SP-15A Portable High Frequency Induction Heating Unit

Operation Manual

MTI Corporation

2700D Rydin Road, Richmond, CA 94804, USA

Tel: 510-525-3070 fax: 510-525-4705 email: info@mtixtl.com

www.mtixtl.com

Notice Before Using

1. As for cooling water, make sure to use the soft water or pure water, and the temperature of the cooling water should be lower than 40°C (104°F).
2. The induction coil is very important for satisfactory heating, so please consult us if you have any problem in design of your induction coil.

CATAGARY

1. Introduction:

SP-15 series machine is a high frequency heating equipment ant in which the latest inverting technology has been used so as to make equipment very light, portable for both fixed and on-site use.

1.1 Applications:

1.1.1 Soldering of diamond impregnated cutting and grinding tools which includes:

a. segmented diamond saw blade from 250-2500mm diameter;
b. thin-wall diamond impregnated bit;
c. diamond impregnated grinding disk
d. diamond impregnated tube; etc.

1.1.2 Soldering or brazing of cutting and drilling tools, etc.

1.1.3 Heat treatment of metal parts

1.1.4 Melting of little amount of metal materials

1.2 Features of SP-15 series:

1.2.1 Quite light and portable

1.2.2 High heating speed—taking the segmented diamond cutting disk of 1600 diameter for example, less than 10 seconds are needed for soldering of one segment;

1.2.3 High duty cycle—no less than 80% even in summer time, so to make you can work continuously with this machine;

1.2.4 Easy installation—this machine can work everywhere with three phase power and water system, and it can be installed in 5minutes;

1.2.5 High frequency and saving of power-the use of inverting technology make this machine with a high efficiency so to save your power and your money;

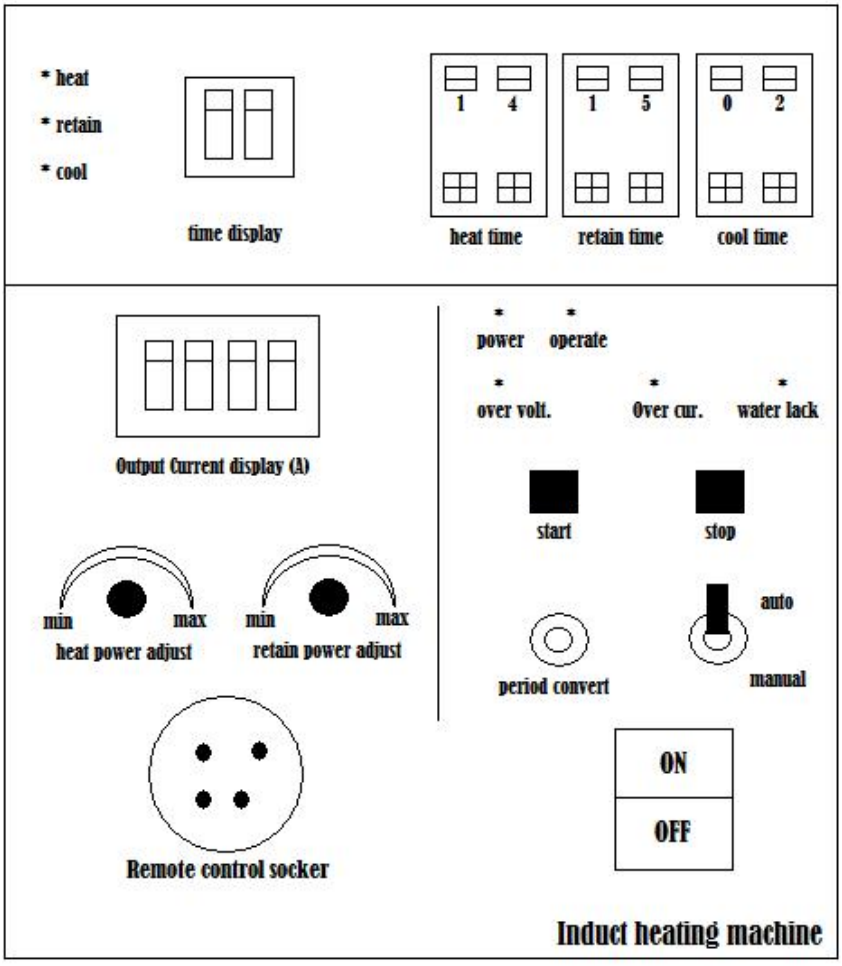
1.2.6 High designing power-this machine have a large potential of power for your work. Typically, the length and shape of the induction coil can be changed in a great range with very little influence to the heating speed so to meet your desire in many applications.

1.2.6 High designing power –this machine have a large potential of power for your work. Typically, the length and shape of the induction coil can be changed in a great range with very little influence to the heating speed so to meet your desire in many applications.

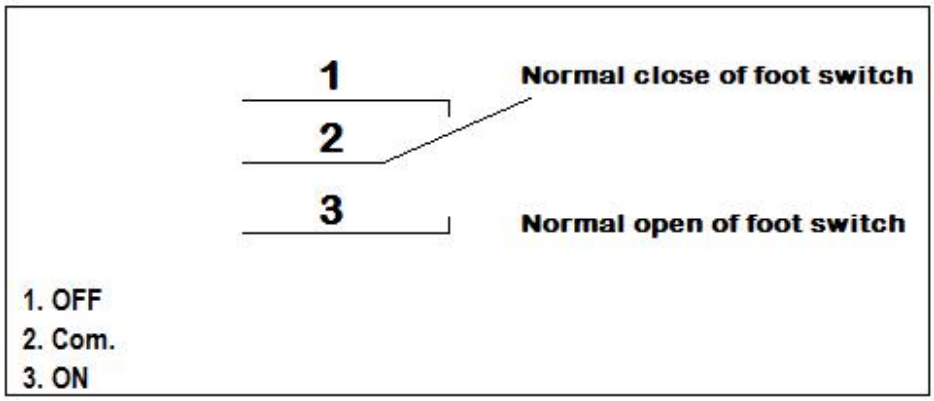
2. Technical parameters of SP-15A

Model	**SP-15A**
Input voltage	**220V single phase**
Input voltage range	**180-245V**
Maximum oscillate power	**15KVA**
Duty cycle	**80%**
Output oscillate frequency	**20-80KHz**
Heat oscillate current	**200-600A**
Retain oscillate current	**200-600A**
Heating time	**0.1-9.9seconds Or 1—99 seconds**
Retain time	**0.1-9.9seconds Or 1—99 seconds**
Cooling time	**0.1-9.9seconds Or 1—99 seconds**
Net weight	**18Kg**
SIZE	**194x400x350**
Cooling water pressure	**>0.2MPa**
Cooling water temp. <40^{o} C (104^{o}F)	**Cooling water flux > 3L/min**

3. Front Panel function explain of SP-15A



4. Tip sockets connect:



3.1 LED:

3.1.1 Power LED:

When the input power is connected and the switch on back panel and the switch on front panel has been put on, this red LED will be on to indicate the control power is OK.

3.1.2 Operating LED

This green LED will flash accompanying with pulsed buzzing when beating process is going on.

3.1.3 Over voltage LED

Input of 220V single phase is required for this machine, and the voltage range is from 180v, to 245v.when the input voltage is higher than 245v, this red “over voltage LED” will be on accompanying with continuous buzzing, and the machine will stop working automatically.

This LED will be off when the input voltage is lower than 245v, at the same time the buzzing will stop automatically.

3.1.4 Over current LED

When this red LED turns on accompanying with continuous buzzing, at the same time, the machine will stop working automatically, this will happen with a few possibilities as follows:

a. Interfere only
b. Equipment failure
c. Short circuit of the induction coil caused by contacting with the work piece.
d. Contact between induction coil

To turn off the control switch of the machine, and turn on again, the “over current” LED will be off, and the buzzing will be off too. Then you can start the machine to work again, If for every start, the machine fails with “over current” LED and the buzzing going on, there must be some failure inside the machine, for repair please refer to “maintenance manual”.

3.1.5 Lack of water LED

For this machine, the induction coil and some parts inside the machine are all cooled by cooling water. So, there are one water pressure meters inside the machine, If the cooling water pressure is lower than rated value, this red “lack of water” LED will turn on accompanying with continuous buzzing, and the machine will stop working automatically. The LED and the buzzing will go off when the cooling water pressure is large enough for use.

3.1.6 Heat LED

Either at “auto” or “manual” status, this red LED shines when the heating process is going on.

3.1.7 Retain LED

Only at “auto” status, this red LED will shine when retaining process is going on.

3.1.8 Cool LED

Only at “auto” status, this green LED shines to indicate that heating operation has been finished and cooling process is going on.

3.2 Button

3.2.1 Start button

One push of this button will start the induction heating process of the machine both at “auto” or “manual” status, But if foot switch or remote control switch with a pair of “normal open” and “normal close” contact, is connected by “remote socket” to machine front panel, the “start button” will be invalid, instead the foot switch or other remote control switch can be used to start the operation of the machine.

3.2.2 Stop button

One push of this button will stop any operation of this machine

3.2.3 Period Convert button

This button is only valid at “auto” status. At “auto” status, the three periods of heating, retaining and cooling will be processed automatically according to the time adjusted, but any push of the “period convert button” will convert the period to the next at once.

3.3 Knob

3.3.1 Heating Power Adjust Knob

This knob can be turned to adjust the heating power of the machine to control the heating speed.

3.1.2 Retaining Power Adjust Knob

This knob is only valid at “auto” status to adjust the retaining power of the machine.

3.4 Display

3.4.1 Current display

This “display” will show the output current of the machine.

3.4.2 Time display

At “manual” status, this “time display” will show out the heating time; at “auto” status, this “time display” will show out the Heating time, retaining time and cooling time correspondingly.

3.5 Time preset

To set the heating time, retaining time and cooling time from 0.1 second to 9.9 seconds or 1~99 seconds as order.

3.6 Remote control socket

By this socket, foot control switch or remote control box or other remote control signal can be connected to control the start and stop of the machine.

3.7 Switch

3.7.1 Control Power Switch

This switch functions to turn on and turn off the control power of the heating machine.

3.7.2 Auto/manual select switch

This switch selects the status of time control function. When select "auto" status, the time controller will work to control the heating, retaining and cooling time, Once start, the machine will process automatically according to the preset heating power, retaining power, heating time, retaining time and cooling time. When select "manual" status, the time controller will be invalid, and the operator will start or stop the heating process of the machine manually.

4. Back Panel function of SP-15A

4.1 Main Power switch

This switch controls the on and off of the power supply of the machine.

4.2 Control power switch

This 1A fuse protects the control circuit of the machine.

4.3 Grounding Screw

Proper grounding of the machine should always be done to ensure the safety of the operator, It is suggested that 2.5MM^2 Copper wire be used for grounding.

5. Installation

5.11 Desire for cooling water

Proper Cooling water is very important for the effective use of induction heating machine, unless, Rust, deposit, block will happened inside the machine to cause failures, of the machine.

On the other hand, High frequency transformer primary coils is also water cooled, and this will make the cooling water nearby having a high voltage, this voltage will decline to a safe value at the "water in" and

"water out" connect by the water resistance. But if the water property is not satisfied, and the water resistance is very small, this will cause a great danger of electricity strike.

A detail about the desire for cooling water is as below:

- Flux of the cooling water: ≥ 6L/min
- Cooling water pressure: ≥0.2 Mpa
- Temperature of the Cooling water: <40^{o} C
- Cooling water purity desire:

PH: 7.0~9.0

Chloride composition<20ppm

Nitrate composition <10PPm

Calcium carbonation<250PPm

Resistively Under 25^{o}C>2500ohm/cm

Total impurity composition<250PPm

Non depositing temperature of impurities: <57^{o} C

5.1.2 Cooling water suggested

Following water can all be used as cooling water. But priority is from left to right:

Distilled water—Soft water—pure water—Filtrated water supply

5.1.3 Cooling water forbidden

Sea water、Salt water、unstrained river water and unstrained well water are forbidden using as cooling water.

5.1.4 Suggested cooling water system

Circulation water system together with heat exchanger; Or city water supply.

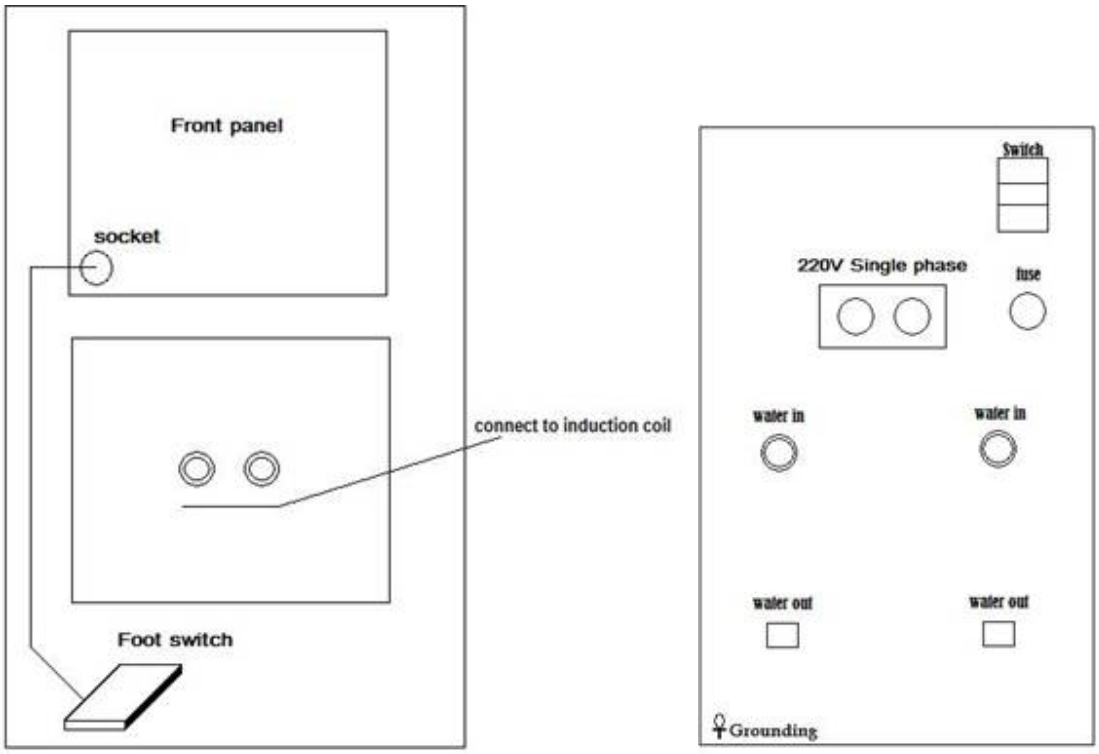
5.1.5 Connection of the cooling water to the machine

To connect the "water in" "water out" of the machine to the circulation cooling system according to figure I, and attention should be paid that:

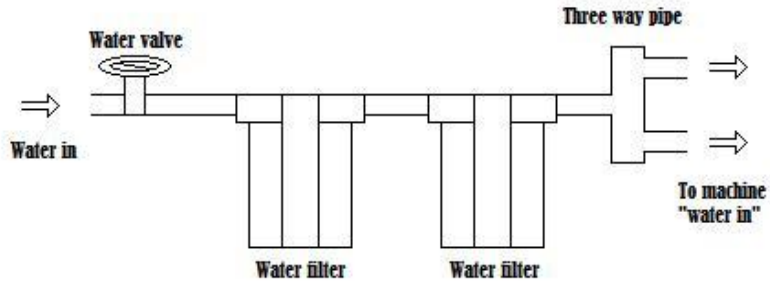
a) Two "water out" from the machine and induction coil should not be

Front panel of the machine

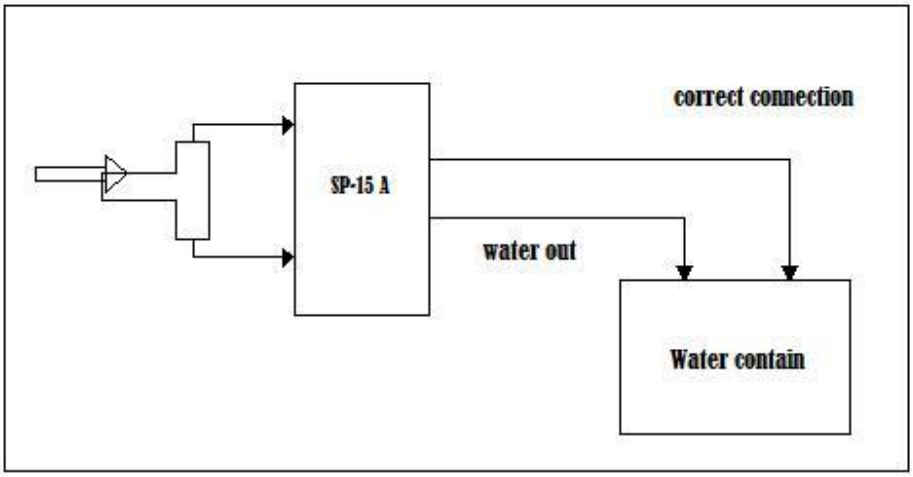
Back panel of the machine for water and power connecting

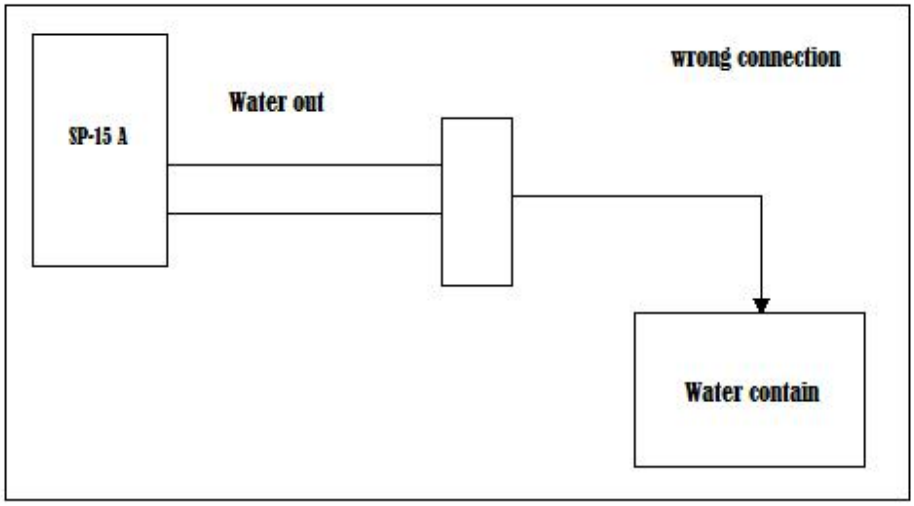


Water in connection



Water out connection


correct connection
SP-15 A
water out
Water contain


wrong connection
Water out
SP-15 A
Water contain

5.3 grounding

$4mm^2$ copper line should be used for proper grounding of the machine for safety of operator and personal nearby.

5.4 Install the induction coil

Proper induction coil is the key to achieve satisfactory heating. Special care should be taken to install the coil to assure best electricity contact and best cooling.

1) Inside 50mm around the coil, ferrous material should not be used, for example, the fixture and water tube clip which are made of ferrous material, should all be put 50mm far away the induction coil.

2) There is one pressure meter inside the machine to test the pressure of the cooling water and to stop the operating automatically when water pressure is too low to work. But these pressure meters can not test the water pressure through the induction coil. So in order to protect the coil from water lack destroy, best way is to make the water connection according to figure2, using one valve to control two "water in".

5.5 Connection of remote control switch

Just refer to figure 1 to make the connection of foot switch.

6 Operating procedure

6.1 To check:

1) Make sure that all the installation be finished.
2) Make sure proper induction coil be connected
3) Check four "water out" of the machine to make sure there are enough water flux from every one water out tube.

6.2 To adjust the function on front panel

1) Select "Auto/manual" switch status.
2) Select "front panel operation" foot switch operation', if front panel operation is preferred, foot switch should be taken away without connection.
3) Adjust the "heat power adjust" knob and "retain power adjust" knob to proper position.
4) At "auto" status, adjust the heating time; retain time and cooling time to proper position.

6.3 Turn on the main power switch on the back panel of main part of the machine.

6.4 **Turn on the control power switch** on the front panel of main part of the machine, And the “power LED” on front panel shines.

6.5 To operate and heat at “auto” status (with time on)

Push “start” button on the front panel, or push “foot switch” to start operation of the machine, The machine will first begin with heating procedure, in heating procedure, the “operate LED” flashes, the “time display” shows the actual heating time, and the “heat LED” shines, and the digital meter shows the heating current or heating power which is preset by the “heat power adjust” knob; when heating times out, the machine will convert to retaining procedure automatically, in the retaining procedure, the “operate LED” continues to flash, the “time display” shows the actual retaining time, and the “retain LED” shines, and the digital meter shows the retaining current or retaining power which is preset by the “retain power adjust” knob; when retaining times out ,the machine will convert to cooling procedure automatically ,in that procedure, there is no heating power and the digital meter show “0” , and the “operate LED” stop to flash the “time display” shows the actual cooling time; when cooling times out, the machine finishes one complete process of heating. Then by push the “start” button or foot switch, another process can begin …..

Points should be mentioned that:

1) To push the “stop” button on front panel can stop the operation of the machine at any time.
2) If “start” button or foot switch was pressed when last process is still going, the timing may go wrong,
3) “Start” button on front panel will be invalid when foot switch is used.

6.6 To operate and heat at “manual” status

Push “start” button on the front panel, or press and hold the “foot switch” to start operation of the machine, the “operate LED” flashes, the “time display” shows the accrual heating time, and the “heat LED” shines, and the digital meter shows the heating current or heating power which is preset by the “heat power adjust” knob; to push the “stop” button on front panel or release the “foot switch”, the heating will be stopped, Also the “ start” button on front panel will be invalid when foot switch is used,

6.7 To turn off

1) Turn off the control power switch on the front panel.
2) Turn off the main power switch on the hack panel of main part of the machine

3) Turn off the power switch of input power.

4) Turn off the water valve.

7. Production details