



北极星
NSTAR

使用說明書



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NSTAR OF CHINA

E-9188E 系列
新型高频感应加热设备

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一、前言

感谢阁下选用 E-9188E 系列高频感应加热设备，为了你更好地使用该设备，操作前，请你务必仔细阅读完本说明书，并妥善保存以便查阅。

二、本产品应用范围

本设备广泛应用于机械行业的热处理、锻造和钎焊等领域，用户可根据工件加热工艺要求具体选用。

1、透热成型

- A、各类标准件紧固件及其它机械零配件、五金工具、直柄麻花钻的热锻、热轧。
- B、对金属材料加热退火，以便拉伸，造型压花等。如钢管退火、弯管、砸头、铁丝、钢丝加热制钉，不锈钢制品退火，位伸、涨型。

2、热处理

各类五金工具、电动、液压、气动元件，汽配摩配等机械金属部件的表面、内孔、局部或整体淬火。如锤、刀、剪、钳及各类轴、凸轮、链轮、齿轮、气门、球头等及大型机床导轨和球墨铸铁的淬火，国内众多生产链轮和机床导轨的厂家均已采用本厂设备进行热处理。

3、钎焊

各类硬质合金刀头、车刀、铣刀、刨刀、铰刀、金刚石锯片、锯齿的焊接、磨具、钻具、刀具的焊接。其他金属材料的复合焊接，如黄铜、紫铜部件，阀门，不锈钢锅底等。

4、金属熔炼

如熔炼金、银、铜等。

5、其他加热领域

铝塑管，电缆、电线的加热覆膜，食品、饮料、制药行业使用的铝箔封口，金属的预热膨胀等。

三、技术特点

E-9188E 系列新型加热设备采用国际上先进的全固态半导体功率器件（如SIT, IGBT, MO-SFET 等）组成逆变主电路，配以完善的控制、保护、显示报警等电子电路使整个感应加热过程的频率全程自动跟踪，功率连续可调节，保护安全可靠，显示数据清晰准确，并且按功率大小和加热频段分档，设计出不同规格多种型号的机型，以满足各种工件加热工世的需要，是替代中频发电机组，电子管式高频加热设备的理想产品。

四、技术参数和机型分档

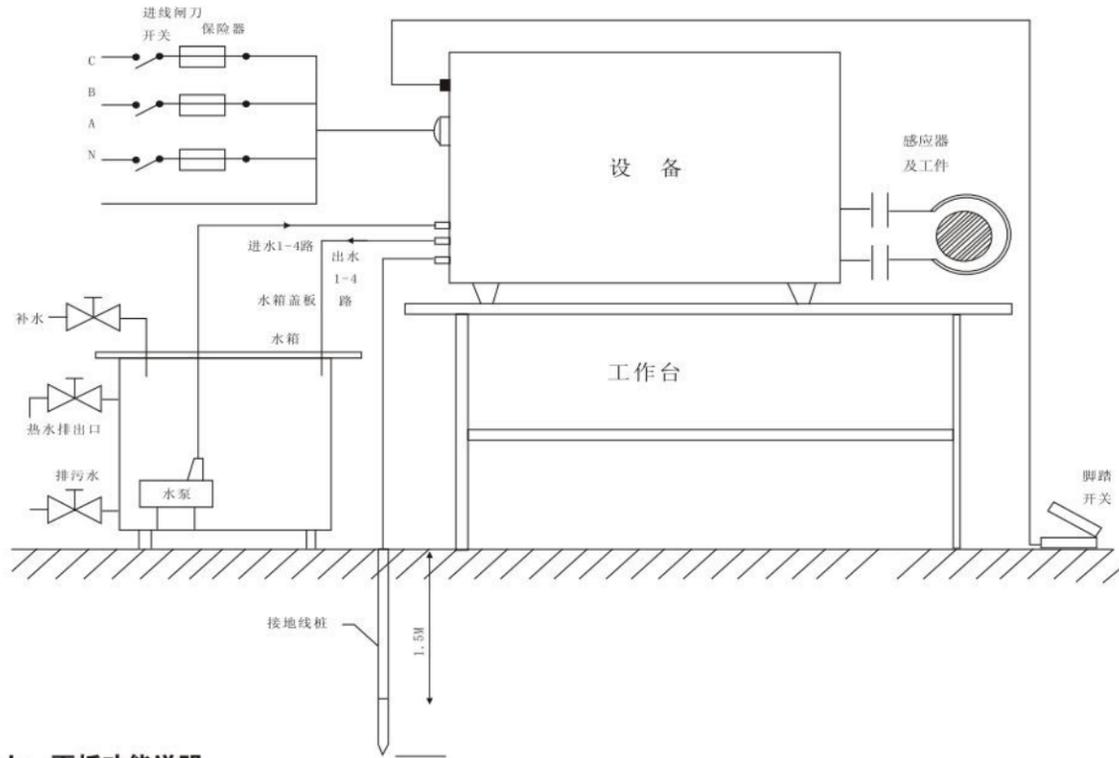
型号	输入电压 (V)		振荡功率 (KVA)	振荡频率 (KHZ)	输出电流 (A)	冷却水压 (Mpa)	重量 (Kg)
	单相220	± 10%					
18	单相220	± 10%	18	100-200	750	0.07-0.2	18
20	单相220	± 10%	20	30-100	840	0.1-0.2	20
25	三相380	± 10%	25	30-80	1000	0.1-0.2	23
30	三相380	± 10%	30	40-60	1200	0.1-0.2	30
35	三相380	± 10%	35	40-60	1400	0.1-0.2	35
40	三相380	± 10%	40	40-60	1600	0.15-0.2	60
45	三相380	± 10%	45	40-60	1700	0.15-0.2	65
50	三相380	± 10%	50	30-60	1800	0.15-0.2	150
60	三相380	± 10%	60	30-60	1999	0.15-0.2	160
70	三相380	± 10%	70	20-40	2200	0.15-0.2	180
80	三相380	± 10%	80	20-40	2400	0.15-0.2	200
100	三相380	± 10%	100	20-40	2800	0.15-0.2	220
120	三相380	± 10%	120	20-40	3200	0.15-0.2	260

注：如遇设备改型参数不符，以实际参数为准。

五、产品优越性能

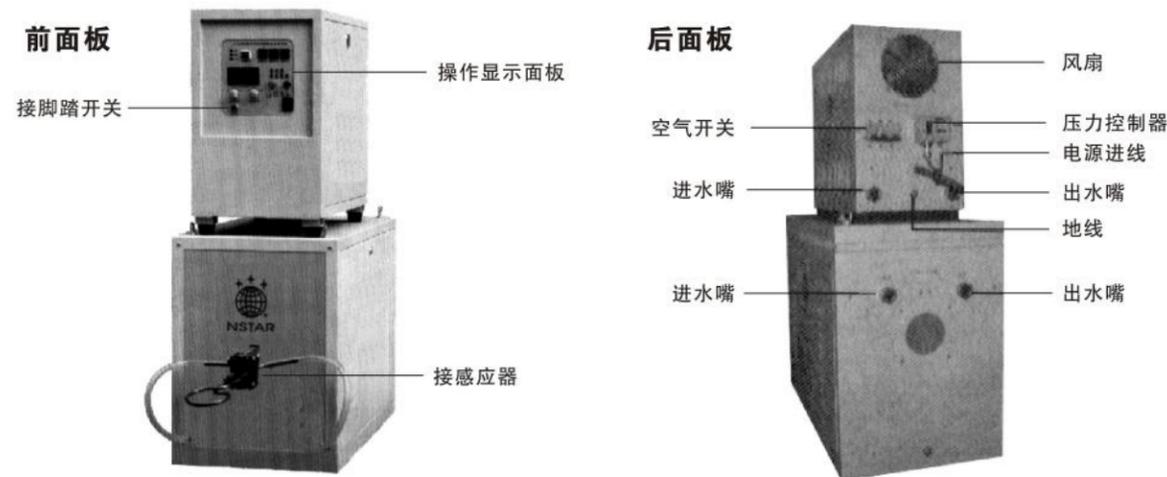
- 1、体积小、重量轻，设备无万伏高压，占地面积小，可移动作业；
- 2、耗电省，节约冷却水；
- 3、加热快，氧化层少；
- 4、按功率大小，频段高低分为多种机型，客户可按工世要求，合理选用，以期获得满意的性能价格比。
- 5、安装简单，操作方便，用户仅需十几分钟即可学会全部操作过程。
- 6、控制方式简捷多样化，可点动，远程，半/全自动，加热定时、自动循环等。
- 7、保护功能齐全可靠，有过电压，过电流，电源缺相，水压过低，水温过高等自动保护报警功能，用户可放心地操作。

六、设备安装（见示意图）



七、面板功能说明

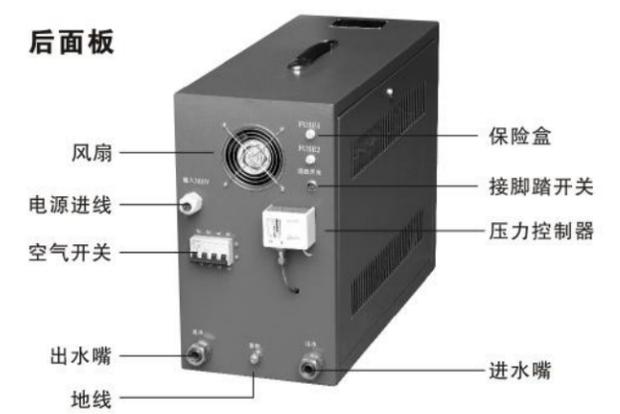
由本厂开发生产的新型固态高频感应加热设备，其各项性能指标完全符合企业标准要求。由设计到工艺，从元件筛选到整机装配老化均有严格的质量保证体系，始终贯彻了用户至上，质量第一的方针。产品性能稳定，安全可靠，操作简便，维护方便，并可按照用户提出的特殊加热要求，设计生产出特种功能的新产品。



前面板



后面板



1、电源连接：按机型输入功率，相数要求，按电工配线要求选用合适的电源进线截面，闸刀，进线闸刀、保险盒一定要另配，不允许直接使用机内空气开关代替。接线牢靠无松动。一般铜质导线截流量选 $4A/mm^2$ ，如 E-9188E20 型机（单相）应配 $10mm^2$ 导线（铜质），两相刀闸，E-9188E50型机（三相）应配 $16mm^2$ 导线（铜质），三相刀闸100A。E-9188E80型机（三相）应配 $25mm^2$ 导线（铜质），三相刀闸200A。

2、冷却水水质要求及接入方式：

一般用自来水，水质清洁无杂物，无污垢、藻类等悬浮物，为节约用水，应配置专用水箱和水泵，以便循环使用。水管和接头应满足 0.2MPa 以上耐压要求，并按机型标示的进、出水咀可靠连接。水箱容积 $1-5m^3$ ，应装有补水口，热水溢流口和排污口，以保证正常工作时，水箱温度维持在 $17^{\circ}C-40^{\circ}C$ 范围内，同时便于定期清理水箱内杂质。水箱应加防尘盖板。

3、接地要求：用 $6mm^2$ 以上铜线，将设备接地端与大地可靠连接，绝不允许地线与电源零线混接。接发端应与工厂配置的地线网就近相接或单独用长 1.5 米以上的接地锚，就近打地桩接地。接地电阻应符合电工规范。

4、感应器安装：感应器工作在大电流状态，一般通过数百安培电流，到几千安培的电流，所以要紧固牢靠。除不漏水外，还要求接触面积最宽。

5、远控开关和脚踏开关与对应接口连接，但要注意锁紧口方向，接后适当拧紧。

八、操作顺序

1、检查设备各部位安装工作是否全部完成。

2、机器因长途运输，开机前应打开侧门检查机内各插头，插件螺丝等紧固件有无明显松动，若有请我厂现场服务人员处理，或由客户专业电工处理。

3、先通水，待各水路都有水流流出，且水压稳定后方可送电。

4、调整感应器位置，放入工件。

5、以上操作完成后，找开电源开关，同时将功率调节旋钮旋至最小，再按“启动”按钮，设备应能正常工作。工作后，蜂鸣器发出约 1 次 1 秒的间断蜂鸣声，工作指示灯相应闪亮。即表示机器已工作正常，可按工件加热需要将“功率调节”旋钮调节到所需功率，直至最大。

6、按“停止”按钮，设备应停止工作。

7、关机顺序：将“功率调节”旋钮旋至最小—取出工件—按“停止”按钮—关断面板电源开关—拉下供电刀闸—停冷却水水泵电源。本设备后侧的空气开关是按限流保护设计的容量，为延长使用寿命，应尽量减少开关次数，请用户配合。

8、自动控制型操作方法：通过数字化自动控制电路将原设备单一的加热功能分解为加热、保温、冷却三个时段。用户根据工作需要每个时段内自由地从 1-99 秒内设置时间，配合面板上的加热功率调节装置，设置更为合理的加热温度及保温温度，使你的产品加工工艺更具科学性、准确性。

9、操作注意事项：

A、在自动工作状态下，各个时间计数器时间设置不得为 00，否则设备将无法自动循环工作。

B、在自动状态，工作中如改变时间，设备将在下一循环按更改后的时间进行。

C、在手动状态，设备与普通设备一样工作，面板显示的时间将不起作用。

九、正常使用中注意事项

1、用户使用中应根据整个厂房用电量及供电变压器容量，满足该设备供电要求（功率，及导线截面要求）。输入电压单相220V，三相380V切勿错接电源，以免造成机器损坏。电网电压高于规定范围时，请不要使用设备。

2、水质要保持长期清洁，最好加设挡尘设施，定期清理水箱（水池）。为防止长期使用造成机器内水管结垢堵塞，应定期（一般二个月内）用除垢剂清洗一次设备水路。具体方法是：除垢剂选用普通汽车水箱除垢剂，按1：40比例配置，将水路循环清洗1小时并用清水冲洗干净（或与我厂客户服务中心联系）。

3、先通水，后通电，任何情况下不允许不通水操作设备。

4、水箱内水温应保持在17℃-40℃内，水箱应放置在室内通风处，水池一般设置在地下，并加盖防尘、防晒盖板。冬天为防止不使用时设备内水管冻坏或堵塞死，应在停止工作后，立即将设备内循环水排空，具体操作方法是：将供水泵从水箱内拉出，空运3分钟，利用空气压力将设备内水管中存水排出。

5、为防止触电，应经常检查接地线是否可靠，更换感应器时应停水，停电后方可拆换。

6、设备工作现场环境一般比较恶劣，工作时应防止粉尘、水汽，油气进时机内，一般工作一星期应打开设备侧门检查机内粉尘、水汽影响情况，若机器内灰尘过多，水汽过重，应在不工作的前提下打开设备风机吹干一段时间，一般十几分钟即可。若工作环境特别恶劣，建议每天工作前先预开风机吹十分钟后，再开始操作。

7、设备出现故障应由专业人员检修，保修期内我厂负责维修。

8、本设备同所有其它感应加热设备一样，感应器的配置，如匝数多少，高度、形状，电流方向及感应器与加热工件之间的距离等均影响感应加热的效率好坏。严重配置不当可能出现设备不能正常启动或损坏设备等，因此更换感应器尺寸，应由懂行的专业人员进行或与我厂技术部门联系，我厂提供免费咨询服务。

十、故障现象及排除

故障现象	故障原因	排除方法
无电源指示	1、空气开关、电源开关未合上； 2、控制电路保险断； 3、空气开关或电源开关损坏	1、合上开关； 2、换保险； 3、更换空气开关或电源开关； 4、与厂家联系维修。
按启动按钮不启动	启动失败	功率调节旋钮调小，重新启动
反复多次重新启动，仍无加热	设备故障	与厂家联系维修
工作即报警，反复多次现象一样	设备故障	与厂家联系维修
启动后即掉电，主电源开关跳闸	设备故障	与厂家联系维修
加热时突然停止	1、感应器与工件短路 2、报警 3、其它	1、消除短路 2、按下面介绍的报警排除方法处理 3、与厂家联系维修
工作时报警	过压	过电压指示灯亮表明电压已高于420V，机器自动停止工作 处理电网电压
	过流	此灯亮 1、干扰信号 2、温度过高 3、工件碰感应器 4、感应器匝间短路 关机消除报警。先排除工件和感应器之间接触器，再排除感应器匝间短路，检查水温正常，仍无法工作，与厂家联系维修
	过热	此灯亮，冷却水温度过高或变压器温度过高 立即停止加热，不停水、待降温后，再用小电流加热
	缺水	缺水指示灯亮，水量过小，水压太低，管道不畅通设备自动停止工作等 处理水路相应问题
	缺相	此灯亮，说明电源缺相 处理电源进线（保险烧一相或断一相线）

设备装箱清单

1、主机	1台
2、辅机（45型以上有辅机）	1台
3、试机感应器	1副
4、感应器连接头	2副
5、脚踏开关	1个
6、保险管	2个
7、说明书	1本
8、合格证、保修卡	1份
9、产品用户反馈卡	1份

本说明书仅供参考，如设备改型，造成内容不符者，如不另行通知。

NSTAR OF CHINA



北极星
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E-9188E series

New Type High-frequency Inductive Heating Equipment

Operating manual



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I. Forward

Thank you for purchasing E-9188E series high frequency inductive heating equipment, in order to use this equipment better, please read this manual carefully before you operate and preserve it well for future.

II. Application range

Widely used for different fields like thermal treatment, forging, soldering, it can be chosen according to heating technology of work piece.

1. Forming for diathermancy

A. Hot upsetting and hot rolling for kinds of standard pieces and fasteners, other mechanical parts, hardware as well as twist drill with straight handle.

B. Heating and annealing for metal material, which can take convenience for stretching, shaping, coining, such as annealing of steel pipe, bending pipe, heating nail, stretching, expanding and annealing of stainless steel product.

2. Thermal treatment

Quenching for surface, inner hole, part or whole of kinds of hardware, electric elements, hydraulic elements, pneumatic elements, autoparts and motorcycle parts, such as hammers, knives, scissors, pliers, shafts, cams, chain wheels, gears, valves, button heads, rails and nodular cast irons of large-size machine tools, there are lots of manufacturers producing chain wheels and rail of machine tool adopting our equipments.

3. Solder

Soldering for tool bits, turning tools, milling cutters, planer tools, saw bits for diamond, reamers, grinding tools, drilling tools and cutting tools, besides, composite welding for other metal material such as brass and red copper parts, valves, stainless steel pan bottom and so on.

4. Smelt metal

Such as gold, silver, copper and so on.

5. Heat other fields

Heating and overlay film for polyethylene-aluminum composite pipe, cable and wire, sealing the aluminum foil used for food, drinking, pharmaceutical industry, pre-heat expanding for metal.

III. Technical features

E-9188E series new type heating equipment adopts international advanced full solid-state semi-conductor power equipment (like SIT, IGBT, MO-SFET) for combining into inversion main circuit and is equipped with perfect electronic circuit having control, protection and display alarm, hence, the frequency of whole inductive heating cause can be traced automatically. Its power can be adjusted continuously, safe and reliable, the data is very clear and accurate, furthermore, the equipment can be designed into different types and specifications through being classified as per power size and heating frequency range, so as to meet the requirements of different work pieces. It is the ideal products replacing the medium frequency generator set, electronic pipe type high frequency heating equipment.

IV. Technical parameter and classifying of machine type

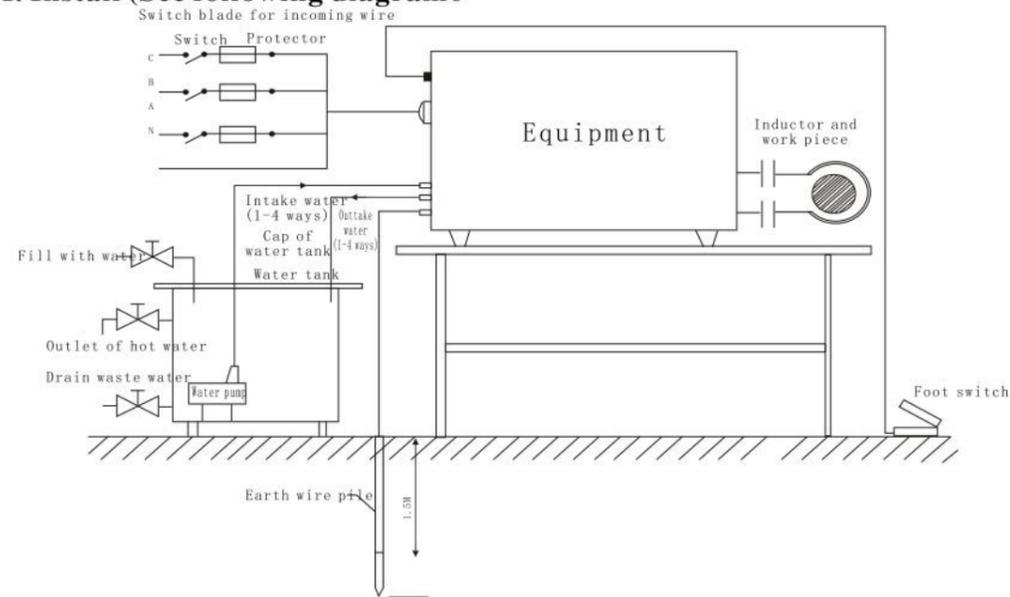
Parameter Model	Input supply voltage (V)		Oscillation power (KVA)	Oscillation frequency (KHZ)	Output supply current (A)	Cooling water pressure (Mpa)	Weight(Kg)
	Single-phase	±10%					
18	220	±10%	18	100-200	750	0.07-0.2	18
20	220	±10%	20	30-100	840	0.1-0.2	20
25	380	±10%	25	30-80	1000	0.1-0.2	23
30	380	±10%	30	40-60	1200	0.1-0.2	30
35	380	±10%	35	40-60	1400	0.1-0.2	35
40	380	±10%	40	40-60	1600	0.15-0.2	60
45	380	±10%	45	40-60	1700	0.15-0.2	65
50	380	±10%	50	30-60	1800	0.15-0.2	150
60	380	±10%	60	30-60	1999	0.15-0.2	160
70	380	±10%	70	20-40	2200	0.15-0.2	180
80	380	±10%	80	20-40	2400	0.15-0.2	200
100	380	±10%	100	20-40	2800	0.15-0.2	220
120	380	±10%	120	20-40	3200	0.15-0.2	260

Note: If the parameter for equipment type changing is out of the range listed in above table, please refer to the real parameter.

V. Excellent performance

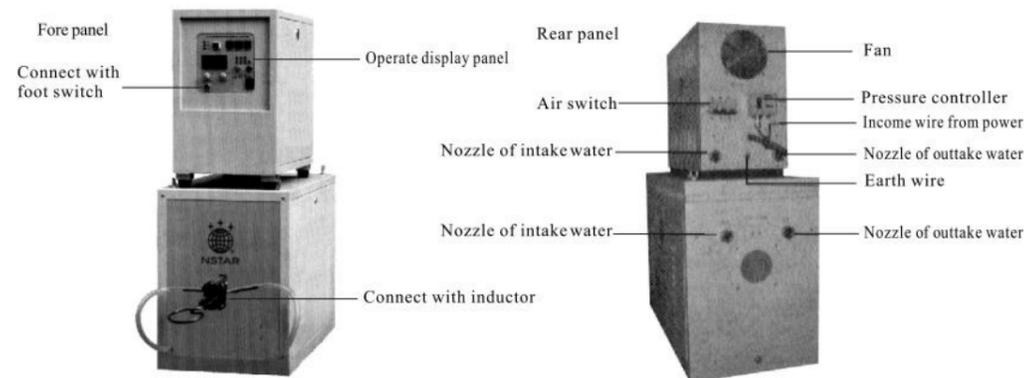
1. Small volume, light weight, without high voltage of ten thousand volt, little occupying space, can be operated movably.
2. Save electricity and cooling water
3. Rapid heating and little oxide layer;
4. The machine can be classified varieties of types according to power and frequency range, user can properly choose the product at your operating requirement, to get the satisfying ratio of performance and price.
5. Simple installation, convenient operating, only you take ten more minutes to study, you can know the whole operating cause.
6. Simple and various control mode, it has joggling control, remoter control, half/full automatic control, times the heating, cycles automatically.
7. Complete and reliable protection functions, it can protect against over voltage, over current protection, lack phase of power, too low water pressure, too high water temperature, besides, it has automatic alarm function, user can operate safely.

VI. Install (See following diagram0

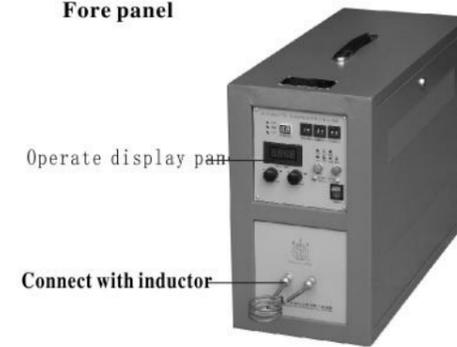


VII. Panel functions

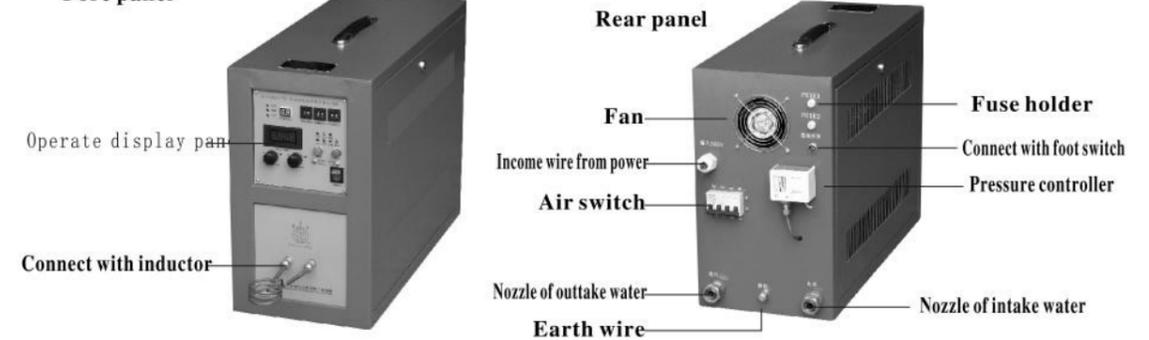
Each performance index of this product manufactured by us absolutely conforms to enterprise standard. From design to process, from choosing elements to assemble the whole machine, up to age, each of them is provided with strict quality assurance system, it demonstrates that we always carry out the guideline of customer first, quality first. The product presents stable performance, safe and reliable, simple operation and convenient maintenance, while, we are able to design products with special functions according to users' heating requirements.



Fore panel



Rear panel



1. Connect with power supply: Input power and phase number into it according to machine type, choose suitable sectional area of incoming wire from power at electric worker's wiring requirement, the switch blade, switch blade for incoming wire, fuse holder are supplied separately, they can't be replaced by air switch in the machine. The connecting shall be firm. In general, cooper conductor is supplied with 4A/mm², for example, E-9188E20 type equipment (single phase) shall be provided with 10mm² copper conductor, two-phase knife switch; E-9188E50 (three-phase) shall be provided with 16mm² copper conductor, three-phase knife switch 100A; E-9188E80 (three-phase) shall be provided with 25mm² copper conductor, three-phase knife switch 200A;

2. Quality of cooling water and connecting mode
The tap water shall be clean without impurity, dirt, suspended solid like algae. To save the water, please equip with special water tank and water pump to use the water circularly. The water pipe and joint shall meet the requirement of withstanding voltage more than 0.2MPa, and they are reliably connected with nozzle of intake water and nozzle of outtake water. The volume of water tank is 1-5m³, and it is mounted with water compensation port, overflow port for hot water and waste water outlet, so that the temperature of water tank keeps 17C-40C under the normal working and the impurity in the water can be cleared away regularly. In addition, the water tank shall be covered by dustproof cap.

3. Requirements for earth: Connect the earth terminal of equipment to the ground with cooper conductor more than 6mm², mustn't connect the earth wire and naught wire in mixture. The receiving and sending terminals shall be connected with the handy earth wire network equipped by factory, or it is earthed through making the earth pile with an earth anchor more than 1.5m length. The earth resistance shall conform to the electric engineering rules.

4. Install inductor: Under high current state, the inductor shall be given the hundreds of ampere current or thousands of ampere current, so it shall be connected very firmly. Besides no leak water, its contacting area shall be the widest.

5. The remote control switch and foot switch shall be connected with the corresponding interfaces respectively, and pay attention on the direction of locking port, after connecting, please tighten them properly.

- VIII. Operating order
1. Check whether all parts are completed installing or not.
 2. Because of long distance transporting, each plug, plug-in unit, screw in the machine may loose, please open the side door to check them before turning on the machine, if any loosening, please invite our on-site worker or user's professional electric worker to handle.
 3. Please supply water first, only water flows out from each waterway and the water pressure is stable, you can switch on the power.
 4. Adjust the inductor position and put the work piece into.
 5. After completing above operations, please turn on the power switch, rotate the power button in the min position, then press the Start button, now, the equipment can operate normally. After working, its buzzer makes buzzing for 1s interval for once, the corresponding operating indicator lamps go on, namely, the machine has worked normally, now, you can adjust the power required according to heating requirement of work piece, up to the max.
 6. Press Stop button, the equipment stops working.
 7. Order of turn-off: Adjust the power button in the min position first, take out the work piece, press Stop button, turn off the power switch on the panel, and draw down the kniveswitch, at last, cut off the power supply of cooling water pump. The air switch mounted at the back of equipment is designed according to current limiting protection capacity, so user shall reduce the times of turning on or turning off for prolonging its service life.
 8. Operating method for automatic control type: Through digital automatic control circuit, divide the single heating function of original equipment into three time intervals: heat, heat preservation, cool. You can set the time from 1-99s of each time interval, while, operating the heating power adjustment device on the panel, thus, you can get the reasonable heat temperature and heat preservation temperature, and your products shows more scientific and more accurate.

9. Attentions:
A. In the state of automatic working, the time of each time counter can't be 00, otherwise, the equipment wouldn't work circularly.
B. In the automatic state, during the equipment works, if the time has been modified by you, the equipment will operate in next cycle with the modified time.
C. In the manual state, the equipment is the same as common equipments on the working. The time displayed on the panel doesn't take any effect.

IX. Attentions for operating

1. User shall meet the requirement of this equipment power supply (power and sectional area of conductor) according to power consumption of whole factory and capacity of transformer. Input single-phase 220V and three-phase 380V to equipment, mustn't connect the power supply in mistake, otherwise the equipment would be damaged. If the mains voltage is higher than range specified, please don't use this equipment.

2. The water shall be clean all the time, you'd better equip with dustproof facility, and clean the water tank (pool) regularly. To prevent the water pipe being blocked for cumulative dirt, please clean the primary equipment waterway with the detergent regularly. The detailed method as follows: choose common auto water tank detergent, which is distributed in scale 1:40, clean the waterway for 1h, then clear away the dirt with the fresh water (or contact with our customer's service center).

3. Supply water first, then power supply. In any occasions, you are forbidden to operate this equipment before you haven't supplied water.

4. The water temperature of water tank shall be kept at 17°C-40°C, and the water tank shall be put in the ventilated place of room, generally, the pool is mounted under the ground, and covered by dustproof, sun-proof cap. In winter, to prevent the water pipe being damaged or blocked, please evacuate the circulating water in the equipment at once since the equipment has stopped working, the detailed method as follows: pull out the water pump from water tank, airlift the equipment for 3 min, drain the water in the water pipe of equipment relying on the air pressure.

5. To prevent electric shock, please often check the earth wire, can't disassemble the inductor until you cut off the water and power supply.

6. In general, the working environment for equipment is quite bad, so you shall prevent the dust, water vapor and oil vapor entering into the equipment during the equipment working, and open the side door of equipment to check every week, if there are much dust and water vapor, please turn on the fan to dry it just for ten more minutes under the equipment stops the operating. If the working environment is specially bad, it is suggested the fan should dry the equipment for ten minutes first before the equipment operates.

7. The damaged product shall be repaired by professional workers, and we take responsibility for maintaining in guarantee period.

8. Like as other inductive heat equipments, the configuration of inductor, such as the number of coils, height, shape, current direction, the distance between inductor and heat work piece, influences the induction heating efficiency, if the configuration of inductor is supplied very badly, the equipment wouldn't start or it would be damaged, therefore, in case that the size of inductor is changed, please invite professional worker to change or contact with our technical dept., we supply free enquiry service.

X. Symptom and remedy

		Cause	Remedy
No power supply		1. No turn on the air switch and power switch 2. The fuse of control circuit is broken. 3. Air switch or power switch is damaged.	1. Turn on the switch 2. Change the fuse 3. Change the air switch or power switch 4. Contact with manufacturer
After pressing "Start" button, it can't start		Fail in starting	Adjust the power to be lower, start again.
Start again and again, it isn't able to heat		Equipment occurs fault	Contact with manufacturer
As soon as it operates, the alarm will show, the situation is the same if it operates again and again.		Equipment occurs fault	Contact with manufacturer
The power fails after turning on it, the mains switch trips		Equipment occurs fault	Contact with manufacturer
Stop heating suddenly		I. Inductor and work piece show short-circuit II. Alarm III. Others	II. Eliminate short-circuit III. Get ride of the alarm with following methods. IV. Contact with manufacturer
Alarm during operating	Over voltage	The over voltage indicator lamp goes on, which shows the voltage is higher than 420V, the machine stops working automatically	Handle the mains voltage
	Over current	The light goes on, which shows 1. Interfering signal 2. Over high temperature 3. The work piece touches the inductor 4. Among coils of inductor has short-circuit	Turn off the machine to get rid of alarming. Take out the contactor between work piece and inductor, then eliminate the short circuit happening among coils of inductor, check if the water temperature is normal, if the equipment still fails in working, please contact with manufacturer.
	Over hot	The light goes on, which shows the temperature of cooling water is too high or the temperature of transformer is too high	Stop heating at once, no cut off the water, after the temperature drops for while, please heat with low current
	Lack water	The indicator lamp goes on, which shows too little water, too low water pressure, the pipe is blocked, the equipment stops working automatically.	Handle the problems of waterway.
	Lack phase	The light goes on that shows the power is lack phase.	Handle the problems of incoming wire form power (One phase wire is bumed out or broken).

Packing list

1. Main machine	1 piece
2. Auxiliary machine (For above 45 type) .	1 piece
3. Inductor	1 set
4. Joint of inductor	2 sets
5. Foot switch	1 piece
6. Protective tube	2 pieces
7. Manual	1 copy
8 Certificate & warranty card	1 copy
9. User's feedback card	1 copy

This manual is only for reference, if the contents in the manual for equipment improving show various, we won't notice separately.