# INVERTER AC/DC WELDER

# USER'S MANUAL

# MODEL: WSE160/WSE200 SUPER160/SUPER160P

# INSTRUCTIONS

Thank you for using our welding machines!

For important safety of bodies, please read this manual book and understand its contents before operation.

## GUARANTEE

we give our unreserved guarantee that it's the Inverter Welding and Cutting Power Source series comply with IEC974 international safety standard.

Maintenance for one year since the date of purzhase.

## WARNINGS!

You may be faced with dangers during the course of welding, so please be carefull and read the manuals carefully before working.

## CAUTIONS:

. A certain switch is needed to protect the machine from electricity-leaking.

. Please use welding tools of good quality.

. Operators should be qualified for welding.

### Electric-shock: it may be fatal to life.

. Set earth cable to the standard.
. No touching electric parts with bare hands, wet hands or wet clothes.
. Make sure that you and working piece are in insulation circumstances.
. Make sure that your working is in safety.

### Smoke: it may be harmful to your health.

. Keep your head out of the smoke.
. When welding, make sure the air is flowing to avoid breathing in the smoke.

### Arc-emission---may be harmful to your eyes and skin

. Wear suitable welding mask and clothes to protect your eyes and skin.
. Use suitable screen or curtain to keep the look-ups from the emission.
. The welding splash may cause fire, so make sure that there is no flammable things nearby the working place.

### Noises---too much noise may be harmful to your hearing.

. Please wear something to protect your ears from the noises.
. Warn the look-ups of the hidden harm the noise may cause.

### Break-down: ask the professional for help

. If you have any problems in setting up or opetating, please first consult this manual.
. If you still can not understand after reading this tnanual, please contact your supplier or manufacturer to get professionals' help.

## A BRIEF INTRODUCTION TO THE PRODUCTS

WSE AC/DC p serial is our newly-developed AC/DC and pulse products, whose main character is that it can not only weld non-rusty steel, alloy steel and carbon steel and

other nonferrous metals with DC function, but also it can weld aluminum and alloy aluminum with AC function. For instance, for welding skateboard and bicycle made of aluminum. The total power exchange rate of the machines are over 85%, and they are energy-saving. The main types are WSE160/WSE200 、SUPER160/SUPER160P

The use and development of inverter teclmology in welding benefits from the invention of high power electronic spare parts.esp.IGBT, the employ of which greatly reduces the volume and weight of main parts, e.g. transformer and anti-electricity, thus making our machines able to work under HF 20KHZ. We also employ PWM and CPU-control to make the welding current stable, accurate and easy to adjust; and the machines convenient to operate, and avoid the distrubance of electric magnetism.

WSE welders are made with inverter technology, and they are lighter , smarter and more efficient as compared with traditional ones; while compared with imported ones. they are cheaper, and has stronger electric net. The most characteristic one is the use of twice inverter technology and output of pure squ are wave, which makes the arc more straight, heat more concentrating, anti-elearance stronger and wider clearance, etc to make sure the high quality of the machines.

Inverter welders are also equipped with TIG torch, and cable of suitable length, hose and water-cooling connector. Besides, there are also other spare parts for torch, such as ceramic nozzle, collet body, short cap and long cap. The size and quantity of them can see in the enclosed packing list. If you need more spare parts, you can order separately.

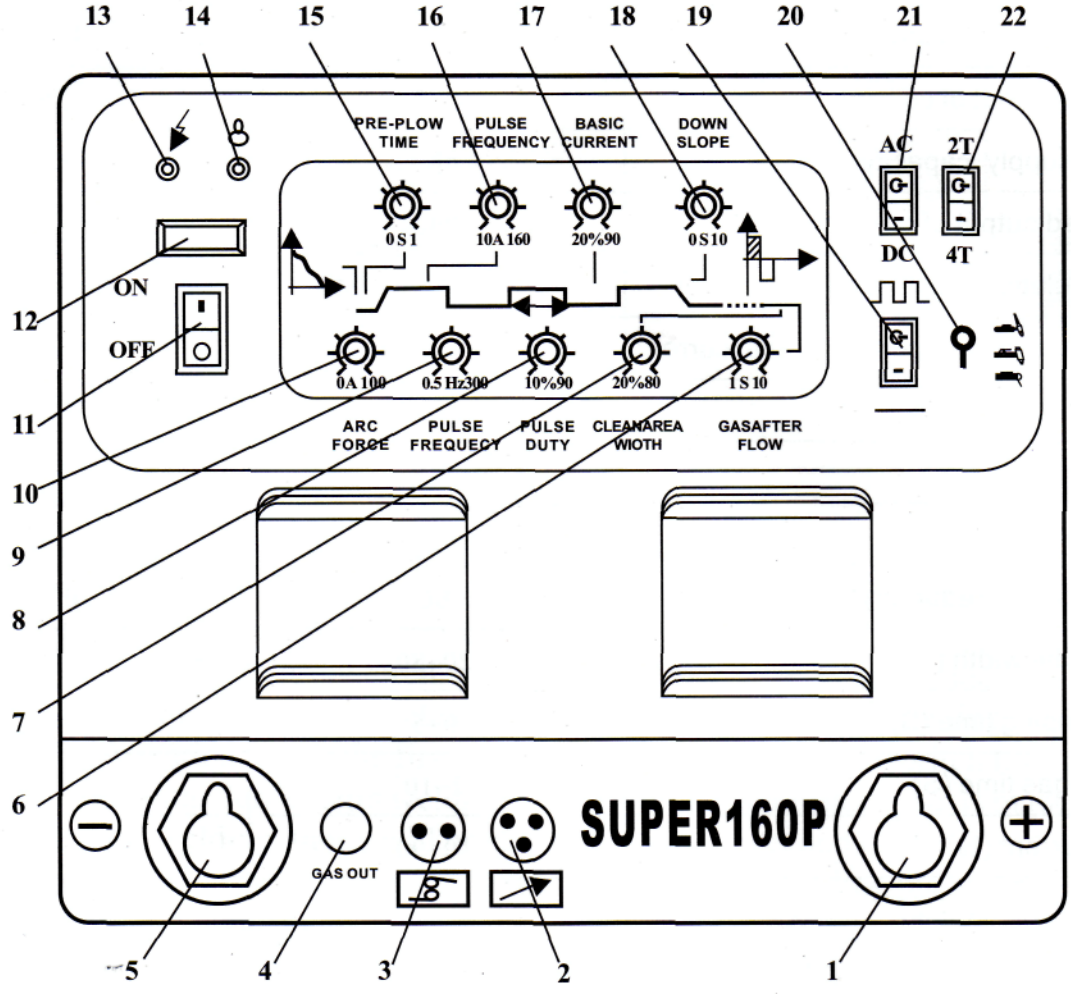
**Cautions!**

This equipment is used mainly in technology. Under room temperature, this equipment may have wireless emission, please pay attention to it when working.

**The main technique parameters of SUPER series' inverting type AC/ DC** welder are showed in the form below:

| Machine Type | SUPER160P | SUPER200P |
|---|---|---|
| Power supply voltage | AC220± 15%50/60Hz | AC220± 15%50/60Hz |
| The rated input of current | 22A | 26A |
| Power supply capacity | 4.8KVA | 5.2KVA |
| The rated output of current | 160A | 200A |
| The regulation range of output current | 20~160A(15-40A) | 20~200A |
| The regulation range of arc force current | 0~100 | 0~100 |
| No-load voltage | 56V | 58V |
| operating voltage | 28V | 32V |
| Pre-flow (S) | 0~2 | 0~2 |
| The output of frequency(Hz) | 60 | 60 |
| Tidy up the width (%) | 20~80 | 20~80 |
| The damping time (S) | 0~5 | 0~5 |
| The tail gas time (S) | 2~10 | 2~10 |
| Basic current (%) | 10~90 | 10~90 |
| pulse frequency (Hz) | 2~200 | 50~200 |
| The pulse duty ratio(%) | 10~90 | 10~90 |
| Remote control | no | no |
| Arc strike | high frequency oscillation | high frequency oscillation |
| Efficiency (%) | 85 | 85 |
| Load duration rate (%) | 60 | 60 |
| Power factor | 0.93 | 0.93 |
| Insulation grade | B | B |
| Outer shell protection grade | Ip21 | Ip21 |
| Weight (K g) | | |
| Features size (m m) | 500x320x300 | 500x320x300 |
| Biggest welding thickness (m m) DC | 10 | 10 |

**The structure of the SUPER series inverting type AC/DC welder** is showed as figure 1.




1, Output terminal to connect work piece;
2, Three cores aviation plug;
3, Two cores aviation plug;
4, Gas out joint;
5, Output terminal to connect weld the gun;
7,Tidy up the width regulating knob;
6, Afterblow time regulating knob;
9, The pulse frequency regulating knob;
8, The pulse duty ratio regulating knob;
11, Main power switch;
10, Arc force current regulating knob;
13 , Abnormality indicator;
12, Digital meter;
14, Overheating protection indicator;
15, Foreblowing time regulating knob;
16, The current regulating knob;
17, Basic current regulating knob;
18, The reduction regulating knob;
19, Puise/no puise changeover switch;
20, MMA/TIG/CUT changeover switch;
21, AC/DC changeover switch;
22,2T/4T changeover switch;

## Each switch function as follows:

**The first:** Changeover switch

1, **Main power switch;**

2, **MMA / CUT/TIG changeover switch;**

3, **The AC/ DC changeover switch:** Place changeover switch at "**AC**", it is argon welding with alternating current,can weld aluminum product. Place changeover switch at "**DC**", it i s argon welding with direct current, can weld stainless steel product.

4, **2T / 4T changeover switch:** When **2T / 4T** changeover switch is at "**2T**", it is the position of short time welding, the electric arc will light. When press the switch of welding torch, the electric arc will crush out .When the switch is off.When the **2T/4T** changeoverswitch is at "**4T**", press switch of welding torch. The arc light. Unciench the switch, welding machine keep output after press the switch again. It will stop.

5, **Pulse /no pulse changeover switch;**

**The second:** Regulating knob

1, **Fore blowing time regulating knob:** Welding result for assurance,it is requested that argon gas arrives earlier than current at welding, and this knob is set to regulate the time difference between argon gas and current.

2, **The current regulating knob:** This knob is set to regulate welding current.

3, **Basic current regulating knob;**

4, **The reduction regulating knob:** While completing a welding, modeling well for assurance, it is requested that the current decreases gradually to stop. This knob is set to regulate current decreasing time.

5. **Arc force current regulating knob;**

6, **The pulse frequency regulating knob;** In the **DC TIG,** you can change the pulse frequency by this knob.

7, **The pulse Duty ratio regulating knob;**

8, **Tidy up the width regulating knob:** In the **AC** argon welding, current is alternating continuously in two directions. While current flows from the tungsten needle to the work piece, it is positive current. The tungsten needle is not very hot, calories concentrated, it is beneficial to weld. When the current flows from the work piece to tungsten needle, it is negative current, it can tidy up the oxidizing layer at the work plece surface at this time,contribute to attaining a good welding result, but tungsten needle will be overburden easily because of being too hot. This knob is set to regulate positive and negative current time rate. While this knob is turned to "**O** "position, the time rate of positive and negative electricity is **50 %.** While it is turned to "**+5**" position, the time rate of positive and negative electricity is **80% .** While it is turned to "**- 5**" position , the rate of positive and negative current time is **20%.** Revolved clockwise, positive electricity time will grow;negative current time will be shorter. Revolved counterclockwise the result is contrary then.

**Note:** Please use smaller duty ratio when the current is higher, for example:
Above **160 A** to use a duty ratio below **30%.**
And use bigger duty ratio when the current is lower; for example: below **100 A** to use a duty ratio above **50%.**

9, **after blow time regulating knob:** After welding, the work piece will be oxidized because of intensely hot, so after stopping welding it is required to use the argon gas that the gun blows to cool off for a period of time. This knob is for regulating tail gas after blow time. The longest time can reach 10 seconds.

**The three:** Indicators function

**1, Overtheating protection indicateor:** It is set for overheating protection when welder is at continuous, long time, high current work , and in bar of the inner part is too hot to damage components. When this light is bright, you should stop work , but don't shut down. It can recover automatically in **2~3 minutes.**

**2, Abnormality indicator:** This light will be bright when welder's internal work is abnormal. If the light is bright, please turn off power switch. After the light is out , restart it again. If the welder restores normally, it can be used continuously. If it appears again, please ask professional personnel or manufacturer to check and fix.

**3, Digital meter:** Dispiay the current of welding.

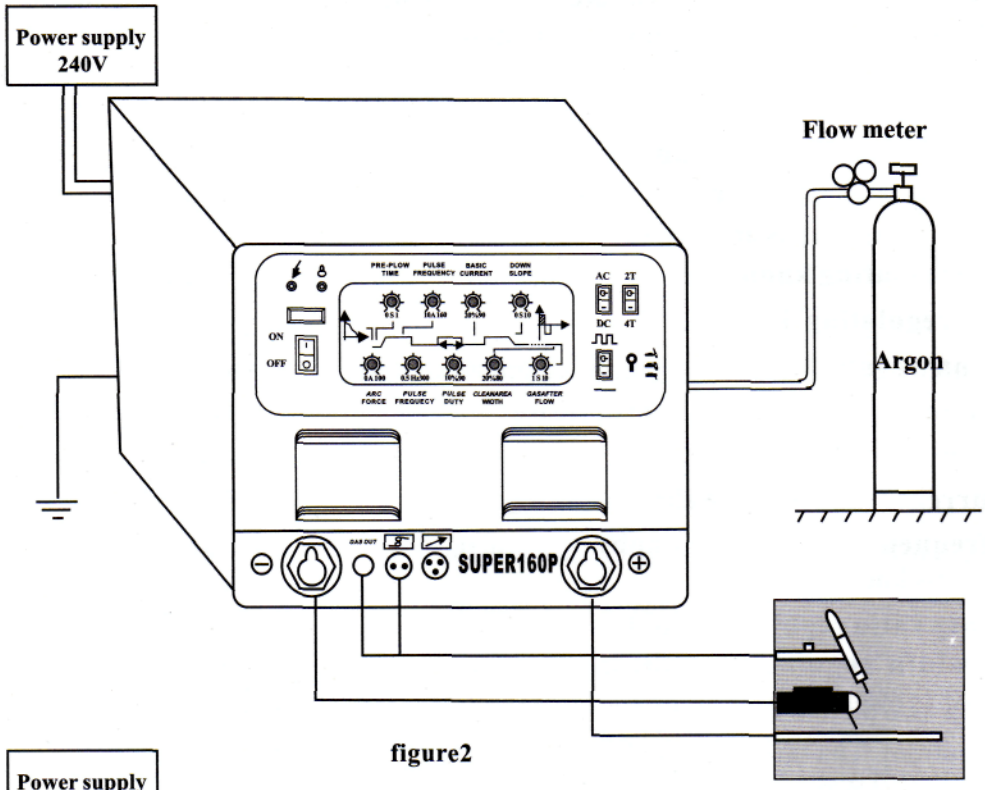



figure2

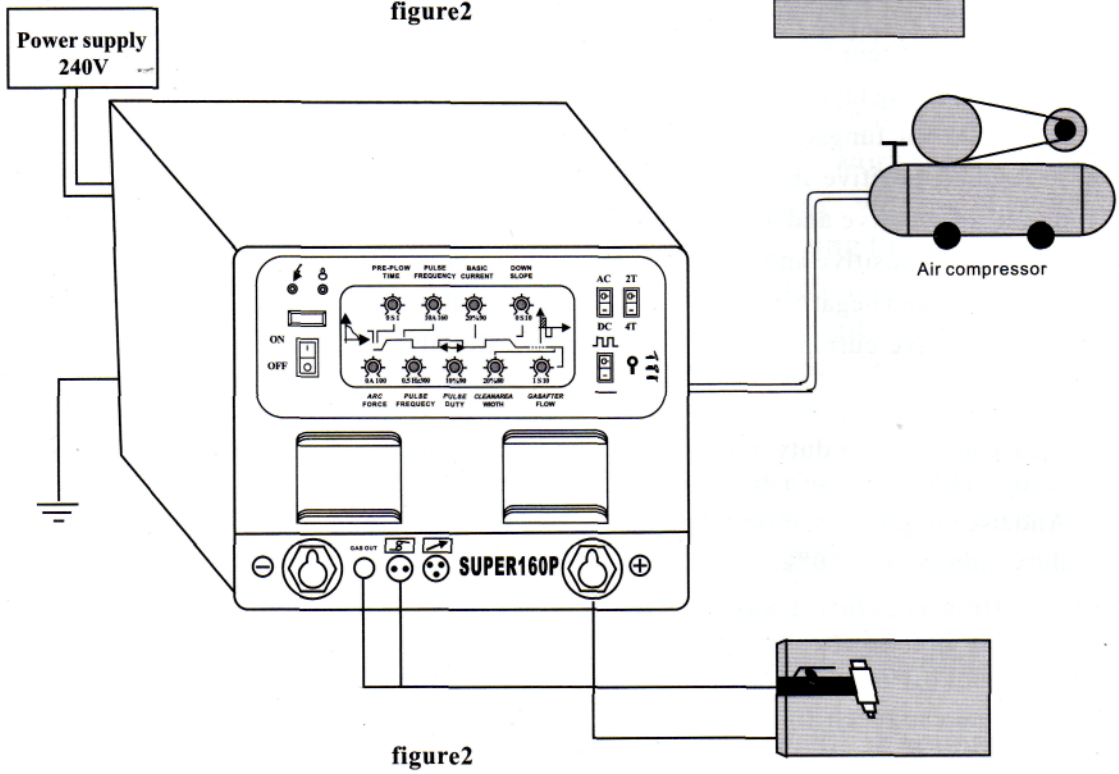



figure2

This product is suitable only to TIG serials (TIG).

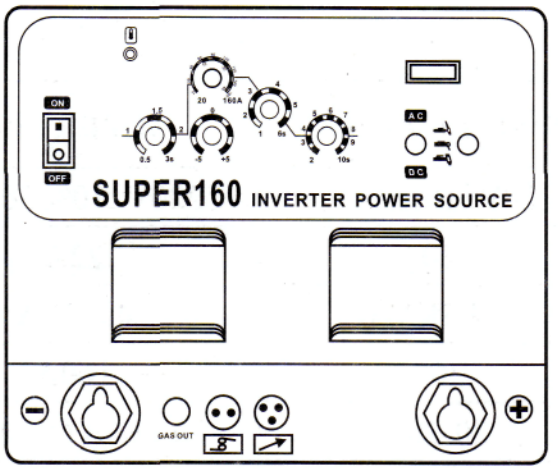
## THE MAIN PARAMETER

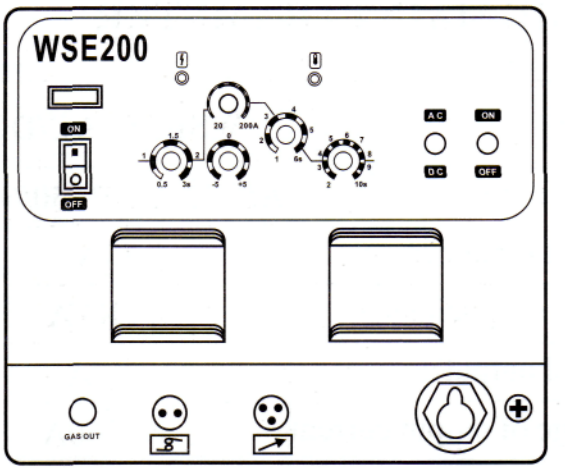
| TYPE | WSE 160AC/DC | WSE 200AC/DC | SUPER160 |
|---|---|---|---|
| Power voltage | AC220V±10% 50/60Hz | AC220V±10% 50/60Hz | AC220V±10% 50/60Hz |
| Rated input current | 17A | 20A | 22A |
| Power capacitance | 4.1KVA | 4.5KVA | 4.8KVA |
| Rated output current | 160A | 200A | 160A |
| Range of output current | 20-160A | 20-200A | 20-160A (15-40A) |
| No-load voltage | 51V | 56V | 56V (220V) |
| Working voltage | 14V | 18V | 28V (100V) |
| Pre-flow(S) | 0-2 | 0-2 | 0-2 |
| AC output frequency(Hz) | 60 | 60 | 60 |
| Clean witdth(%) | 20-60 | 20-60 | 20-60 |
| Slope-down time(S) | 0-5 | 0-5 | 0-5 |
| Tail-gas time(S) | 2-10 | 2-10 | 2-10 |
| Remote control | YES | YES | YES |
| Arc-leading | HF vibration | HF vibration | HF vibration |
| Efficiency(%) | 85 | 85 | 85 |
| Rated duty cycle(%) | 60 | 60 | 60 |
| Power factor | 0.93 | 0.93 | 0.93 |
| Insulation class | B | B | B |
| Protection class | IP21 | IP21 | Ip21 |
| Weight(kg) | | | |
| Size(mm) | 500X330X320 | 500X330X320 | 500X330X320 |
| Max welding thickness(mm) | 10 | 10 | 10 |

## Panel board functions & instructions

SUPER 160 Panel

WSE 200AC/DC Panel




A. Exchange switch:

1. ARC/TIG/CUT exchange switch: place the switch on "ARC", it's for MMA welding;
   place the switch on "TIG', it's for AC or DC tig welding.
   place the switch on "CUT', it's for palsam welding
2. AC/DC exchange switch: place the switch on "AC", it's AC, for aluminum; place the switch on "DC", it's DC, for non-rusty steel.

B. Adjustment switch

1. Pre-flow time switch: To guarantee the welding efficiency, gas is before current, this switch is to adjust the time between gas and current.
2. Current time switch: It's for current adiustment, and change the volume of the current。
3. Clear width switch: In AC TIG welding, the current exchanges between positive and negative directions, when current is from tungsten to work piece, it's positive direction and tungsten heats little, convenient for welding; while if current is from work piece to tungsten, it's negative and good for removing the oxidization coating on the surface of the work piece, buc the tungsten mav be easily damaged because of overheat. This switch iS for adjusting the current time between positive and negative. When it's at the middle, the proportion is 50%; at the maximum is 80%; at the minimum,20%. If in clockwise direction, the positive current time turns longer and negative one shorter: and vice versa.

   Re: Big current, low clear width; e.g.≥200A, the clear width≤30%.

   Little current, high clear width; e.g.≤100A, the clear width≥50%.

4. Slope-down switch: After finishing welding, at the crater time, the current is required to reduce gradually until it stops, and this switch is to adjust the reducing time.

   Re: If use "foot switch", this switch is adjusted to "0" in counterclockwise direction.

5. Plst-flow time switch: The work piece may be oxidized because of heat, so it needs to cool with the welding gas for some time as long as 10 seconds, this switch is for adjusting the post-flow time.
6. Arc force adjustment: if you adjust this switch at MMA, then it can change the welding characteristic of the little current.
7. Base current: at DCTIG pulse, this button can adjust the volume of the valley current.
8. Pulse frequency switch: at DCTIG, and place the DC/PULSE at PULSE, this switch can adjust the pulse frequency (0.5-300Hz).
9. Air-occupying proportion: change the air-occupying proportion at DCTIG pulse

**C. Pilot light function**

1. Pilot light for over-heat protection: If the machine works continuously for 1ong time under big current, its inner parts may get burned as a result of over-heat. To avoid this, we set the pilot light, when it's on, please stop working, but do not tum off the machine, and it can recover after 2 of 3 mill.
2. Pilot light for abnormal phenomenon: If the machine has abnormal phenomenon. the light will be on, when you should turn off the power supply and restart the machine to see if it's normal again; if not, please ask professionals or the manufacturer for help.

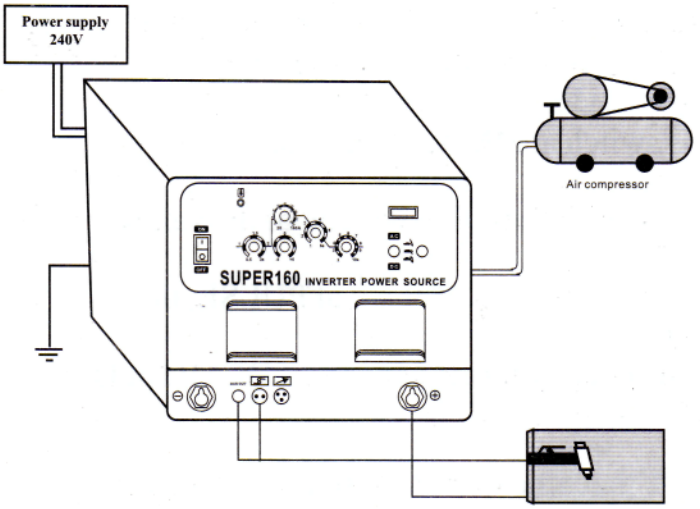
## INSTALLATION

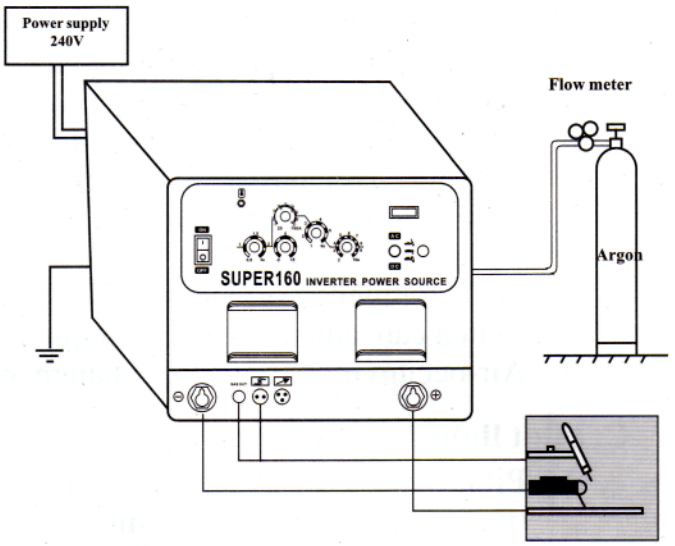
WSE welders are equipped with power voltage complement, and when the power voltage ranges between ± 15%, it can still work.

When using long output cable, to reduce voltage-decreasing, we suggest you choose cables with wider section; but if the cable is too long, it may cause abnormal in the working system, so we recommend you use the given length.

1. Make sure the ventilating mouth is not blocked or covered lest the cooling system invalid.
2. Connect well the $CO_2$ source. The gas supply includes gas bottle, gas hose and gas regulator, the connection of the hose should be connected with hose clamp or othcr things lest gas-leaking or air-in.
3. Connect the case to earth with cables whose section is no less than 6mm$^2$, from the back of the welding machine to earth screw to earth-connecting equipment.
4. Plug the air-plug of the back circuit cable to on the air-socket "+", and whirl the switch in clockwise direction tightly, the other terminal of the earth clamp is tied to the work piece.
5. Tie the power plug to the concerned socket, and make sure that the power supply is AC 380V with a tolerance error of the given rarge.
6. Set up the water-cooling torch according to the given map, tie the copper screw at one end of the torch to the one-knob on the panel bcard, and tighten it in clockwise direction.
7. Connect the two-cored air plug of the foot swirch respectively to the two-cored and three-cored sockets on the panel board.
   After finishing all the work above, you can start welding.
8. Connect the foot pedal flug to the 7-cored sockots on the panel board,and rum down The current to be lowest

Installation: Installation of water-cooling torch:




## INSTRUCTIONS TO AC TIG:

1. Place "AC/DC" to "AC".
2. Turn on the power switch , the fan begins to work.
3. Turn on the gas switch, adjust the gas to rated standard. (See parameter)
4. According to the oxidization degree of the work piece, adjust the switch for clean width to change the positive and negative current rate.
5. Tum on the switch on the welding torch, and the electromagnetic valve works, you will hear the sound of HF electricity-releasing, meanwhile, there is gas coming cut of the torch mouth. Attention: If it's the first time to weld, please hold the switch for seconds before welding, don't begin welding urtil all the air in the gas road is made out. After you finish welding, there will be still be gas out for seconds. This is designed for protecting the welding point, so please stay in the welding place for seconds before removing the torch.
6. According to practical use, choose the foot switch. If the foot switch is in use, please turn the current to the minimum, and the current volume is under the control of the foot switch.
7. According to practical use, adjust the time of "pre-flow"、 "post-flow" and "slope-down".
8. Keep the distance between the tungsten and work piece between 2mm to 4mm, push the torch switch, then HF electricity-releasing will come out between the welding tungsten and work piece; after the arc-leading, the splash may disappear at once, then you can start work.

## INSTRUCTIONS TO DC TIG:

1. Make "AC/DC" to "DC" place.
2. PULSE/DC switch, if you put it at PULSE, you can adjust the buttons for Base current adjustment、pulse adjustment or clear width adjustment to achieve the welding efficiency that you need.
3. Turn on the power switch, the fan inside the mactfine begin to work..

4. Turn on the gas switch, adjust the gas to rated standard. (See parameter)

Same as ACTIG welding instructions5、6、7、8.

**CAUTIONS**

Any plug-in or plug-out of cable or connection during the welding is forbidden, because such operation may cause. harm to either body safety or the equipment.

## Cautions & Pre-cautions

Environment

1. The operation should be in a comparative dry environment, the air humidity no more than 90%.
2. The around temperature should be between - 10℃ and 40℃.
3. Avoid working under the sun or in the rain, do not let in water or rain.
4. Avoid working under the circumstance of dust or air with corrosive gas.
5. Avoid doing Ar working under the condition of strong air flow.

Safety tips

WSE welders are equipped with over-voltage and over-current and over-thermal protection circuit,when the output voltage, output current and inner temperature is over the rated ones, the machine will stop working automatically. But over-use (e.g. over-voltage) may damage the welding machine, so pay attention to the following tips:

1. Make sure of good ventilation: TIG welders are large technical welding machines, and has huge current through it when workhag. and natural air flow can not satisfy its cooling need, so we put two embodied fans to cool it and makes it work normally. The operator should make sure the fjul not blocked or covered, and the distance between the welder and surroundings shouldn't be less than 0.3m. The users should always pay attention to the flowing condition of the machine, because it is very important for the working quality and working year of the machine.
2. No over-load: The users should pay second attention to the allowed max loading current (comparative load cycle), and make sure the welding current not surpass the allowed max. Over-current may obviously shorten the working year of the machine. and even may fire the machine to pieces.
3. No over-voltage: The power voltage is listed in the "Main Parameter" table, generally. the automatic compensating circuit may make sure the current is in rated range. If the voltage surpasses the allowed value, the machir e mav be damaged. The operator should be familiar with it and take certain actkw s to prevent it.
4. Every welder has an earth screw, and earth cormecting mark. Before operation, please choose a cable whose section is more than 6mm$^2$, make the case firm earth-conn-ecting to avoid accidents which may be caused by electricity-leaking.
5. If the working time of the weldcr surpasses the standard load cycle, the machine may suddenly enter protection condition and stop working, which shows that the machine has been over the standard load cycle, and over-heating works the thermal-control switch, thus making the machine,stop working. Meanwhile, the red pilot light orl the:

panel board is oil. Under this circumstance, you needn't pull off the plug, so that the fan can continue working, thus cooling the machine. When the red light is off, the temperature decreases to the standard range, the n you begin to weld again.

## MAITENANCE

**WARNING:**

All maintenance and checking work should be carried out under the circumstance of light off. Make sure the power plug is pulled off before you open the case.

1. Use clear and dry compressed air to remove the dust in certain period, if the machine is working under heavy-polluted environment,clear it daily.
2. The pressure of the compressed air should be in 8 suitable level lest it damages the little parts in the machine.
3. Check the inner circuit connection in the welding, machine, and make sure the connections are right and firm (esp. plug-in or parts); if there is rust or loose, use the sand-paper to rub off the rust or oxidized coating and re-connect it firmly,
4. Avoid water or water gas into the inner of the machine, if happens, please first dry it, and then measure the insulation situation with Omen meter. (including the joints and joint vs case) Do not continue until you make sllre there is no abnormal phenomenon.
5. If the machine is not used for long time, please put it into the original box and keep it in dry condition.

## PRE-CHECKING

**WARNING**

Blind experiment and uncautious checking may cause trouble for formal repair and make the breakdown area bigger. And the inner bare parts of the machine have voltage that may cause dangers if it has power supply, so any direct or indirect touch may cause accidents of electric shock, and heavy shock may even cause death!

Caution: During the maintenance period, if not authorized, any personal wrong repair to the welders may cause the maintenance invalid.

## Checking breakdown

Cautions: The operators are supposed to have enough knowledge of electric-gas and common sense of safety, and concerning certificaics are needed. We suggest you contact us before operation and meanwhile get permission.

| BREAKDOWN | POSSIBLE CAUSES | SOLUTION |
|---|---|---|
| 1. No reflection after turn-on | 1. No power supply or short of phase,<br>2. Power cable in break circuit.<br>3. Assistant power off in the phase. | 1. Check the power supply.<br>2. Open the case to check the voltage.<br>3. Contact the supplier or specialist. |
| 2. The regulator indicates, no sound of releasing electricity, no show of breakdown. | 1. Something wrong with tbe switch.<br>2. Releasing nozzle in short circuit.<br>3. Air-socket wrongly set up. | 1. Use screw knife to make the two-cored air socket short circui<br>2. Adiust the distance between electri-releasing nozzle.<br>3. When using torch or foot switch the concerned plug should be in the two-cored socket. |
| 3. Have HF electricity-releasing, but no current output. | 1. Earth cable not well connected.<br>2. Torch cable in short circuit. | 1. Check the earth cable。<br>2. Check or renew the torch. |
| 4. Have current output, but cannot adjust. | 1. Hand-control and foot switch in wrong place.<br>2. Potentiometer in the foot switch broken. | 1. When using foot switch, tile exchange switch should be ih "on" place.<br>2. Renew the potentiometer |
| 5. Hand-controI normal, while foot switch abnormal. | 1. Slight switch in foot switch broken.<br>2. Sliding potentiometer in the foot switch broken. | 1. Renew the slight switch.<br>2. Renew 1K sliding potentiometer |
| 6. Abnormal pilot light on | 1. Sponmneous over-currem protection.<br>2. Too much dust causes short circuit.<br>3. Some tmrts in the machine broken | 1. Turn 0ff the machine, and restart after the light on.<br>2. Open the case, use the compressed air to clear the dust.<br>3. Contact professionals or supphers. |
| 7. Can not remove the oxidized coating in AL-welding | 1. Choose the wrong welding button.<br>2. Cleai widlh too low.<br>3. Damage the MOSFET in second inverter | 1. Choose AC button in AL welding<br>2. Make clear width hiigh or remove the oxidized coming.<br>3. Contact professional. |
| 8. Current normal, but no gas out. | 1. Have sound of electromagnetic valve<br>a. gas nozzle bloeked up<br>b. gas hose broken<br>2. No sound of electromagneric valve<br>a. valve damaged<br>b. valve-controlled circuit in trouble | a. clear the blockings.<br>b. Repair and change tig torch<br><br>a. change the valve<br>b. ask professional to repair the board |
| 9. Tungsten terribly damaged | Clear width adjust too much | Adjust the clear width in counterclockwise. |
| 10. Earth cable too hot. | Earth cable not well connected | Better tie the cable screw to the work table. |