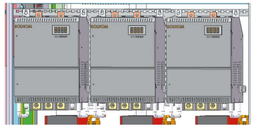
六、工艺优势 Technology Advantage

◆ 一体化防静电金属封闭柜体设计。
◆ IGBT模块单元采用IP20封闭式箱体结构，维护安装方便。
◆ 组合型水冷散热器采用先进的搅拌摩擦焊工艺，单元回流式水道设计使水冷器散热效率提高20%。

◆ Using integrated anti-static metal closed cabinet design.
◆ IGBT module unit adopts IP20 closed box structure, easy maintenance and installation.
◆ The combined water-cooling radiator adopts advanced friction stir welding technology, and the unit flux waterway design improves the heat dissipation efficiency of the water cooler by 20%.

防静电金属封闭柜体
Anti-static metal closed cabinet



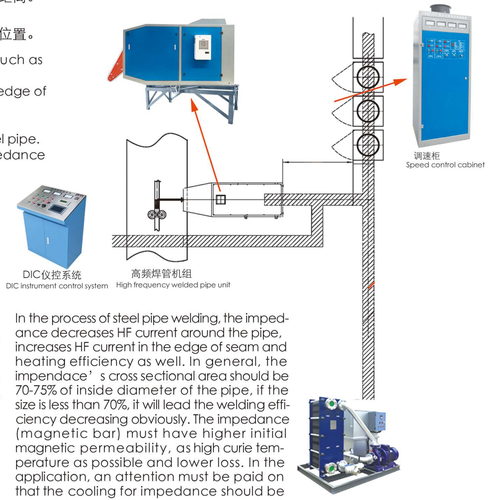
功率单元
Power unit

水路温度保护
Waterway temperature protection

焊管常识---影响焊速的几个因素 The general knowledge for welding pipe —several factors affect welding speed as follow:

1.感应器的几何尺寸、如感应器的直径、宽度和匝数。
2.感应器前沿到挤压辊中心线的距离。
3.钢管开口角的大小。
4.阻抗器（磁棒）的长度及放置位置。

1 Geometric size of induction, such as diameter, width and tunes.
2 The distance from the leading edge of the inductor to the center of the squeeze roller.
3 The size of opening angle of steel pipe.
4 The length and position of impedance (magnetic bar).



阻抗器在钢管焊接中的作用 Impedance function in steel pipe welding

在实际的管缝焊接过程中，阻抗器减少了环绕管坯圆周的高频电流。相应增加了焊缝边缘的高频电流，显著的提高了加热效率。通常磁棒的横截面积应占到管坯内径的70%～75%，低于70%将导致焊接效率的明显下降。用于高频焊管的阻抗器（磁棒）应具有较高的起始磁导率，尽可能高的居里温度和较低的损耗。在使用中应注意阻抗器（磁棒）的冷却要充分，防止阻抗器（磁棒）被激碎或温度超过居里点而失效，阻抗器的长度及放置位置均会对焊接效率产生影响。

In the process of steel pipe welding, the impedance decreases HF current around the pipe, increases HF current in the edge of seam and heating efficiency as well. In general, the impendace’s cross sectional area should be 70-75% of inside diameter of the pipe, if the size is less than 70%, it will lead the welding efficiency decreasing obviously. The impedance (magnetic bar) must have higher initial magnetic permeability, as high curie temperature as possible and lower loss. In the application, an attention must be paid on that the cooling for impedance should be enough to protect from its cracking or fault due to over curie point and temperature being too high. The length and position of impedance inside the pipe might affect the welding efficiency.

一体焊机与传统分体式电源优势对比 Comparison of the advantages of integrated welder and traditional separate power supply

对比项目 Comparison project	通用型固态焊机 General type solid state welder	串联型固态焊机 Tandem solid state welder	新型一体式焊机 New integrated welder
保护速度 Protecting speed	一般 General	一般 General	快 Fast
远程监控 Remote monitoring	无 Non	无 Non	选配 Optional
控制板一致性 Control panel consistency	现场调整 On-site adjustment	现场调整 On-site adjustment	无需现场调整 No need on-site adjustment
安全保护 Safety protection	开路保护困难，短路保护容易。 Difficult protection for open circuit, easy protection for short circuit	开路保护容易，短路保护困难。 Difficult protection for short circuit, easy protection for open circuit	皆易。 Both are easy
调功方式 Power adjustment method	移相触发 Phase shift trigger	移相触发或前 0～25% 可控硅调压后脉冲屏蔽调节逆变阻抗电流（复杂） Phase shift trigger or the first 0-25% of the current is regulated by SCR and then pulse shield adjusts the inverter impedance’s current(it is complex)	逆变 PWM 调控 Inverter PWM adjustment
负载匹配 Load matching	电感调节 Inductance regulation	变压器抽头、电感、脉冲屏蔽调节 Transformer plug, inductance, pulse shielding adjustment	电子自调节 Electronic self-regulation
逆变输出效率 Inverter output efficiency	高 High	一般（感性） General	高 High
输出纹波系数 Output ripple coefficient	1%	1%	0.5%
功率因数 Power factor	取决于输出功率大小 Depending on the output power	取决于输出功率大小，或 25%额定功率以上时，功率因数 0.92。 Depending on the output power; when rated power is more than 25%, it will be 0.92	全范围 0.93 Full wave is 0.93
功率单元设计 Power unit design	敞开式功率模块 PCB 设计 Open- style power module PCB design	敞开式镶嵌铜管镀锡工艺 Open-type inlaid copper tube with tin-plated process	封闭式 IP20 箱体结构 Closed IP20 cabinet structure
电气隔离方式 Electrical isolation	降压变压器 Step down transformer	匹配变压器 Matching transformer	高频变压器 HF transformer
受控器件 Controlled parts	可控硅（50Hz） SCR(50Hz)	可控硅（50Hz） SCR(50Hz)	IGBT(高频) IGBT(HF)
安装 Installation	占地面积大，耗时多，柜间连线多 Large size, more time, and more connecting wires between cabinets	占地面积大，耗时多，柜间连线多 Large size, more time and more connecting wires between cabinets	占地面积小，安装快，无柜间连线 Small size, fast install, no cabinet connecting wire
调试维护 Debugging and maintenance	调试维护技能要求较低 Lower skill	调试维护技能要求较高 Higher Skill	调试维护技能要求低 Low skill
可维护性 Maintainability	良 Good	良 Good	优 Excellent
制造成本 Manufacturing cost	较高 Higher	高 High	高 High
运维成本 Operation and maintenance cost	较低 Lower	高 High	低 Low

一体焊机运行现场
Integrated solid state
HF welding machine runing site

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BOLHOM® 博宏感应 BOHONG INDUCTION

多功能型智能化一体式固态高频焊机
Multifunctional intelligentized integrated solid state HF welder

高效节能 精稳性能
多用功能 交互智能
Energy-efficient Reliable performance
Multi-function Interactive intelligence

功率范围 Power range 60～400kW
频率范围 Frequency range 100～800kHz

专注感应电源研发、制造、应用
Focus on induction power supply research & development, production and application.
--The welding field
一焊接领域

河北博宏感应技术股份有限公司
Hebei Bohong Induction Technology Co., LTD.

BOLHOM®
博宏感应
BOHONG INDUCTION

一、公司简介 Company Brief

河北博宏感应技术股份有限公司是一家专业从事感应加热电源开发、制造、应用的现代化高科技型企业。公司拥有一支从业近三十年的管理、技术团队，服务于金属和材料热处理领域，可根据用户要求提供各型装备、应用、服务的系统解决方案。

公司产品系列：中频、超音频、高频、射频电源，各型非标机械设备，自动化控制系统。广泛应用于冶金，有色金属，铸造，汽车，轨道交通，机械，电器，电子，建筑，航空与航天，能源，光纤通讯等各个工业领域。

我们致力于服务全球市场，期待着与您的合作！

Hebei Bohong induction technology Co., LTD. is a modern high-tech enterprise engaged in induction heating power supply research, development, production and application. It has a management and technical team that has been in business for nearly 30 years which serves the fields of metal and material heat treatment. The company can provide various types of equipment, application and service solutions according to customers' requirements.

Company product series: power supply series which include medium frequency, superaudio frequency, high frequency and radio frequency power supply; various types of non-standard mechanical equipment and automation control system. Products are widely used in metallurgy, non-ferrous metals, foundry, automobile, rail transit, machinery, electric appliance, electronics, construction, aeronautics and astronautics, energy, optical fiber communication and other industrial fields.

We are committed to serving the global market and sincerely look forward to cooperating with you.


办公室
Office


测试工位
Test station


新产品研发测试
New product development and testing

二、企业宗旨 Enterprise Purpose

企业技术创新是方向
专业集成应用是目标
实现用户价值是关键
打造卓越团队是核心

Enterprise technology innovation is the direction.
Professional integrated application is the goal.
Realizing user value is the key.
Building an excellent team is the core.

三、企业资质 Enterprise Qualification

河北省高新技术企业
→High-tech Enterprise of Hebei Province

四、性能特点 Performance Characteristics

高效节能：Energy-efficient:

◆ 采用整流、逆变一体化机箱结构设计，占地小，安装方便。

◆ 利用三相全波整流+IGBT逆变调功技术，纹波系数＜0.5%，用高频变压器替代降压变压器，减少铜损和磁滞损耗，逆变效率高。无柜间连线，去除线损，整机节能较上一代产品（通用型）提高15%（静态测试对比）。

◆ It adopts rectifier and inverter integrated chassis structure design, covers small area and easy to install.

◆ Using three-phase full-wave rectification and IGBT inverter power-regulating technology, the ripple coefficient is less than 0.5%. The high-frequency transformer is used to replace the step-down transformer, which reduced the copper loss and hysteresis loss, and increased inverter efficiency. There is no cabinet connecting wires which removed the line loss. The machine energy saving is 15% higher than conventional solid-state HF welder (Static test comparison).

多用功能：Multi-functions

◆ 低纹波系数满足功率输出的恒定，可用于高端汽车用管，铝集流管，铜管，各系列不锈钢管材的焊接。

◆ 可选择加装速度一功率闭环控制功能。

◆ The low ripple coefficient satisfies the constant power output and can be used for welding high-end automotive pipe, aluminum header pipe, copper pipe and various series of stainless steel pipe.

◆ The speed-power closed-loop control function can be added per customer request.

精稳性能：Stable performance

◆ 采用独有的主回路软启动控制专利技术（专利号ZL201721056139.3）。

◆ 采用精确的高频逆变脉冲PWM控制技术。

◆ 采用自主均流控制技术 。

◆ 提升优化产品工艺结构。

◆ Using unique main loop soft starter control patented technology (patent No.ZL201721056139.3).

◆ Using accurate high frequency inverter pulse PWM control technology.

◆ Using autonomous current sharing control technology.

◆ Upgraded and optimized the product process structure.

交互智能：Interactive intelligence

◆ 支持云端数据服务，通过手机APP实时查看设备运行情况。

◆ 可根据用户要求进行功能拓展服务。

◆ Support cloud data service, and view device running status in real time through mobile APP.

◆ Provide function expansion service according to user requirements.

五、设备配置与现场安装 Equipment Configuration and Installation

全套配置： 新型一体式焊机全套设备包含：焊机、DIC仪控系统、冷却系统三大部分。

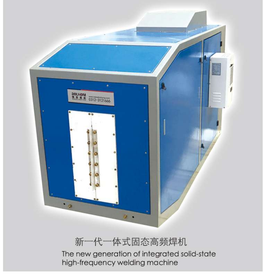
Configuration: The full set configuration of the new integrated welder includes welder, DIC instrument control system and cooling system.

现场安装： 现场安装只需连接三根电源线、进出水路快速接头、焊机与DIC仪控系统采用重载连接器即可。

On-site installation: It only needs three power lines, inlet and outlet quick connector and the heavy-duty connector which is used to connect the welder and the DIC instrument control system.


远程运维轻松实现
Remote operation and easy maintenance


DIC仪控系统
DIC instrument control system


新一代一体式固态高频焊机
The new generation of integrated solid-state high-frequency welding machine


冷却系统（水-水、风-水选配）
Cooling system (Optional for water-water or air-water cooling system)

新型一体式固态高频焊机选型 The YGGP model list of solid sated HF integrated welder

指标/型号 Index/Model	YGGP60-0.6	YGGP100-0.4	YGGP150-0.4	YGGP200-0.4	YGGP250-0.4	YGGP300-0.35	YGGP350-0.3	YGGP400-0.3
输出功率 Output power	60KW	100KW	150KW	200KW	250KW	300KW	350KW	400KW
直流电压 DC Voltage	250V	250V	250V	250V	250V	250V	250V	250V
直流电流 DC Current	300A	500A	750A	1000A	1250A	1500A	1750A	2000A
输出频率 Output frequency	550-620KHz	350-420KHz	350-420KHz	350-420KHz	320-400KHz	300-380KHz	270-350KHz	250-320KHz
效率 Efficiency	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%
纹波系数 Ripple coefficient	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
模块数量 Model quantity	50KW×2	50KW×2	50KW×3	50KW×4	50KW×5	50KW×6	50KW×7	50KW×8
电源柜 Power cabinet	PWM脉宽调制、高功率因数、高控制精度 软开关技术的低电压、高可靠性、紧凑型逆变器 PWM (pulse width modulation) technology, high power factor, high control accuracy, low voltage of the soft switching technology, compact inverter							
配电容量 Power distribution capacity	78KVA	130KVA	200KVA	250KVA	320KVA	380KVA	450KVA	500KVA
功率因数COSΦ Power factor COSΦ	全范围>0.93 Full wave > 0.93							
供电电压 Supply voltage	380V/50Hz 10%线性 380V/50Hz 10% linear							
最大进线电流 Max input current	111A	191A	287A	379A	486A	575A	684A	767A
进线电缆（单相） Incoming cable(single phase)	70mm²	95mm²	140mm²	190mm²	240mm²	280mm²	340mm²	380mm²
工作水压 Hydraulic pressure	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa
工作水流量 Cooling water flow	>11.7m³/h					>23.5m³/h		>32.5m³/h
冷却能力 Cooling capacity	>21500Kcal/h		>32250Kcal/h	>43000Kcal/h		>64500Kcal/h		>86000Kcal/h
蒸馏水 Distilled water	100siemens/cm PH=6~8 进水温度<35℃ 100siemens/cm ph=6~8 input water temperature＜35℃							
不生锈，无污染管路 No rust, no pipeline pollution	不含离子及矿物质 Free of ions and minerals							
水冷器 Water-cooling system （风水/水水） (F-S/S-S)	1200×800×1480mm			1300×1000×1480mm		1600×1550×1480mm	1700×1600×1480mm	
使用环境 Working environment	接地电阻≤4Ω；海拔高度<1000M；环境温度-5℃<工作温度<+50℃；空气相对湿度<85%；倾斜度<5°；无剧烈震动、无导电尘埃、无各种腐蚀性气体及爆炸性气体 Earth resistance≤4Ω; Altitude height＜1000m; Ambient temperature not lower than -5℃ and operation temperature does not exceed 50℃; Air relative humidity＜85%; Angle of inclination＜5°; No violent vibration, no conductive dust, no corrosive gases and explosive gases.							

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指标/型号	MGGP60-0.6	MGGP100-0.4	MGGP150-0.4	MGGP200-0.4	MGGP250-0.4	MGGP300-0.35	MGGP350-0.3	MGGP400-0.3
输出功率	60KW	100KW	150KW	200KW	250KW	300KW	350KW	400KW
直流电压	250V	250V	250V	250V	250V	250V	250V	250V
直流电流	300A	500A	750A	1000A	1250A	1500A	1750A	2000A
输出频率	550-620KHz	350-420KHz	350-420KHz	350-420KHz	320-400KHz	300-380KHz	270-350KHz	250-320KHz
效率	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%
纹波系数	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
模块数量	50KW×2	50KW×2	50KW×3	50KW×4	50KW×5	50KW×6	50KW×7	50KW×8
电源柜	PWM脉宽调制、高功率因数、高控制精度 软开关技术的低电压、高可靠性、紧凑型逆变器							
变压器	75Kva/400Y/240△	130Kva/400Y/240△	200Kva/400Y/240△	250Kva/400Y/240△	320Kva/400Y/240△	380Kva/400Y/240△	450Kva/400Y/240△	500Kva/400Y/240△
配电容量	78KVA	136KVA	210KVA	263KVA	343KVA	400KVA	480KVA	526KVA
功率因数COSΦ	全范围>0.93							
供电电压	380V/50Hz 10%线性							
最大进线电流	111A	191A	287A	379A	486A	575A	684A	767A
进线电缆（单相）	70mm²	95mm²	140mm²	190mm²	240mm²	280mm²	340mm²	380mm²
工作水压	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa	0.25MPa
工作水流量	>11.7m³/h					>23.5m³/h		>32.5m³/h
冷却能力	>21500Kcal/h		>32250Kcal/h	>43000Kcal/h		>64500Kcal/h		>86000Kcal/h
蒸馏水	100siemens/cm PH=6～8 进水温度<35℃							
不生锈，无污染管路	不含离子及矿物质							
水冷器 （风水/水水）	1200×800×1480mm			1300×1000×1480mm		1600×1550×1480mm	1700×1600×1480mm	
使用环境	接地电阻≤4Ω；海拔高度<1000M；环境温度-5℃<工作温度<+50℃；空气相对湿度<85%；倾斜度<5°；无剧烈震动、无导电尘埃、无各种腐蚀性气体及爆炸性气体							

对比项目	通用型固态焊机	串联型固态焊机	新型一体式焊机
保护速度	一般	一般	快
远程监控	无	无	选配
控制板一致性	现场调整	现场调整	无需现场调整
安全保护	开路保护困难，短路保护容易。	开路保护容易，短路保护困难。	皆易。
调功方式	移相触发	移相触发或前 0～25%可控硅调压后脉冲屏蔽调节逆变阻抗电流（复杂）	逆变 PWM 调控
负载匹配	电感调节	变压器抽头、电感、脉冲屏蔽调节	电子自调节
逆变输出效率	高	一般（感性）	高
输出纹波系数	1%	1%	0.5%
功率因数	取决于输出功率大小	取决于输出功率大小，或 25%额定功率以上时，功率因数 0.92。	全范围 0.93
功率单元设计	敞开式功率模块 PCB 设计	敞开式镶嵌铜管镀锡工艺	封闭式 IP20 箱体结构
电气隔离方式	降压变压器	匹配变压器	高频变压器
受控器件	可控硅（50Hz）	可控硅（50Hz）	IGBT(高频)
安装	占地面积大，耗时多，柜间连线多。	占地面积大，耗时多，柜间连线多。	占地面积小，安装快，无柜间连线。
调试维护	调试维护技能要求较低	调试维护技能要求较高	调试维护技能要求低
可维护性	良	良	优
制造成本	较高	高	高
运维成本	较低	高	低