



DCC
Corporation

产品使用说明书

HOTSPOT II

WARNINGS

(Concerning Hot Spot II Use & Repair)

The Hot Spot II is a pulse high energy welding unit and can generate voltages and hot particles that are dangerous to the operator. Care should be taken to avoid coming into direct contact with the uninsulated portions of the holding pliers or wire being welded while using this tool. Particular steps should be taken to avoid damage caused by sparks and sprays of molten metal produced by welding operations. The operator can be protected by a plastic shield from the hot particles. In no case should the unit be used without suitable eye protection such as the shaded goggles provided with the welder. Avoid flammable clothing and do not operate in areas containing inflammable or explosive materials. Very high currents are produced by this device so care should be exercised using the unit in any electrical environments sensitive to such pulses.

Internal power supply and energy storage capacitors will retain significant charge for an extended time interval after the unit is turned off. Circuit board inspection or repair should be performed by qualified personnel and only after these capacitors have been discharged. The ground electrode of the welder (heavy lug) is electrically common with power line safety ground and the metal case of the welder. Take care to avoid accidental discharge to the unit's case or other grounded conductors.

Use the Hot Spot II in well ventilated areas and minimize breathing the toxic compounds generated by the high temperature arc from the various elements of the components being welded.

All potential operators should be aware of the above cautions and the welder's operating characteristics before using the Hot Spot II.

警告

(HotSpot II 的使用和维修)

HotSpot II 是脉冲高能焊接单元，它能产生电压和热飞溅颗粒物，这些对操作者是有危险的。在使用该设备时要格外小心，拿钳子时不要接触非绝缘的部分或被焊接的线，并且要采取特别措施来防止在焊接操作时熔融金属火花溅到身上。操作人员可以使用塑料防护物来保护自己，使自己免受热颗粒造成的伤害。操作人员绝对不能在未戴合适的防护镜的情况下进行操作（焊接机已配护目镜）。不要穿易燃的衣服，不要在有易燃或易爆材料的地方操作。该设备能产生强电流，应该小心不要在对脉冲比较敏感的地方使用该设备。

内部电源和储能电容器能在设备断电后延长操作时间。线路板检测或维修都应由专业人员操作，而且在电容器完全放完电后进行。焊接机的接地电极（插头上的粗接线柱）是电学通用的与电源安全接地线和焊接机的金属盒连接的电极。设备对外壳或其它接地导体的意外放电要格外小心。

在通风良好的地方使用 Hot Spot II 来减少由焊接各种零部件时产生的高温电弧附带的有毒气体。

所有准备操作的人员在使用 Hot Spot II 之前应该看一下以上警告和焊接机的特性。



Controls, Indicators, and Overload Protection

The Hot Spot II is powered from the AC line through a step-down transformer and rectifier. Front panel indicators and controls allow the operator to easily monitor the state of the unit, determine the level of energy to be transferred to the storage capacitors, and initiate a weld cycle, the maximum power output of the Hot Spot II is approximately 250 Joules. The power level is set by the position of the front panel control knob. The power ranges, normal (low) and turbo (high), are selected by a two position toggle switch. Initiation of the welding discharge is controlled by a snap action push button switch.

The range switch and power level control set the voltage to which the energy storage capacitors are charged. Peak voltage on the low range is approximately 35 VDC and on the high range 75 VDC. The stored energy is proportional to the square of the capacitor voltage. Increasing the setting of the control knob will cause the capacitor to be charged to a higher level. However, decreasing the setting will not immediately reduce the value already stored so a welding cycle will always release an energy pulse equal to the highest power setting since last recent discharge.

When the internal capacitors are being charged to the level set by the energy control potentiometer, the charging indicator glows brightly. The P1 and P2 indicators show that the two high energy storage capacitors have been charged. Once the energy in the storage capacitors has been raised to the value indicated by the control potentiometer, the charging indicator will be only dimly lit or off. After a weld cycle has discharged these capacitors, the charging cycle will be repeated automatically (following a short delay to assure internal SCR turn-off) A reset table circuit breaker in the primary AC line is accessible on the unit's back panel and protects against damage from internal circuit shorts and similar fault conditions.

调控、指示和超负荷保护

Hot Spot II 是通过降压变压器和整流器来给焊机提供交流电的。面板指示和控制便于操作人员对设备状态进行监控，从而决定电容转换储存的能量级别和启动的焊接周期。Hot Spot II 的最大输出功率大约为 250 焦耳。能级是由面板控制按钮的调整决定的。能级范围----正常（低位置）和涡轮（高位置）是通过双位拨动开关来选择的。启动焊接放电是由便捷按钮开关来控制的。

能级范围开关和能级控制旋钮可以设定能量储存电容器的充电电压。低位置时的峰值电压大约为 35VDC，高位置时的峰值电压为 75VDC。能量储存大小与电容器电压的平方成正比。调高控制按钮的数值将会使电容器的充电值增加。但是，减少设定值不会立即减少已经储存的电压值，因此每一个焊接循环释放的能量值与上次循环放电时最高的能量值相等。

当内部电容器充电至能量控制旋钮的设定值时，充电指示灯将会变亮。P1 和 P2 指示灯会显示两个能量储存电容器的充电最大值。一旦储存电容器的能量升高至控制旋钮的设定值时，充电指示灯会变暗或熄灭。在一个焊接循环电容器放电后，充电循环将会自动重复进行（紧跟着会有一个延缓来保证内部 SCR 关闭）。主交流电路上可重置的断路器已接到设备后部面板上，用来防止因内部线路短路或小的错误操作引起的损坏。

Hot Spot II Capabilities and Features

The principal difference between the Hot Spot II and the Standard Hot Spot is its heavier wire welding capacity. The Hot Spot II can handle wire pairs as heavy as #14 gauge. It can also close larger tubes than the standard unit and can do light duty stud welding as an aid in wire harness attachment and in insulation blanket installation.

For the same weld power the Hot Spot II can operate at lower arc voltage than Standard Hot Spots. This produces less weld splatter and somewhat aesthetically superior thermocouple beads. There is no difference in the reading accuracy of the junctions produced by either unit.

The Hot Spot II operates only from AC power. A battery powered version of the unit is not offered. Its less than 14# weight and compact design make it a very portable package. Simplified front panel controls and status display facilitate operator training and understanding.

Identical procedures are used when making and attaching thermocouples as were developed for the Standard Hot Spot. Expectedly, there are fewer problems with T type junctions or heavier wire sizes, the same internal power circuitry operates for both high and low energy ranges. Therefore, control resolution desired and maximum energy required should dictate which range is to be employed for a particular application.

Hot Spot II 功能和特性

Hot Spot II 与标准的 Hot Spot 的主要区别是它的粗丝焊接能力。Hot Spot II 可以焊接#14 (1.6mm) 粗的线。它也可以将大尺寸的管子封口，可以连接轻型螺柱和铠装线，以及协助安装隔热衬垫。

使用同样的焊接能量，HotSpot II 可以在比 HotSpot 的电弧电压低的情况下操作，这种焊接产生的飞溅物少，而且产生的热电偶焊结球也要美观些。任何一款设备在结球时，读取焊接能量的精确性上并没有什么差别。

Hot Spot II 只能使用交流电源，我们不提供电池供电的设备。其重量只有 14 磅（6.3 公斤），而且设计紧凑、便携。简化的面板控制和状态显示便于操作培训和学习。

制作和焊接热电偶的程序设计与 HotSpot 焊接时的程序相同。该设计也达到了预期的效果，在焊接 T 型热电偶或粗丝时出现的问题较少，同样的内部能量电路可以在高和低两个量程下操作。因此，所需的控制能力和所需的最大能量要求应该指出特定设置的特殊要求。

Caution!

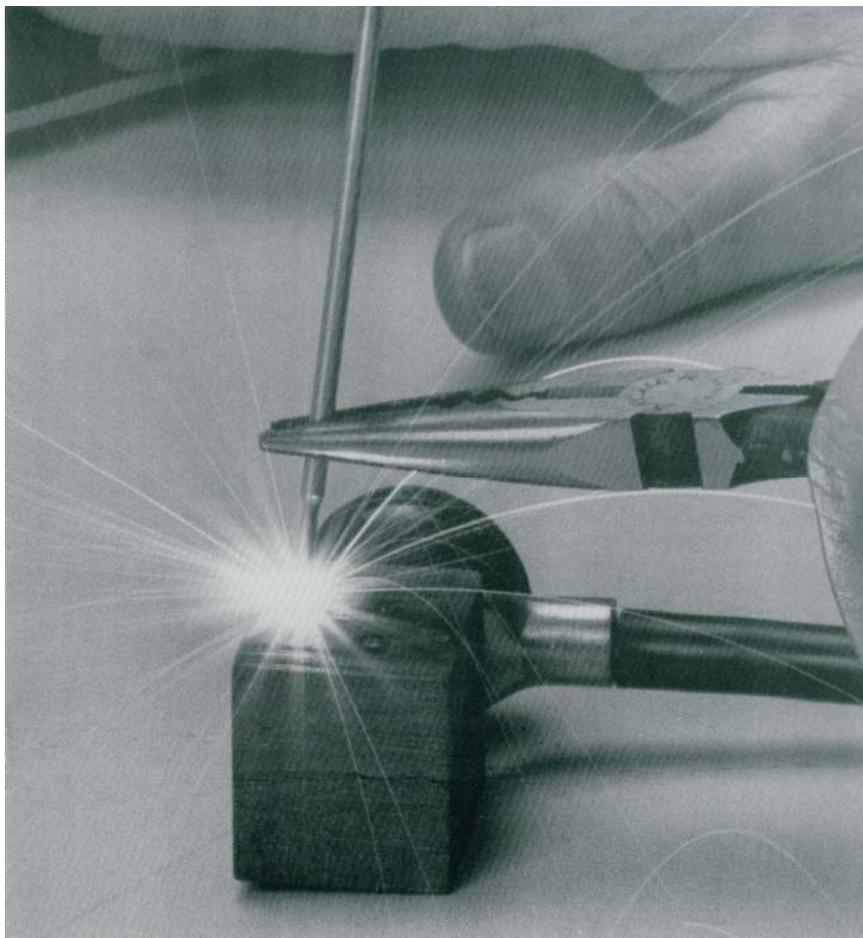
The Hot Spot II can be damaged if operated in a mode which allows the charging circuit to operate continuously. The welder is designed to recharge to maximum power in less than 10 seconds.

- Starting a **CHARGING CYCLE** while still in a **DISCHARGE MODE** will allow the charging circuit to Latch On in a continuous discharge cycle. This extends the end of the normally short charging cycle and will **OVERHEAT** and **DESTROY** the charging circuit **FET** switch and associate components.
- **TO AVOID CHARGING CIRCUIT DAMAGE, OPEN the PLIERS CIRCUIT** after each discharge. During welding operations, the **Red LED** charging lamp should be on for **NOT MORE than 10 SECONDS**. Care should be taken that unusual welding modes, modification to the circuitry, or discharge during a charging cycle do not create the above damaging conditions.

警告!

如果在充电模式下进行持续操作的话，Hot Spot II 有可能损坏。该焊接机在 10 秒钟内能达到充满状态。

- 在放电模式下起动充电循环（就是放电后，电极还在接通中），会使充电电路锁定在连续放电循环中。这种情况下会延长正常的短时间充电模式，会导致设备过热和损坏充电电路的 FET 开关和相关组件。
- 为了避免充电电路损坏，在每次放电完毕后拿开钳子，断开电路。在焊接作业时，充电红色 LED 指示灯显示的时间不能超过 10 秒。应该注意的是，不要非正常焊接、不要修改电路和在充电周期内不要放电，这样就不会产生上述的损坏。



Specifications

Size: 3.5" High, 8.5" Deep, 11.5" Wide (less handle)

Weight: 14 Pounds

Stored Weld Energy: 5 to 250 Watt seconds

Weld Capability: Welds wire pairs of #14 gauge or finer, and #8 or lighter studs

Cycle Time: Charging time at maximum energy setting is less than 10 seconds

Controls: Provides energy adjustment control, dual energy switch, and LED displays to indicate charging and energy storage status.

Power: Uses 120 VAC 60 HZ line power
(220 VAC 50HZ option)

规格

尺寸: 高 3.5 英寸(89mm), 深 8.5 英寸(204mm), 宽 11.5 英寸(292mm) (不含手柄)

重量: 14 磅 (6.3 公斤)

储存焊接能量: 5~250 瓦特秒

焊接能力: 焊接一对#14 (1.6mm) 或更细的金属丝, 8# (螺纹大径 4.166mm) 或更细的螺栓

循环时间: 达到额定最大充电能量的时间小于 10 秒

控制: 提供能量调节控制旋钮、双位能量拨动开关、充电指示灯和能量存储情况指示灯

电源: 使用 120V 60HZ 交流电源
(220V 50HZ 交流电源可选)

WARRANTY

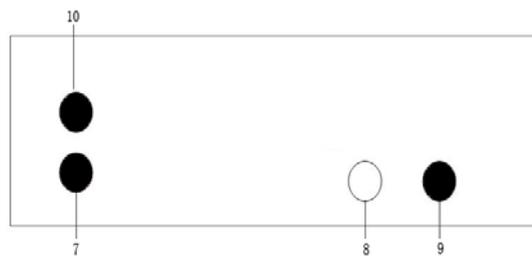
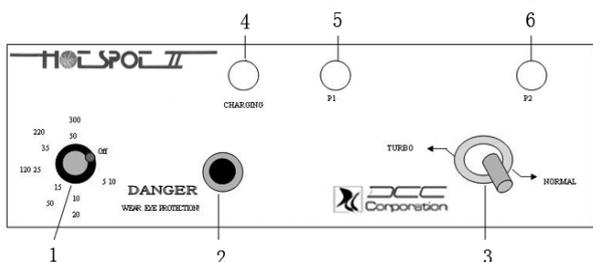
DCC warrants to the original purchaser each HOT SPOT to be free from defects in material and workmanship for the period of one year from date of delivery. This warranty does not include the internal storage battery or wear and tear due to ordinary utilization of the unit. Neither does it cover damage caused by misuse, negligence or improper supply voltages. DCC will repair free of charge any units returned to its factory and deemed by DCC to be defective under this warranty. DCC shall not be liable for any special or consequential damages caused directly or indirectly by the use of the HOT SPOT or performance of this warranty.

保证书

DCC 保证首次购买的 HOTSPOT 焊接机在发货一年内, 材料和生产工艺上没有任何缺陷。该保证书承认内置充电电池在常规使用后的损耗, 并不保修因错误操作或非正常电源导致的损坏。DCC 免费维修任何退回工厂的该担保书规定的被 DCC 公司确认为是产品缺陷的设备。DCC 公司不会承担任何由 HOTSPOT 焊接机引起的直接或间接的损失, 也不对该保证书的执行情况负责。

Description about the function of front and back panel

面板功能描述



1、The power control knob:The Hot Spot II is powered from the AC line through a step-down transformer and rectifier. Front panel indicators and controls allow the operator to easily monitor the state of the unit, determine the level of energy to be transferred to the storage capacitors, and initiate a weld cycle, the maximum power output of the Hot Spot II is approximately 250 Joules. The power level is set by the position of the front panel control knob.

2、Firing switch: Initiation of the welding discharge is controlled by a snap action push button switch.

3、Power ranges control holder: The power ranges, normal (low) and turbo (high), are selected by a two position toggle switch. The range switch and power level control set the voltage to which the energy storage capacitors are charged. Peak voltage on the low range is approximately 35 VDC and on the high range 75 VDC.

4、Incharge LED: Once the energy in the storage capacitors has been raised to the value indicated by the control potentiometer, the charging indicator will be only dimly lit or off. After a weld cycle has discharged these capacitors, the charging cycle will be repeated automatically (following a short delay to assure internal SCR turn -off)

5、Capacitors LED(P1):The P1 indicators show that the high energy storage capacitors have been charged.

6、Capacitors LED(P2):The P2 indicators show that the another high energy storage capacitors have been charged.

7、Welding cable (with washer): Connects to carbon block or magnetic iron. The cable Length: 1.5m, Diameter: 4mm (#6), Voltage: 600V Temperature range: -50-105°C.

8、Circuit breaker knob :A reset table circuit breaker in the primary AC line is accessible on the unit's back panel and protects against damage from internal circuit shorts and similar fault conditions.

9、Three phase AC power cord: 220VAC 50HZ and ground electrode. The ground electrode of the welder (heavy lug) is electrically common with power line safety ground and the metal case of the welder. Take care to avoid accidental discharge to the unit's case or other grounded conductors.

10、Welding cable (with plier sleeve): Connects to carbon block or magnetic iron. The cable Length: 1.5m, Diameter: 4mm (#6), Voltage: 600V Temperature range: -50-105°C.

1、能量调控旋钮: 此旋钮是调整能量大小的。能量指示和控制便于操作人员对设备状态的监控,从而决定电容转换储存的能量级别和启动的焊接周期。Hot Spot II 是通过降压变压器和整流器来给焊接机提供交流电的,最大输出功率大约为 250 焦耳。

2、焊接按钮: 此按钮是启动焊接放电的按钮。

3、能量范围调节把: 此调节把是双位拨动开关,用来调节能级范围,有正常(低位置)和涡轮(高位置)两档选择。能级范围开关和能级控制旋钮可以设定能量储存电容器的充电电压。低位时的峰值电压大约为 35VDC,高位置时的峰值电压为 75VDC。

4、充电指示灯: 当内部电容器充电至能量控制旋钮的设定值时,充电指示灯将会变亮。一旦储存电容器的能量升高至控制旋钮的设定值时,充电指示灯会变暗或熄灭。在一个焊接循环电容器放电后,充电循环将会自动重复进行(紧跟着会有一个延缓来保证内部 SCR 关闭)。

5、电容指示灯(P1): P1 指示灯会显示能量储存电容器的充电最大值。

6、电容指示灯(P2): P2 指示灯会显示另一个能量储存电容器的充电最大值。

7、焊接电缆(带连接圈): 接碳块或磁铁,1.5 米长, #6 (4mm) 粗,(600V, -50~105°C)。

8、断路开关按钮: 在主交流电路上已安装可重置的断路开关,此开关在设备后部面板上,用来防止因内部线路短路或小的错误操作引起的损坏。

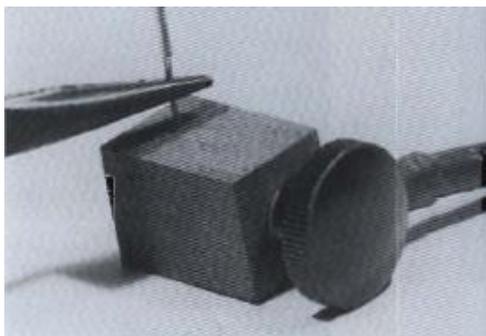
9、三相交流电源线: 由 220V 50HZ 交流电源线和接地线构成,接地线电极(插头上的粗接线柱)是电学通用的与电源安全接地线和焊接机的金属盒连接的电极。设备对外壳或其它接地导体的意外放电要格外小心。

10、焊接电缆(带钳子连接套筒): 接钳子,1.5 米长, #6 (4mm) 粗,(600V, -50~105°C)。

Application Notes...

The combination of operator ingenuity and HotSpot flexibility allows a wide variety of welded junctions to be produced. Illustrated here are some HotSpot fabrication techniques and results. They provide a suggestion of the range of possibilities and are not a definitive set of weld examples.

● Free standing junctions are produced by holding the paired wires in the electrode pliers and touching them to the carbon block electrode, **after the HotSpot firing switch has been pushed and continues to be held in.** The following energy settings may be used as an initial guide. However, they should be modified to suit the individual operator, wire type, and desired result. #30 wire pairs, 20 Watt seconds; #26, 30 Watt seconds; #24, 40 watt seconds; #20, 50 Watt seconds; #16, 100 Watt seconds; and #14 pairs, 200 Watt seconds.



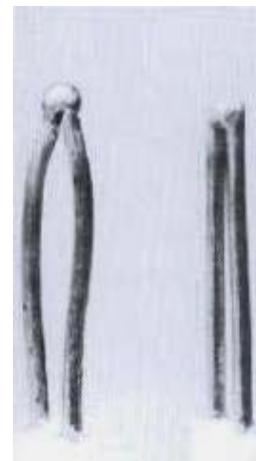
● Stripped wire pairs should be positioned in the plier electrode so that each wire is contacted. Asymmetrical contact can produce a distorted bead. Other factors, including wire material, contribute to bead distortions. Multiple attempts with the same junction may help in producing the desired shape.

操作说明

操作人员的精明与热点焊接机的灵活的结合使得多种焊接接合成为可能。这个操作手册上的图解说了一些热点焊接机的制造技术和效果。它们给各种可能性焊接提供了建议或指导，但这并不是焊接方式的最终模式。

● 通过把热电偶线夹在带电极的钳子上并且使它们与碳块电极接触，与此同时按一下 HotSpot 的点火开关并且持续，就能产生结球。同时，已经有的能量设置，可作为能量级别的参考。通过把热电偶线夹在带电极的钳子上并且使它们与碳块电极接触，与此同时按下热电偶焊接机的点火开关就能产生自动结球。能量调节旋钮刻度可作为焊接级别的初始向导。尽管如此，操作员还应根据热电偶线类别、期望效果、焊接线需要的能量（如#30 (20w·s)、#26(30w·s)、#24(40w·s)、#20 的热电偶线或#16 的单根丝）等进行适当的调节，从而便于操作。

● 多根丝的热电偶线，应该保证所有的丝都和钳子接触，达到充分的焊接。不对称的末端焊接，会使结球不规则，材料的因素也会引起不规则。但在同一个接合处的多次放电有助于产生预期的形状。



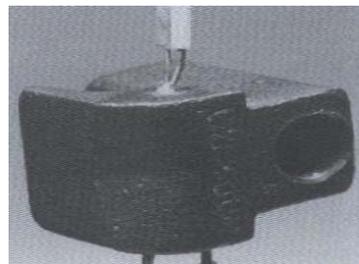
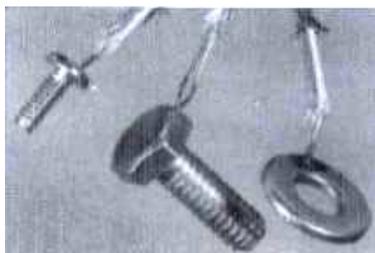
●Junctions which have a quick response and easily attach to plane surfaces can be made by flattening the bead, after it is formed. The Function of the bead is to create an identical thermal and electrical environment at the wire ends. The thermocouple output is not meant to be produced by the bead, a unique alloy peculiar to that particular junction, but by the temperature gradient along the wire themselves. Therefore, the flattening should extend to the wires. For critical applications, the resulting quick response couple should be compared against an unmodified bead, since cold working during the flattening may effect the calibration. Unacceptable differences can be mitigated by annealing or heat cycling.

●The HotSpot is very useful for welding thermocouples directly to metal items which will be monitored or to brackets, nuts, bolts, clamps, etc., which are assembled to such items. Best control and attachment is obtained if free standing junctions are first made, and then touched down to the metal surface (attached to the other welder wire) **while the firing button is depressed**. Where positioning is critical, the junction can be held with some slight pressure against the metal base, and then the firing button pushed. Neither approach is useful when the wires are finer than #26 or #28 since they will not support the pressure needed to keep them in contact with the base material during the welding period.

●焊接点要迅速，并且给予压力，焊接点成扁平后，就能焊接在表面上。热电偶结的功能是在焊接线末端形成与基体同样的导热和导电环境，热电偶信号并不是由结点产生的，结点仅仅是一个特殊的合金球，信号是因为线的温度不同而产生的。因此，压扁的部分应该与焊接线连接。对于特殊应用，快速形成的热电偶应该和普通的校对对比一下，因为在压扁操作过程中的冷处理可能会影响校准，通过退火或热循环处理可以减少差错的发生



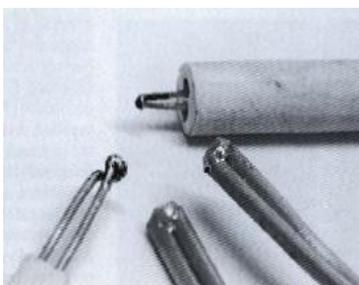
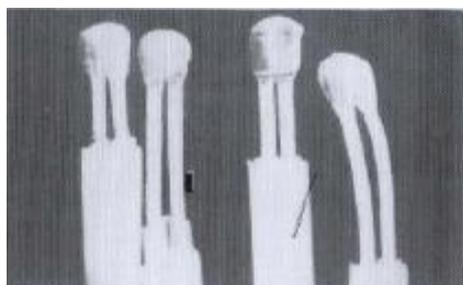
●Hot Spot 在把热电偶直接焊接到被监控的金属部件或可以与这些金属部件组装在一起的支架、螺母、螺钉、夹具上也是很有用的。如果结球一开始就已经制成，直接将其与金属表面（或与其他焊接线接在一块的）碰触，按下点火按钮就可以产生最好的监控装置。在那些关键的地方可以使用钳子夹住接合处（而不是碰触）并且紧靠金属基体，然后按下点火按钮。当热电偶线的尺寸比#26(0.4mm)或#28(0.315mm)还细时，以上的任何一种方法都不可以使用，因为它们没有支持使它们与基体材料接触所需求的电压



●Welding to materials like aluminum, copper, white metal, and brass that have low melting temperatures and are easily oxidized, can be facilitated by flushing the welding spot with nitrogen, argon, helium, carbon dioxide or some similar protective gas. Also, attachment is improved if the wire is gently "smacked" into the surface after the firing button is depressed.

●Different physical results will be obtained if the wires are twisted, or one wrapped around the other. For "T" type junctions, the copper can be given a turn around the constantan to keep it from melting back too rapidly from the arc area. Start with the constantan extended beyond the copper ring a short distance. For welding type "T" to a copper base, first weld the constantan wire to the base. Then cut off the wire flush with the surface, and weld a pre-formed junction over the resulting constantan pad. Wires can be welded to difficult bases by first passing them through a short stub tube of similar material, and then welding the assembly to the base.

●Fine wire thermocouples can be protected by first passing them through a thin stainless tube and welding the end closed in a grounded junction configuration. The HotSpot is capable of making needle probes, using .60" or .90" O.D. tubes. Expectedly, larger tubes whose ends have been swaged to a smaller diameter for a short distance can be similarly closed. To protect a simple surface junction, the HotSpot Expansion Kit includes a utility cement useful to temperatures exceeding 4000 F. This provides stress protection and some thermal insulation at the thermocouple attachment point. **If unsuccessful in any operation, call for help.**



●焊接那些像铝、铜、白合金、黄铜这些熔点很低、易于氧化的材料，使用氮气、氩气、氦气、二氧化碳或一些类似的保护气体，吹洗焊接焊点。同样，如果在按下点火按钮后，使用焊接线对焊接处表面进行轻微的“敲击”的话，焊接效果会更好。

●如果焊接线弯曲了或一根线绕在另一根线上的话，就会得到不同的物理性能。对于“T”型热电偶的结球，铜能给康铜提供一个回转时间，防止它在电弧区域快速熔化，只要让康铜线比铜线长出一小段即可。对于在铜底座上焊接“T”型热电偶来说，先把康铜线焊接到基体上，然后将焊接线烧红处切断留基体表面，然后在这个康铜垫上焊接一个热电偶结。或者，一开始将焊接线穿过一个与基体材料材质类似的短管，然后把组件焊接到基体上，通过这种方法可把任何的材料焊接在基体上。



●一开始将细的热电偶线穿入一个细的不锈钢管并且把结球与不锈钢管末端焊接，封住管，就可以对热电偶线进行保护了。HotSpot 能制作针形探头，可用外径为 0.6 英寸或 0.90 英寸的管子。同样，大的管子在末端封口形成小的末端，也可以进行类似的封口操作。为了保护简单的表面接合，HotSpot 扩充工具有一种粘合剂，它在 4000 华氏度的高温环境下特别有用，也能在热电偶附着点上提供压力保护和热绝缘。如果在操作上不顺利的话，请打电话给我们，我们给您提供帮助。

CAUTION

After each discharge, the HotSpot II automatically recharges. An internal delay of a few seconds between the time the discharge button is pushed and the start of the recharge cycle allows the storage capacitors to discharge completely and the output SCR switches to open (unlatch). A red LED indicator comes on during the charging cycle.

Some welding conditions (like a dirty contact) extend the discharge cycle. If the discharge interval is too long, the charge/discharge cycle can overlap and the internal charging circuitry may be damaged.

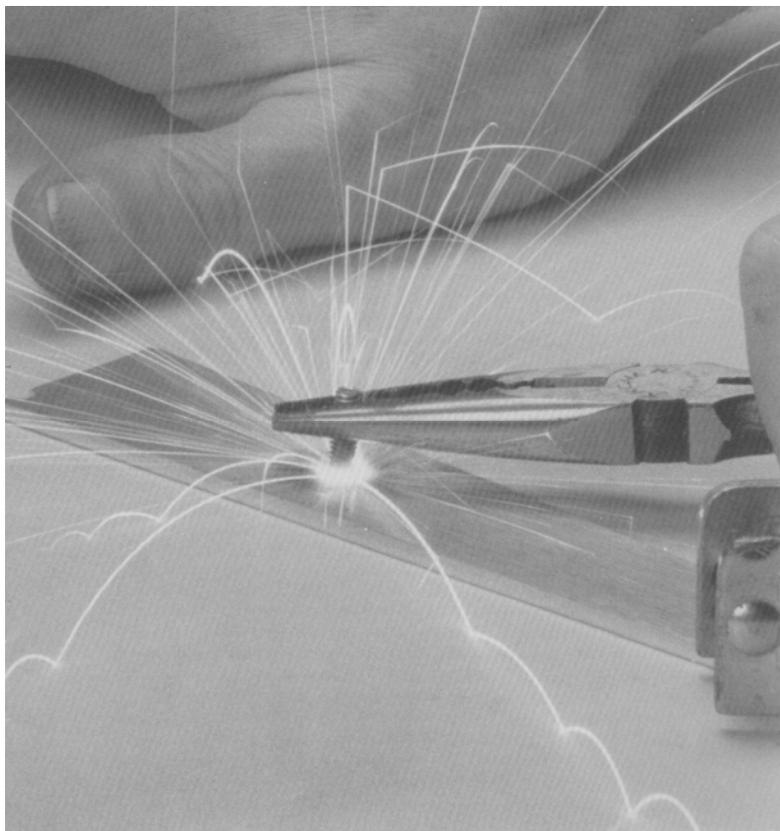
- THE RED CHARGING INDICATOR SHOULD NEVER BE ON FOR MORE THAN 10 SECONDS OR DAMAGE MAY RESULT.
- THE PLIERS CIRCUIT SHOULD BE OPENED AFTER EACH DISCHARGE TO ASSURE THE OUTPUT CIRCUIT IS OPEN.
- HIGH RESISTANCE DISCHARGE PATHS WHICH EXTEND THE DISCHARGE INTERVAL SHOULD BE AVOIDED.

注意事项

每次放电后,HotSpot II 会自动充电。松开放电按钮后,再次充电前会有几秒的间歇,主要是使储能电容器彻底放电和断开(拔掉)SCR 输出开关。充电过程中,一个红色 LED(发光二极管)会亮起。

一些焊接条件(如:接触面不干净)会延长放电周期。如果放电间隙过长,充电/放电循环可能会重叠,这样会造成内部充电电路损坏。

- 红色充电指示灯亮起不应超过 10 秒,否则可能表明有故障。
- 每次放电后应断开钳子与碳块电路,以保证输出电路打开,否则会烧毁电路元件。
- 应避免高电阻放电电路延长放电时间。



Guarantee Clause

1 The length of warranty will last 1 year after the installation.

In the warranty period, when it is normally operated according to the operational manual, attached note , in case of failure, our company will be responsible for its maintenance or repair free of charge.

2. Our company is not responsible for any direct or indirect damage caused by the failure of our machine or using our machine.

3. The following repair cases will be charged in the warranty period:

- Fault or damage caused by the improper operation, poor repair or change.
- Repair and replacement for the wearing parts.
- Fault or damage caused by unintentional drop during the transportation or movement.
- Fault or damage caused by the earthquake, fire, wind, flood, thunder and other natural disasters; or caused by the external factors such as abnormal voltage.

4. Repair cases beyond the length of warranty

If the machine can perform normally after the repair, we will charge for the repair according to the user's requirement.

5. After-sales service

Any repair requirement, components purchase and other unclear points, please consult the suppliers. During the repair, please inform the following information including name, model, manufacture number, problem as well as the supplier's name.

保修条款

1、保修期为收货验收合格之日起 1 年。保修期内用户根据使用说明书、注意事项，正常使用的情况下，万一发生故障时，本公司将免费负责修理。

2、本公司不负责由于本装置的故障或者使用本装置时所造成的直接或间接的损失。

3、保修期内以下的修理为有偿修理：

- 由于用户在操作上的错误以及不当的修理或改造而造成的故障或者损坏。
- 易损件的修理和替换。
- 由于用户在运输、移动过程中跌落受冲击等用户的使用不当而造成的故障或损坏。
- 由于地震、火灾、风水灾害、雷击以及其它自然灾害，或者由于异常电压等外部因素造成的故障或损害。

4、超过保修期的修理：修理后可维持本装置性能的前提下，跟据用户的要求，进行有偿的修理。

5、有关售后服务：如果有修理的要求、部件的购买以及其它不清楚的地方，请向各供货商的销售人员询问。另外，在商量修理时，请告知购买机器的名称、型号、产品编号、状况以及供货商名称等信息。

