

HUAHENG

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HUAHENG
昆山华恒焊接股份有限公司
HUAHENG WELDING CO., LTD.

地址：江苏省昆山市博士路1588号 邮编：215347
Add: No.1588 Boshi Road, Kunshan, Jiangsu, P.R.China. PC:215347
Tel: 0512-81866666 Fax: 0512-57328188
E-mail: info@huahengweld.com www.huahengweld.com

昆山华恒切割系统有限公司
KUNSHAN HUAHENG CUTTING
SYSTEMS CO., LTD.

地址：江苏省昆山市吴淞江北路99号 邮编：215300
Add: No. 99 Wusongjiang North Road, Kunshan, Jiangsu, P.R.China PC: 215300
Tel: 0512-81866666 Fax: 0512-50139612

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自动化切割系统
Automatic Cutting Systems

企业简介

Company Introduction

昆山华恒焊接股份有限公司，是中国最早从事焊接、切割自动化装备开发、制造的国家级高新技术企业，是一个在弧焊工艺技术、工业机器人、自动化、智能化装备领域提供一体化解决方案的中国领先者。

企业在昆山、徐州、长沙建有60000m²的生产基地，现有员工800多人，先进、齐全的生产设备、检测仪器300多台套，企业通过中国强制性产品（CCC）认证、质量管理体系（DIN ISO9001）认证、软件成熟度（CMMI-3）认证。企业主导产品-“全位置管焊设备”、“焊接自动化专用设备”、“中厚板钢结构件焊接机器人成套装备”的产销量均居国内之首。先后获得国际发明博览会金奖、江苏省科技进步奖、江苏省优秀新产品金奖、江苏省软件产品金慧奖和江苏省名牌产品等荣誉。

企业在昆山建有16000m²的研发基地，拥有江苏省焊接自动化装备高技术研究重点实验室、江苏省机器人自动化装备工程实验室，企业博士后科研工作站，具有国际先进水平的实验、仪器设备200多台套。先后承担并完成国家863计划、国家重大科技专项、国家火炬计划、国家重点新产品计划等一批国家级的研发项目，拥有71项授权专利（其中发明专利18项）和44项软件著作权，成为中国工业机器人、焊接自动化领域研发的主力军。

企业上海设有国际销售中心，在全国各地设有88家销售、代理和服务网点，为用户就地提供高效、快捷的服务。企业产品已广泛应用于工程机械、航空航天、船舶、海洋工程、轨道交通、能源、化工、核电、军工、医药、轻工、矿山机械等各个领域，并出口美国、欧洲、印度、巴西和东南亚等国家。

HUAHENG WELDING Co., Ltd. is one of the biggest companies in China engage in automatic cutting and welding equipment manufacture and welding system integration. As the lead of company in China, we supply integrated solutions for argon arc welding, industrial robots, automatic, and intellectualization.

HUAHENG owns 60000m² production base in Kunshan, Xuzhou and Changsha, 300 sets of advanced production equipments and test instruments. We got CCC certificate, DIN ISO9001 and CMMI-3 certificate. The production and sales volume of our main products "orbital welding equipment", "automatic welding equipment" and "robot welding equipment for steel structure plate" are No.1 in Chinese market. We are awarded honors of "International invention exposition", "Jiangsu Science and technology progress prize", "Jiangsu new products gold medal", "Jiangsu software products JinHui award", "Jiangsu famous brand products" and so on.

HUAHENG owns 16000m² R&D center, Jiangsu automatic welding equipment library, Jiangsu automatic robot library and postdoctoral work-station. Till now, 200 sets of test equipments and instruments with advanced international level. We undertook and finished "national 863 plans", "national key technical", "national torch program", "national key new products program" and other national R&D programs. We own 71 patents (including 18 invent patents), and 44 software copyright. We are main force for research and development of Chinese industrial robot and automatic welding.

We have international center in Shanghai, 88 sales center, agent and service network in China, which are providing high efficient and fast service locally for the customers. Our products are mainly used in engineering machinery, Aeronautics and Astronautics, vessel industry, ocean engineering, Rail Transit, energy, chemical, nuclear, military, medicine, light industry, mining machinery and so on. Our products have also been sold to overseas, like America, Europe, India, Brazil, Southeast Asia and so on.



机器人切割 Robot Cutting System



● 坡口切割 Beveling Cutting

- 6轴~7轴联动
- 机器人可以纵向行走
- 主要用于平面切坡口。可对不同厚度的直线、曲线进行“I”、“X”、“Y”、“V”、“K”的坡口切割
- 可选等离子或火焰切割
- Six axis to seven axis synchronized robot cutting system
- Robots can longitudinal travel
- Mainly used for bevel cutting plane. For different thickness, line, curve type "I", "X", "Y", "V", "K" beveling cutting
- Optional Plasma cutting or Flame cutting

机器人封头切割 Beveling Head Cutting



● 机器人封头切割 Beveling Head Cutting

- 6轴~9轴联动机器人系统
- 可根据封头大小具体配置
- 主要用于压力容器封头切割
- 可选择等离子、火焰或激光切割
- Six axis to nine axis synchronized robot cutting system
- According to head the size of a specific configuration
- For pressure vessel head cutting
- Optional Plasma 、Flame or Laser cutting



● 型材轮廓切割机
Profile Contour Cutting Machine

- 6轴~9轴联动的机器人系统
- 主要针对各种型钢如角钢、槽钢、H型钢、球扁钢等进行空间切割
- 可选择等离子或激光切割
- Six axis to nine axis synchronized robot cutting system
- Mainly for all kinds of steel like angles, channels, H-beam, the ball flat, etc. space cutting
- Optional Plasma or Laser cutting



数控火焰等离子切割机

Procut plasma & flame cutting machine



- 此款切割机是一种精密的重型数控切割机，该机型是高切割精度和生产效率的完美结合，可适用于火焰和等离子切割。
- Product is a heavy duty CNC cutting machine with precise structure. High cutting accuracy and product economy are perfectly combined for both oxy-fuel and plasma applications.

技术参数

Technical Parameters

轨距	Track Span (mm)	3000	3500	4000	4500	5000	6000	7000	8000
切割宽度*	Cutting width (mm)	2200	2700	3200	3700	4200	5200	6200	7200
整机宽度*	Overall width (mm)	4000	4500	5000	5500	6000	7000	8000	9000
驱动速度	Drive speed	12000mm/min							
割炬最多配置	Max. No. of heads	6(其中可配2个等离子 2 plasma available)							
*会随割炬数量而变化		May change by the number of torches							

集成数控切割机

Finecut plasma cutting machine



- 此款切割机是一种高速、精密、等离子数控切割机，采用一体式模块化结构，使安装迅速、方便。配抽烟工作台、除尘器，以达到环保排放要求。
- Finecut is a high speed, high accuracy CNC plasma cutting machine. It features compact modular construction for easy and fast installation and commissioning. A fume extraction table is optionally available to satisfy environment requirements.

技术参数
Technical Parameters

型号Model	6020	4020	3015
有效切割范围 Effective working area (mm)	6000x2000	4000x2000	3000x1500
整机宽度 Overall width (mm)	3200	2000	
驱动速度 Drive speed	0-12000mm/min, 0-24000mm/min, 0-50000mm/min		
割炬最多配置 Max. No. of heads	1		

火焰等离子切割机

Easy Cut



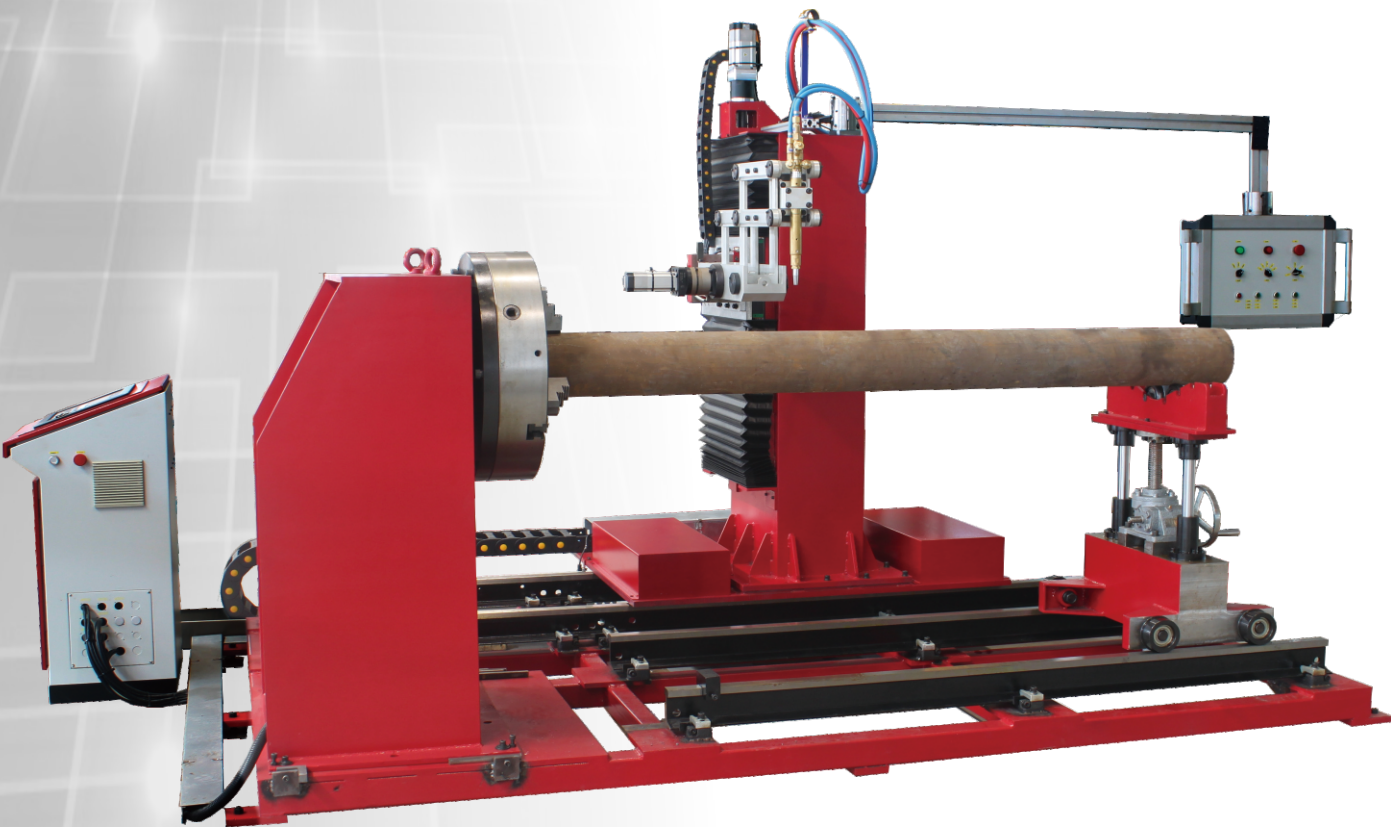
- Easycut、Easycut Plus是中小尺寸、多功能的精密火炬等离子切割机，搭配海宝EDGE Connect可实现精密小圆孔切割。
- This machine is small and medium sized CNC flame&Plasma Using Hypertherm SensorTHC can realize "True-hole".

技术参数
Technical Parameters

类型		参数	
工作宽度A	Working width	mm	A=B*500
轨距B	Track Span	mm	2100、2600、3100、3600
最大宽度C	Maximun width	mm	B+650
轨长	Track length	根据客户需求 According to customer demand	
工作长度	Working length	轨长	Tracklength-1500mm
最大运行速度	Max speed	6m/min	12m/min

数控相贯线切割机

Pipecut cutting machine



●该系列数控相贯线切割机是一种对钢管和有色金属管子的结合处相贯线孔、相贯线端部、弯头（虾米节）进行自动计算和切割的设备。该机广泛运用于建筑、化工、造船、工程机械、冶金、电力等行业的管道结构件的切割机。数控相贯线切割机能十分方便的切割加工此类工件，无需操作计算、编程，只需输入管道相贯系统的管子的相贯线、相贯线孔及焊接坡口。

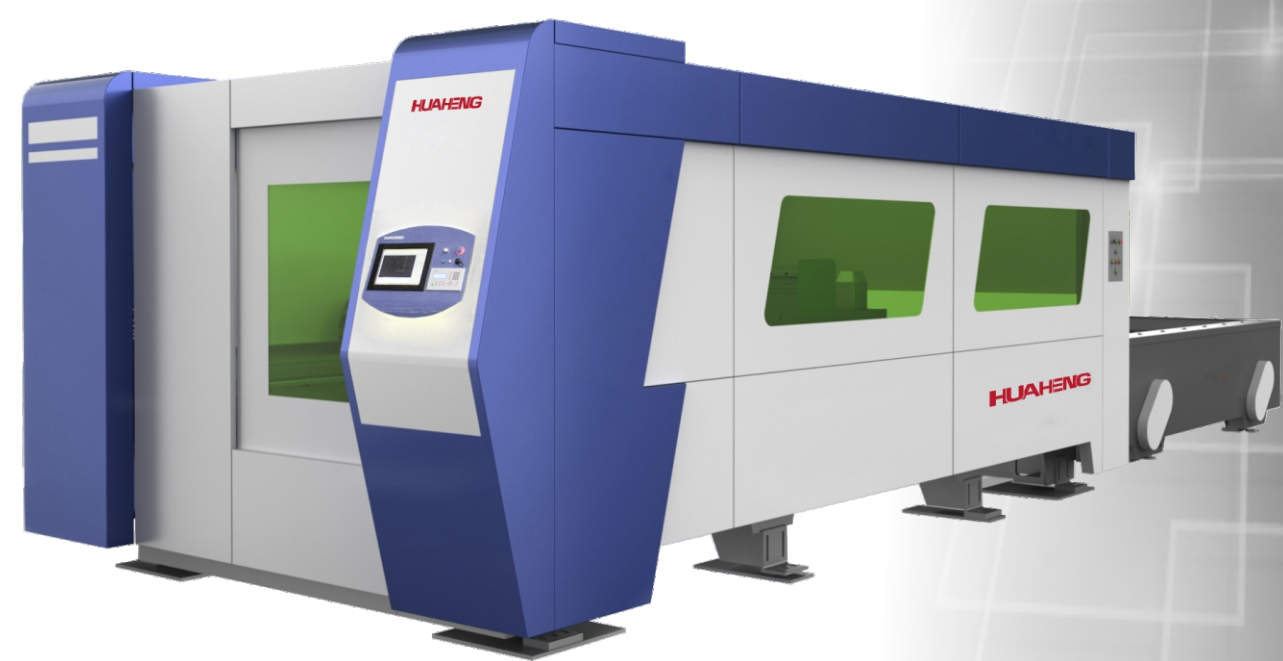
技术参数

Technical Parameters		
控制轴数 Axis	2-6轴 2-6 axis	
切割外径 OD	mm	50-1500
切割长度 Length	mm	2000-18000
切割厚度 Thickness	mm	5-60
最大载重 Max. payload	KG	8000
割炬组数 Torch No.	等离子/火焰 Plasma/Oxy-fuel	
切割速度 Cutting speed	mm/min	80-2500
空行速度 Idle speed	mm/min	0-10000
切割方式 Cutting method	等离子/火焰 Plasma/Oxy-fuel	
切割坡口 Bevel	V/Y ±45°（等离子 Plasma）±60°（火焰 Oxy-fuel）	
坡口规范 Bevel standard	美国AWS/ 定角/变角AWS/fixed bevel/adjustable bevel	

The system is used for steel pipe or nonferrous pipe intersection position, profile position edge, elbow etc. automatic calculation and cutting. It is mainly used for pipeline structural component cutting in building construction, chemical engineering, ship building, construction machinery, metallurgy, electric power industries etc. CNC profile cutting machine is very convenient for the work-piece mentioned above, no operation calculation requirement, skilled programming, only profile intersection position, hole position and bevel position required

重型光纤激光切割机

Heavy Fiber Laser Cutting Machine



- 昆山华恒切割系统有限公司开发的激光切割机，采用IPG光纤激光，转换效率可达30%，这比传统激光的电光转换效率高出了好几倍，同时光纤激光器具有超常的可靠性、优秀的光束质量、综合使用费用低、体积小等一系列优点。结合高性能的控制系统、高精度的机械结构，表现出优秀的切割品质与效率。
- HUAHENG Fiber Laser Cutting Machine adopts IPG Fiber Laser with up to 30% wall-plug efficiency, which is several times higher than conventional lasers. In addition, fiber laser also provides numerous advantages such as high reliability, fine beam quality, low overall cost, high compactness, etc. Integrated with high feature control system and rigid mechanical structure, HUAHENG is a high-quality & high-efficiency cutting expert.

设备型号Model		FiberLaser3015H 系列	FiberLaser4020H 系列	FiberLaser6020H 系列
有效范围 Effective stroke	X轴X axis	1500mm	2000mm	2000mm
	Y轴Y axis	3000mm	4000mm	6000mm
	Z轴Z axis	300mm	300mm	300mm
最大速度 Rapid speed	X轴X axis	75000mm/min, (可选 86000/100000mm/min)		
	Y轴Y axis	75000mm/min, (可选 86000/100000mm/min)		
	X-Y 综合 X-Y coordinate	100000mm/min (可选120000mm/140000mm/min)		
	Z轴Z axis	30000mm/min		
加速度 Acceleration		1.0G~1.5G		
定位精度 Max. cutting thickness		±0.01mm/6000mm		
激光发生器(美国IPG/武汉锐科) Laser Generator (IPG, USA/ Raycus, Wuhan)		2000W, 3000W, 4000W, 6000W, 8000W, 10000W, 12000W.....		
可选配置项 Adaptable to		电源稳压器, 交换切割台, Raytools或Precitec自动调焦切割头 美国IPG或武汉锐科光纤激光发生器 Voltage Regulator, Raytools or Recitec Automatic Zooming Cutting Head IPG from USA or Raycus from Wuhan, Fiber Laser Generators		
最大切割厚度 Max. cutting thickness		根据切割的材料种类以及选定的激光器功率而定 As per the laser Power Selected according to the materials to be cut		

中型光纤激光切割机

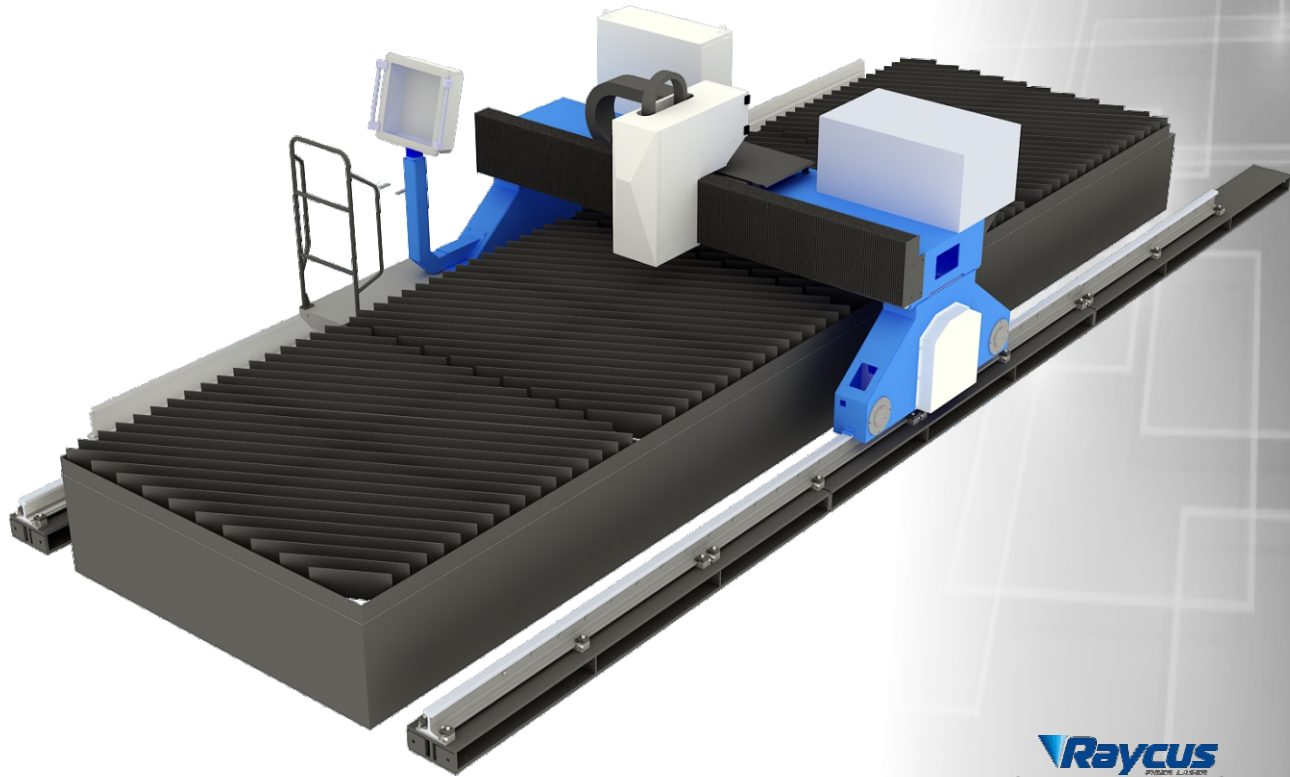
Medium Fiber Laser Cutting Machine



设备型号Model		FiberLaser3015M	FiberLaser6015M
有效范围 Effective stroke	X轴X axis	1500mm	1500mm
	Y轴Y axis	3000mm	6000mm
	Z轴Z axis	100mm	100mm
最大速度 Rapid speed	X轴X axis	60000mm/min	60000mm/min
	Y轴Y axis	60000mm/min	60000mm/min
	X-Y 综合 X-Y coordinate	84000mm/min	84000mm/min
	Z轴Z axis	30000mm/min	30000mm/min
加速度Acceleration		0.6G	0.6G
定位精度Positioning accuracy		±0.02mm/3000mm	±0.02mm/3000mm
最大切割厚度Max. cutting thickness根据具体切割材质以及选定的激光器功率而定 Depends on material thickness and laser power			

龙门式重型光纤激光切割机

Gantry Fiber Laser Cutting Machine



Laser Generator (IPG, USA/ Raycus, Wuhan)	轨距 (mm) Track Span (mm)	3000	3500	4000	4500	5000	5500	6000	6500
	切割宽度 (mm) Cutting Width (mm)	2000	2500	3000	3500	4000	4500	5000	5500
	激光发生器 (美国IPG/武汉锐科)	1000W,1500W,2000W, 3000W, 4000W, 6000W, 8000W, 10000W, 12000W.....							
	驱动速度 Driving Speed	24000mm/min或50000mm/min							
	可选配置项电源 Adaptable to	稳压器, Raytools或Precitec自动调焦切割头, 美国IPG或武汉锐科光纤激光发生器 Voltage Regulator, Raytools or Recitec Automatic Zooming Cutting Head IPG from USA or Raycus from Wuhan, Fiber Laser Powers							
	最大切割厚度 Max. cutting thickness	根据切割的材料种类以及选定的激光器功率而定 Depends on material thickness and laser power							
	轨距最大10000mm;切割长度=轨道长度-3000mm Max Track Span10000mm;Cutting Length=Track Length-3000mm								

数控系统

CNC system

● EDGE Connect

系统参数：
System Configuration:

EDGEConnect (Turnkey)		
处理器	英特尔四核J1900	
处理器速度	2.0Ghz	
操作系统	Windows embedded 8/10	
内存	4GB RAM	
网口	1 RJ-45 Ethernet接口	
海宝专用接口	无	
USB接口	2 USB 2.0	
串口	无	
无线网络	符合802.11G和802.11N标准	
硬盘	120G 固态硬盘SATA接口	
显示器	482.6mm (19英寸)液晶声波	触摸屏



EDGEConnect (Turnkey)	
Processor	J1900 Intel Quad-core
Speed of the processor	2.0Ghz
Operating system	Windows embedded 8/10
Network Port	1 RJ-45 Ethernet interface
The treasure dedicated	None
Serial Port	None
Wireless networking	In line with the 802.11G and 802.11N standard
Hard drive	120G solid-state drive interface SATA
Display	482.6mm (19 inches) of liquid acoustic wave touch screen

● 海宝数控系统

Hypertherm CNC system

● Mini EDGE Connect

Mini EDGE Connect CNC
处理器MCU: 英特尔四核J1900 Quad-core
内存RAM: 4G DDR3-1600
固态硬盘SSD: 120GB Intel S35002.5"
无线网卡WiFi: Intel AC7260
前面板: HDMI + 4 x USB + LAN
后面板: DVI + EtherCAT + ON/OFF & 电源接口
外壳: 铝制
散热: 被动散热, 无需风扇



Mini EDGE Connect CNC
Processor MCU: Intel Quad-core J1900
RAM: 4G DDR3-1600
SSD: 120GB Intel S35002.5"
WiFi: Intel AC7260
Front panel: HDMI + 4 x USB + LAN
Rear panel: DVI + EtherCAT + ON/OFF & Power interface
Shell: Aluminum
Heat dissipation: Passive heat dissipation, no fan required

● HH2300

硬件配置:

显示器: 10.4寸 1024*768 高分辨 1600万色 彩色高亮度液晶屏 或 10.4寸 800X600, 26万色
内存: 64M SDRAM
用户程序空间: 256M 或 1G 电子硬盘
CPU: 400MHz 系统主频
USB: USB 1.1 接口前置
键盘: 电子CB贴膜键盘 (一体机) 或 标准工业键盘 (分体机)
机箱: 全钢结构完全屏蔽, 真正能够做到防电磁辐射、抗干扰、防静电

HH2300 hardware configuration:

Display: 10-inch 1024 x 768 resolution 16 million color high-brightness color LCD screen or a 10.4-inch 800X600, 26 million colors
Memory: 64M SDRAM
User program space: 256M or 1G electronic drives
Frequency: 400MHZ system frequency
USB: USB 1.1 interface Front
Keyboard: Electronic PCB foil keyboard (one machine) or standard industrial keyboard (split type)
Chassis: All steel is completely shielded, can really anti-electromagnetic radiation, anti-jamming, anti-static



● HH5100

硬件配置:

CPU: Intel 852/855 嵌入式工控主板, 低功耗设计
显示器: 15" LCD 彩色液晶显示器, 支持鼠标和触摸屏 (选配)
外部接口: VGA, USB, COM, PS/2, 10/100Mbps 网络接口
内存和硬盘: 板载 512M 内存; 电子硬盘 4G, (DOM)
USB: USB 2.0 * 2
键盘: 电子CB贴膜键盘或 标准工业键盘
机箱: 全铝结构完全屏蔽, 防电磁辐射、抗干扰、散热好
电源: 24V 输入 (+20V 至 +26V), Icc = 3A MAX

HH5100 hardware configuration:

CPU card: Intel 852 / 855 embedded industrial motherboard low-power design.
Display: 15" LCD color LCD display, support for mouse and touch screen (optional).
External interface: VGA, USB, COM, PS / 2, 10 / 100Mbps network interface.
Memory and hard disk: 512M onboard memory; electronic drives 4G, (DOM).
USB: USB 2.0 * 2.
Keyboard: Electronic PCB foil keyboard or standard industrial keyboard.
Chassis: All aluminum structure is completely shielded against electromagnetic radiation, interference, good heat dissipation.
Power: DC + 24V input (+ 20V to + 26V), Icc = 3A MAX.



● 华恒数控系统

Huaheng CNC system

部件 Component

● 驱动

高性能交流伺服电机，运行速度可达
12m/min或24m/min，有很高的加速度。

● The drives

High performance AC drivers for speeds up to
12m/min or 24m/min and high acceleration

割炬升降 Torch lifter

● 割炬升降

HH300等离子割炬升降挂架
升降行程250mm

● Torch lifter

HH300 Plasma Torch Lifter
Up/down stroke 250mm

● 割炬升降

HH200割炬升降挂架
升降行程200mm

● Torch lifter

HH200 torch suspension
Up/down stroke 200mm



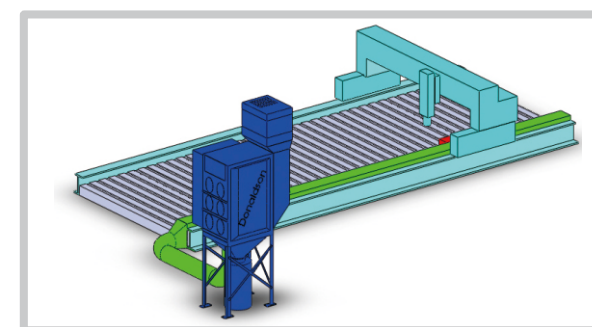
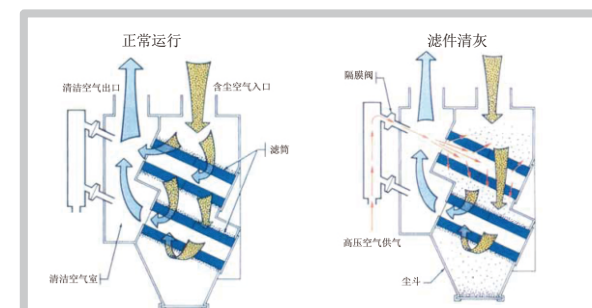
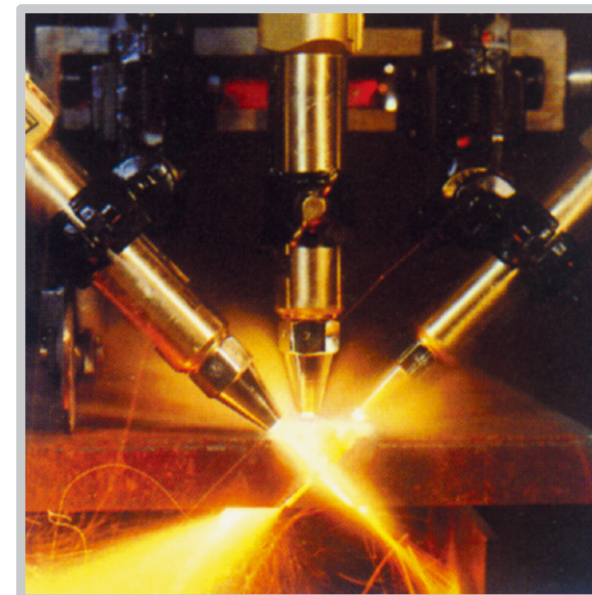
直线三割炬 Triple-torch straight cutt

● 直线三割炬

用于直线V、Y、K型坡口切割
角度调整0°-45°
板条宽度50-130mm
可选择机械式或电容自动调高系统

● Triple-torch straight cutting head

For V, X, Y and K straight cuts
Angle adjustment 0°-45°
Strip width 50-130mm
Optional mechanical or auto capacitive height sensin



● 除尘设备工作台

切割时，会释放出大量铁、氧化铁及有害的镍铬粉末。这些粉末会被捕捉并过滤。滤芯材料可过滤小到0.3 μm的颗粒，过滤效率可达99.97%。
滤芯配有自动清洁装置。

● Fume Extraction Table

Large quantities of iron-and iron oxide dust as well as especially problematical CrNi dust are released during. These are captured by the and fed to the fan/filter system. The ultra fine filter material has a separation factor of 99.97% with particles 0.3μm. The filter is kept functional with a self-cleaning device.

除尘设备工作台 Fume Extraction Table

Hypertherm® 海宝

Cut with confidence®

氧气等离子 Oxygen Plasma



空气等离子 Air Plasma



普通等离子电源 Ordinary Plasma Power						
	型号 Model	空气等离子 Air Plasma				氧气等离子 Oxygen Plasma
项目 Project		Powermax65	Powermax85	Powermax105	Powermax125	MAXPro200
低碳钢 Carbon steel	无熔渣 No slag	不适用 Not applicable	不适用 Not applicable	不适用 Not applicable	不适用 Not applicable	20mm
	生产穿孔/最大穿孔 Production piercing / Max piercing	12/16mm	15/19mm	18/22mm	20/25mm	25/32mm
	质量切割 Quality Cutting	12mm	15mm	18mm	20mm	25mm
	边缘切断 Edge Cutting	32mm	38mm	50mm	57mm	75mm
不锈钢 Stainless steel	生产穿孔/最大穿孔 Production piercing / Max piercing	12/16mm	15/19mm	18/22mm	20/25mm	25/32mm
	质量切割 Quality Cutting	12mm	15mm	18mm	20mm	25mm
	边缘切断 Edge Cutting	32mm	38mm	50mm	57mm	75mm
铝 Aluminum	生产穿孔/最大穿孔 Production piercing / Max piercing	12/16mm	15/19mm	18/22mm	20/25mm	25/32mm
	质量切割 Quality Cutting	12mm	15mm	18mm	20mm	25mm
	边缘切断 Edge Cutting	32mm	38mm	50mm	57mm	75mm
功率 Power		9KW	12. 2KW	16. 8KW	21. 9KW	33KW
电流 Current		20-65A	25-85A	30-105A	30-125A	50-200A

精细等离子 Precision Plasma



精细等离子电源 Precision Plasma Power					
	型号 Model	精细等离子 Precision Plasma			
		HPR130XD	HPR260XD	HPR400XD	HPR800XD
低碳钢 Carbon steel	无熔渣 No slag	16mm	32mm	38mm	38mm
	生产穿孔 Production piercing	32mm	38mm	50mm	50mm
	质量切割 Quality Cutting	25mm	32mm	50mm	50mm
	边缘切断 Edge Cutting	38mm	64mm	80mm	80mm
不锈钢 Stainless steel	生产穿孔 Production piercing	20mm	32mm	45mm	75mm
	边缘切断 Edge Cutting	25mm	50mm	80mm	160mm
铝 Aluminum	生产穿孔 Production piercing	20mm	25mm	38mm	75mm
	边缘切断 Edge Cutting	25mm	50mm	80mm	160mm
功率 Power		19. 5KW	45. 5KW	80KW	160KW
电流 Current		30-130A	30-260A	30-400A	30-800A

Hypertherm® 海宝

XPR300™

机用等离子切割技术一次史无前例的突破，
诠释等离子切割新概念。

The new XPR300™ represents the most significant advance in mechanized plasma cutting technology. This next generation system redefines what plasma can do.



低碳钢	Mild steel	mm
穿孔能力 Pierce capacity	(氩气辅助) (argon-assist) (标准氧气) (standard O2)	50 mm 45 mm 80 mm
切断能力 Severance capacity		80 mm
不锈钢	Stainless steel	
穿孔能力 Pierce capacity		38 mm
切断能力 Severance capacity		75 mm
铝	Aluminum	
穿孔能力 Pierce capacity		38 mm
切断能力 Severance capacity		50 mm

业界领先的切割质量：
Industry-leading X-Definition cut quality
XPR将新技术与精心优化的工艺相结合，实现低碳钢、
不锈钢和铝材的新一代 X-Definition™ 切割品质，进一步提升了
HyDefinition® 的切割质量。
The XPR advances HyDefinition® cut quality by blending
new technology with refined processes for next generation,
X-Definition™ cutting on mild steel, stainless steel and
aluminum.

优化生产效率，降低运行成本
Optimized productivity and reduced operating costs

精心设计的系统比简单易用
Engineered system optimization, Ease of use

先进的工艺控制和交付
Advanced process control and delivery

可在Core™ 自动箱体、Vented Water Injection (VMI) 高级
气体箱和Optimix™ 全能自动气体箱这三款控制箱中进行选
择，每款控制箱都进一步增强了不锈钢和铝材切割能力，低
碳钢切割质量极为出色。所有控制箱均可通过CNC控制器
进行全面控制，提高了生产效率和易用性。

Three console options—Core™, Vented Water Injection™
(VMI) and OptiMix™—offer unmatched mild steel cut quality
with each console delivering successively enhanced
cutting capabilities on stainless steel and aluminum.
All consoles can be fully controlled through the CNC
for high productivity and ease of use.



Vented Water™ Injection VMI
高级自动气体控制箱

Core™ 自动气体控制箱

OptiMix™ 全能自动气体
控制箱

气体控 制箱	切割气体	电流 (A)	切割厚度 (mm)	切割速度 (mm/min)
低碳钢				
Core、VMI 和 OptiMix	氧气等离子气体 氧气保护气体	30	0.5 3 5	5348 1153 521
	氧气等离子气体 空气保护气体	80	3 6 12	5582 3048 1405
	氧气等离子气体 空气保护气体	130	3 10 38	6502 2680 256
	氧气等离子气体 空气保护气体	170	6 12 25	5080 3061 1175
	氧气等离子气体 空气保护气体	300	12 25 50	3940 1950 560
			80	165
不锈钢				
Core、VMI 和 OptiMix	氮气等离子气体 氮气保护气体	40	0.8 3 6	6100 2683 918
	F5 等离子气体 氮气保护气体	80	3 6 12	4248 1916 864
	氢气-氩气-氮气 等离子气体 氮气保护气体	170	10 12 38	1975 1735 256
OptiMix	氢气-氩气-氮气 等离子气体 氮气保护气体	300	12 25 50	2038 1040 387
			75	162
	氮气等离子气体 水保护气体	300	12 25 50	2159 1302 403
铝				
Core、VMI 和 OptiMix	空气等离子系统 空气保护气体	40	1.5 3 6	4799 2596 911
	氮气等离子气体 水保护气体	80	3 6 10	3820 2203 956
	氮气等离子气体 水保护气体	130	6 10 20	2413 1702 870
	氮气等离子气体 水保护气体	300	12 25 50	2286 1302 524
OptiMix	氢气-氩气-氮气 等离子气体 氮气保护气体	300	12 25 50	3810 2056 391

这并不代表完整的可用工艺或厚度列表。