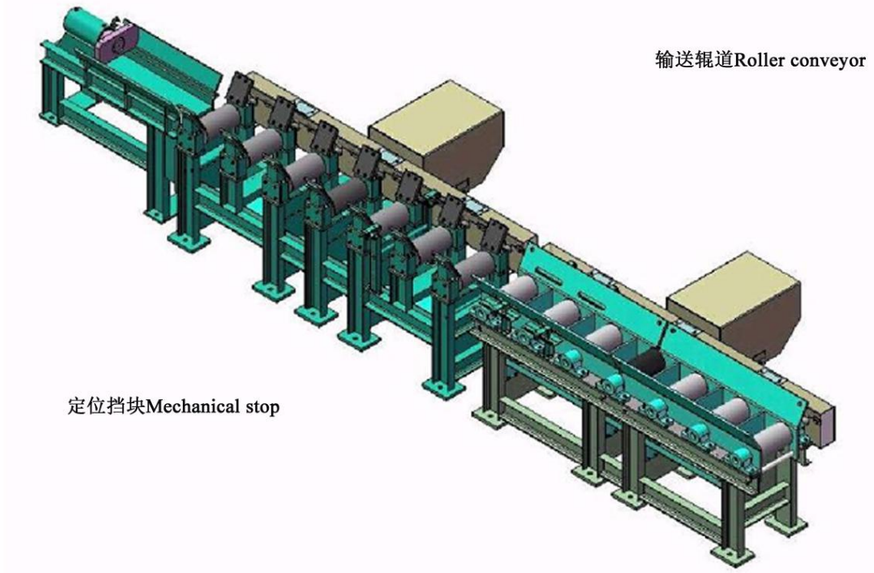
Automatic Loading/unloading equipment includes Loading equipment and unloading equipment.
The Loading equipment will load the work pieces from the Roller conveyor to the manipulator axis, the work piece is clamped by manipulator "A".
After the forging operation, unloading equipment will unload the work piece from manipulator "B" to unloading roller
Maximum and minimum weight and length of work piece is based on process data
For the long work piece material, the work piece can be manually feeding with the crane hollow shaft passes through the manipulator "B"

工件对中装置 Centering Device

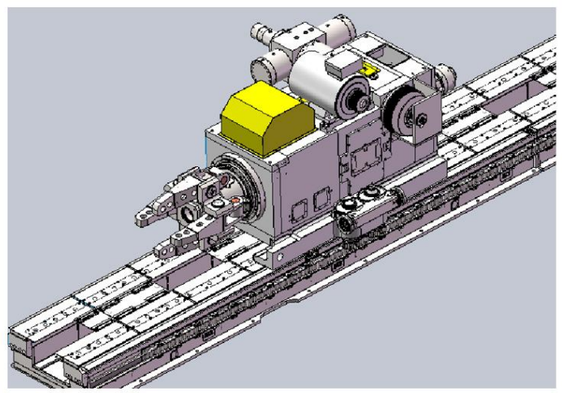
在精锻机的两边，各安装一个工件对中装置，用以保证锻件轴心与数控快锻机中心同心，对于不同规格的工件，均可自动、可靠定心。
One centering device each is arranged on either side of the forging unit. The centering tongs are actuated hydraulically and serve to the guiding of the work piece in it’s correct axis into the forging dies and to support the work piece when it leaves the forging dies.



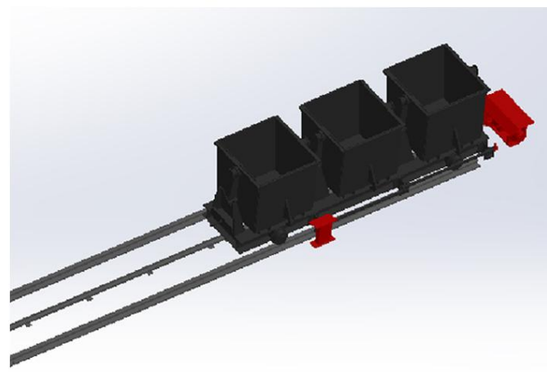
运输辊道 Roller conveyor



轨床 Guide Bed



废料小车 Waste scrap trolley



数控径向锻造压机生产线

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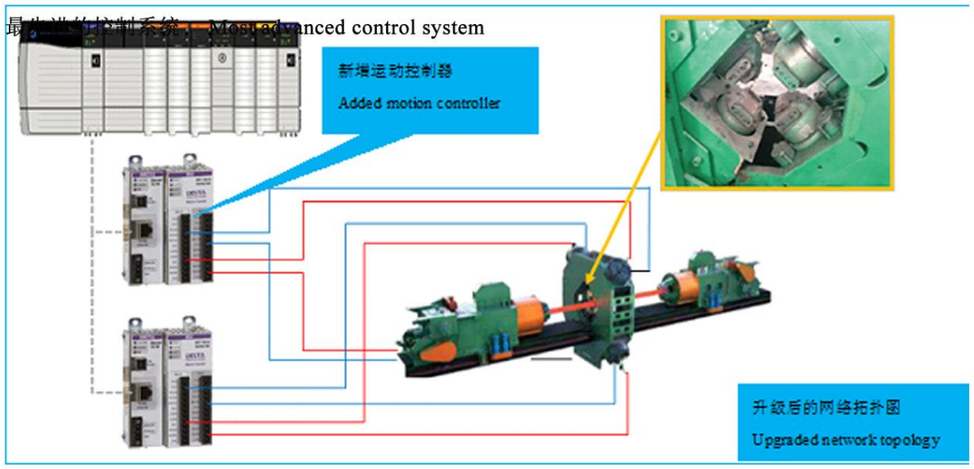


最先进的控制系统 Most advanced control system

针对精锻机高频次（≥240次/min）、高精度（≤±0.3mm）下的各锤头同步、锤头与操作机同步、两操作机同步都需要对过程进行精确控制的要求，精锻机和操作机上面的各个轴向伺服液压驱动的控制，是由运动控制器实现的，并具有如下优点：

For precision forging machine high frequency (over 240 /min), high precision (less than 0.3mm) of the hammer under the hammer and machine operation synchronization, synchronization, two machine synchronization needs the precise control of the process requirements of various axial servo hydraulic forging machine and machine operation above drive control is realized by motion controller. And has the following advantages

1) 超强的运算速度 High computing speed

2) 先进的闭环控制算法Advanced closed loop control algorithm

先进的闭环控制算法，包含高级微分分量增益。在同样的液压系统下，可以达到最优的闭环控制精度。
Advanced closed loop control algorithm, including advanced differential component gain. Under the same hydraulic system, the optimal closed-loop control precision can be achieved

3) 先进的液压数学模型Advanced hydraulic mathematical model

根据液压系统控制特点，引入多个液压系统参数到控制系统中，建立了先进的液压数学控制模型，实现了液压系统快、准、稳的定位需求。
According to the characteristics of hydraulic system control, a number of hydraulic system parameters are introduced into the control system, and an advanced hydraulic mathematical model is established

4) 内置针对液压运动控制的自动优化工具 Built in automatic optimization tool for hydraulic motion control

由于精确的数学模型建立，可以通过手动示教功能，较为准确的计算出液压伺服系统控制参数。
Because of the accurate mathematical model, the control parameters of the hydraulic servo system can be calculated accurately by manual teaching function

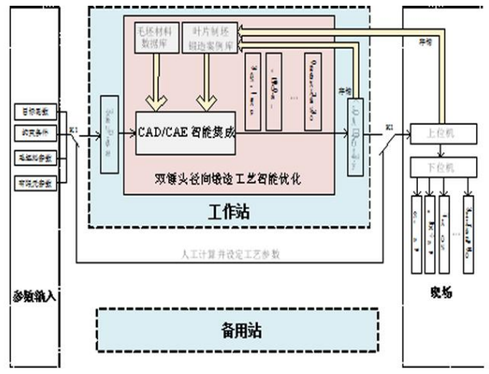
智能工艺软件 Intelligent technology software

该智能工艺软件包括毛坯材料数据库、制坯锻造实例库以及神经网络智能集成技术。
The Intelligent technology software includes blank material database, billet forging case database and neural network intelligent integration technology

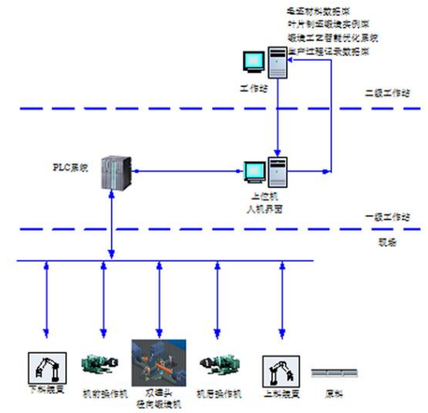
该智能工艺软件是以毛坯材料数据库、制坯锻造实例库为基础，应用神经网络、最优化控制、人工智能、软件科学、塑性力学、有限元模拟、计算机控制技术等多学科集成化的先进智能设计系统。
The Intelligent technology software is a blank material database, billet forging case base as the basis, advanced intelligent design system based on neural network, optimization control, artificial intelligence, software science, plastic mechanics, finite element simulation, computer control technology and other disciplines integration.

可以实现寻找最优的工艺生产参数（部分设置可以人工干预），进而提高径向锻造工艺及各种制坯件的质量和效率。
Can realize the production process to find the optimal parameters (Partial settings can be artificially intervened) and improve the radial forging process, and its blank quality and efficiency.

该软件的应用将极大提升智能制造水平。
The application of the software will greatly enhance the level of intelligent manufacturing.



径向锻造工艺智能优化系统组成图
Composition of intelligent optimization system for radial forging process



智能锻造工艺系统网络结构
Network structure of intelligent forging process system