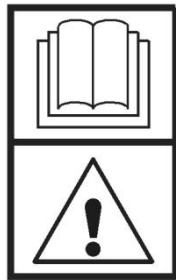


PLASMA CUTTER

MAX 45/125

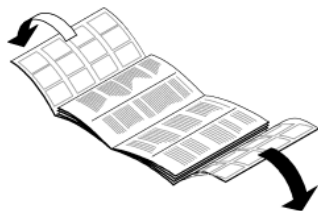
POWER THERM[®]
HEAVY DUTY PLASMA

USER`S MANUAL



Read me first

Thank you for using welder ! For the important safety of your body, please read this manual book and understand its contents before operation. Thank you for your cooperation!



Content

| | |
|-------------------------------------------------------|----|
| 1. Use and Characteristic: | 2 |
| 2. Safty Precaution | 2 |
| 3. Precautions of electromagnetic compatibility | 5 |
| 4. Main technical information | 7 |
| 5. Installation: | 8 |
| 6. Model establishment and illustration: | 9 |
| 7. Brief description of the principle: | 10 |
| 8. Operation and instruction: | 11 |
| 9. Welding machine precautions and maintenance: | 24 |

Use and Characteristic

CUT series of inverter air plasma cutting machine which could be used for the cutting of various metal materials, such as stainless steel, alloy steel, carbon steel, cast iron, copper and aluminum. As this series of arc welding power source possesses ideal external characteristics and excellent dynamic characteristics, and its control function is perfect, it has the following features:

- IGBT high-frequency alternate, efficient, light in weight;
- Control and adjusting function is good, one welder serves several purposes, easy to use;
- It's easy to start arc, stability of arc and high welding quality;
- Rapid cutting speed, smooth cutting surface;

Safety Precaution



Generally Safety Precaution

- Ensure to follow precautions specified in this manual, or else, an accident may happen.
- The design and construction of input power supply, selection of installation site and use of high pressure gas shall be performed according to the relevant standards and rules.
- Irrelevant personnel are not allowed to enter the welding workplace. Only the qualified personnel can install, overhaul, maintain and operate the welding machine.
- Qualified staff is needed for installation, maintenance and use.
- Make sure the welding machine is not used for other purposes except welding (such as charging, heating and pipeline unfreezing, etc).
- If the ground is uneven, please avoid dumping welding machine.



Avoid electrical shock or burn

- Touching electric parts is forbidden.
- Ensure to invite professional electrician to ground the welding machine with copper conductor with specific cross section.

-
- Ensure to invite professional electrician to connect power source in welding machine with copper conductor with specific cross section. The insulating sheath cannot be damaged.
 - Ensure to insulate the body and base metal when working in the wet and restricted area.
 - Please use safety net when working at heights.
 - Please close the input power when not in use.



Avoid welding fume and gas damaging human body

- Ensure to use specified exhaust equipment to avoid gas poisoning and suffocation.
- The protective gas will be deposited around the container bottom to cause suffocation. Pay attention to the ventilation.



Avoid welding arc, splash and welding slag damaging human body

- Ensure to wear protective glasses with enough overshadow. The arc will result in ocular inflammation and the welding splash and slag will burn eyes.
- Ensure to use protective supplies for welding, such as leather protective gloves, caftan, cap, welding spats and apron to avoid welding arc light, welding splash and slag burning skin.



Avoid fire, explosion and fracture and other accidents

- The welding place cannot have the combustibles because splash and hot weld joint will result in fire.
- The cables and base metal must be connected firmly, or else, it may be heat to result in fire.
- Must not weld in the combustible gas or container with the combustibles, or else, it may result in explosion.
- Ensure to prepare fire extinguisher just in case.

 **To prevent the rotating moving parts wounding**

- Must not make fingers, hair and clothes close to the cooling fan and wire feed roll and other rotating parts.
- When feeding wire, must not make the welding gun end close to eyes, face and body to avoid wire damaging person.

 **Avoid falling gas cylinder and breaking gas regulator**

- The gas cylinder shall be fixed reliably, or else it may dump to result in human injury.
- Must not put gas cylinder in a place with high temperature or sunshine.
- When opening gas cylinder valve, must not make face close to the gas outlet, or else high-pressure gas may damage person.
- Ensure to use gas regulator provided by the company and follow the use regulations.

 **Prevent the movement of welding**

- Must not stand under the welding machine and motion direction when moving welding machine with fork lift truck or crane, or else, the welding machine may fall to cause injury.
- The rope sling shall bear enough pull force and cannot be broken when suspending. The angle between rope sling and hook shall be no more than 30°.

Precautions of electromagnetic compatibility

1. Overview

Welding brings electromagnetic interference.

Minimize the interference emission of arc welding equipment with proper installation way and correct application method.

The products described in the manual belong to Class A equipment (all occasions except residential area powered by public electrical power system).

Warning: Class A equipment is not applicable to residential area powered by public electrical power system. It is difficult to guarantee electromagnetic compatibility because of conduction and radiated interference.

2. Advice of environment assessment

Before installing the arc welding equipment, the user shall evaluate the potential electromagnetic disturbance of the surrounding. The considerations are as follows:

- ◆ Check surrounding of arc welding equipment for other power cables, control cables, signals and telephone wire.
- ◆ Check for broadcasting and television launching and receiving equipment;
- ◆ Check for computer and other controllers;
- ◆ Check for high security level equipment, such as industrial protective equipment;
- ◆ Consider the health of surrounding staffs, such as staffs with hearing aid and cardiac pacemaker;
- ◆ Check for calibrating or detection equipment;
- ◆ Pay attention to immunity to interference of other equipment. The user shall make sure that the surround equipment can be compatible. The additional protective measures may be required;
- ◆ Welding or other activity time.

The environmental range is decided based on the building structure and possible activities.

This range may exceed the boundary of building.

3. Method of reducing radiation emission

- ◆ Public power supply system

The arc welding equipment shall be connected into public power supply system with the method recommended by the manufacturer. In case of interference, please take addition preventive measures, such as connecting filter with public power supply system. Ensure to consider power able shielding for fixed arc welding equipment. The power cables can be shielded with the metal pipe or other equivalent methods. Ensure to keep electrical continuity for shielding.

◆ Maintenance of arc welding equipment

Ensure to perform routine maintenance for arc welding equipment according to the method recommended by the manufacturer. When welding equipment runs, all equipment inlets, auxiliary doors and panels shall be closed and tightened appropriately. The arc welding equipment cannot be changed in any form, unless the relevant change and adjustment are allowed in the manual. The spark gap of arc initiation device and arc stabilizing device shall be adjusted and serviced according to the suggestion of manufacturer.

◆ Welding cable

The welding cable shall be short as much as possible and close to each other. Moreover, welding cable shall be next to or close to ground cable.

◆ Equipotential lap

Pay attention to lapping of metal objects in the surrounding. The lapping of metal objects and workpiece will increase job hazard. When the operator touches these metal objects and electrode, he may suffer from electrical shock. The operator shall be insulated from these metal objects.

◆ Workpiece earthing

The workpiece may be not provided with earthing because of electrical safety or workpiece position, such as hull or building steel frame. When earthing is available for workpiece, radiation emission may be reduced. But it is not always the case. Therefore, we must prevent the increased risk of electric shock of users caused by the workpiece earthing or the damage of other electric equipment. When necessary, some workpiece should be directly earthed, but directly grounding is not allowed in some countries, user can achieve this effect only by selecting the appropriate capacitor according to the regulations of the host countries.

◆ Shielding

The shielding of surrounding equipment and other cables can reduce the electromagnetic interference. The whole welding area can be shielded for special applications.

Main technical information

1. Main technical parameter

| parameter \ model | MAX45 | MAX125 |
|------------------------------|----------------------------|---------------------------------|
| Power voltage (V) | AC220V±15% | AC380V±15% |
| Frequency (Hz) | 50/60 | |
| Rated input current(A) | 25 | 29 |
| Rated input capacity(KVA) | 5.5 | 19 |
| No-load voltage (V) | 243 | 325 |
| Output current adjustment(A) | 20-40 | 30-120 |
| Rated output voltage (V) | 96 | 128 |
| Cyclic duration factor (%) | 60 | 60 |
| No-load loss (W) | 100 | 100 |
| Arc-striking way | Arc-striking by contacting | Arc-striking without contacting |
| Efficiency(%) | 70 | 80 |
| Power factor | 0.93 | 0.93 |
| Insulation grade | F | F |
| Protection grade | IP21 | IP21 |
| Weight (kg) | 6.9 | 38 |
| Size (mm) | 375*155*300 | 690*335*575 |

Installation

1. Environment

- ◆ Install in a dry environment with humidity less than 90% at 20°C and 50% at 40°C.
- ◆ The temperature should be in the range of -10°C-40°C when welding, and -20°C-55°C for storage and transportation.
- ◆ Shelter the machine from direct sunshine and rain. Avoid raindrops.
- ◆ Avoid using it in an environment with strong air flow when TIG welding.
- ◆ The inclination of the welding power is less than 10° the altitude no more than 1000m.
- ◆ Avoid using it in a dusty, acid or other corrosive environment.
- ◆ The machine should be placed more than 20cm from the wall, and more than 10cm from other welding machines.

2. Requirement of the input power source

- ◆ Waveform: standard pure sine wave
- ◆ Fluctuation range: 220V or 380V ±15%
- ◆ Frequency: 50Hz/60Hz

3. Input power

| Model | | MAX45 | MAX125 |
|--------------------------|-----------------|--------------------|-------------------|
| Input power | | AC220V±15% | AC380V±15% |
| Min. power of power grid | | 7 | 22 |
| Input protection | Fuse | 40 | 40 |
| | Circuit breaker | 63 | 63 |
| Cable | input | 2.5mm ² | 4mm ² |
| | output | 10mm ² | 16mm ² |
| | ground | 2.5mm ² | 4mm ² |

Enlarge the input , output and grounding cable according to the cable length.

Remark: the specifications of fuse and circuit breaker in the table above are only for reference.

4. Installation of the machine

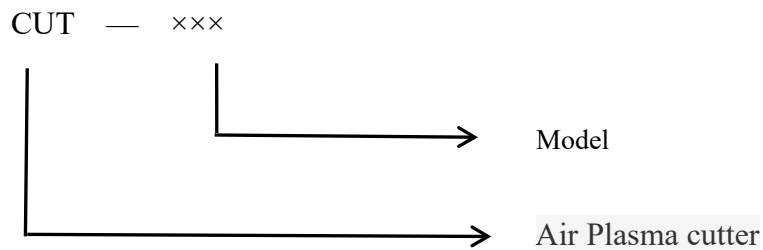
The power supply of this series of products should be single phase AC 220V 50/60Hz. Use a distribution cabinet with an automatic air switch. Ensure safe grounding.

4.1 CUT welding:

- ◆ Connect the earth cable to the positive pole, cut torch to the negative pole.
- ◆ Connect the hose to the machine and gas bottle.
- ◆ Turn off the machine.
- ◆ Connect the input cable to the distribution cabinet, switch on.

Model establishment and illustration

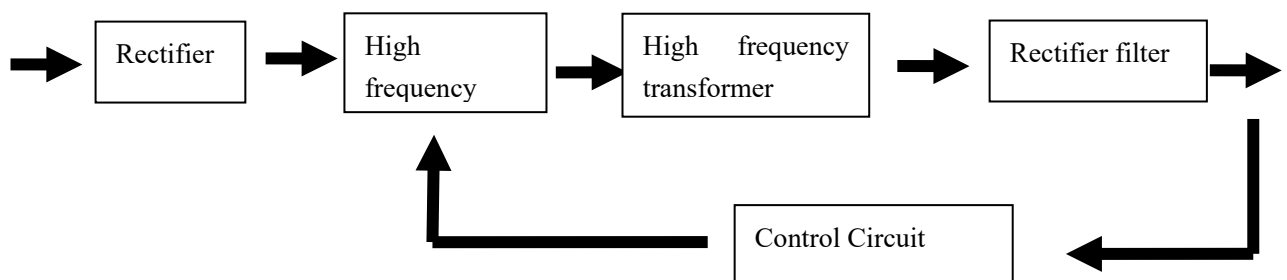
CUT series welding machine model establishment and description as shown in figure 1:



(table 1) CUT series welding machine model establishment and description.

Brief description of the principle

The schematic diagram of the MIG series welding machine is show figure 2:

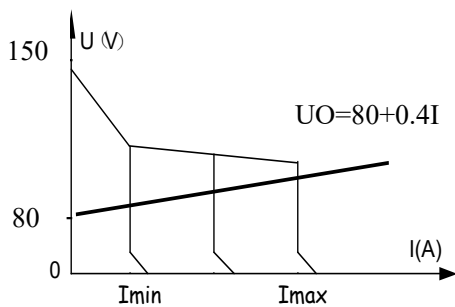


(table 2) Welding machine schematic

The welding machine adopts IGBT high frequency inverter technology, power frequency 220V or 380V power input, direct rectification and then sent to the inverter composed of IGBT and other components to become high frequency alternating current, high frequency alternating current obtained after inverter is passed through high frequency transformer after the step-down, high frequency rectifier rectifies and filters, the output is suitable for the DC current of the welding. Through this process, the dynamic response of the welder is improved, the volume and weight of the transformer and the reactor are reduced, and the efficiency of the whole machine is improved.

The design of the control circuit enables the welder to always achieve good welding process performance when external conditions change (such as grid voltage fluctuations and different output cable lengths). It is easy to arc, the arc is stable, the weld is well formed, and the welding current can be continuously adjusted.

CUT series welding machine output characteristics such as shown in figure 3:



(3A) CUT welding output characteristics

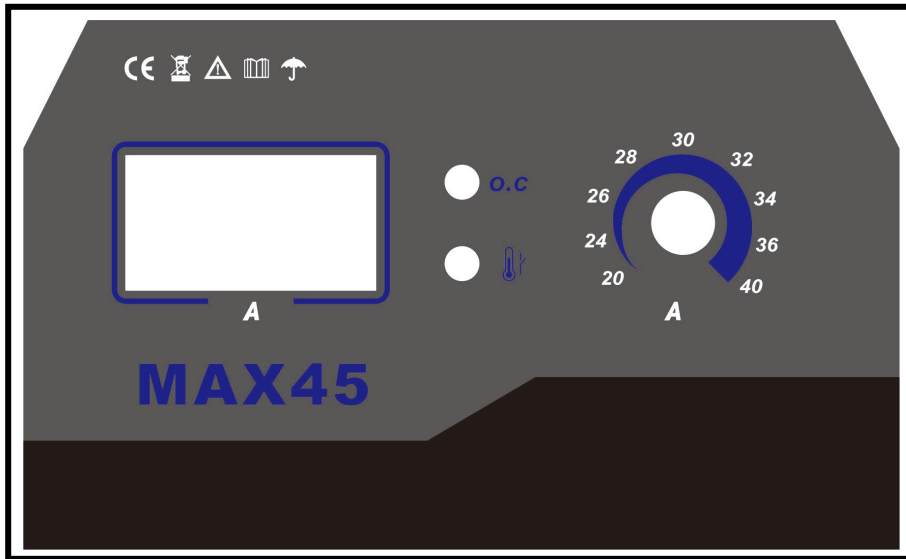
CUT welding output characteristics: Drooping characteristics.

Operation and instruction

1. Function

1.1 Welding machine front panel

As shown in table4, control panel is used for selecting functions and setting data of welding machine. Control panel including digital display、adjusting knobs、selection keys and LED indicator lights.

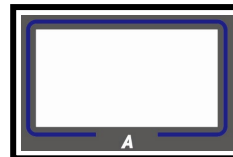


MAX45 (table 4)

1.1.1 MAX45 Functions selection and data setting.

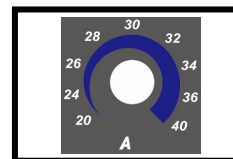
- ① Displayer:

Display the current value;



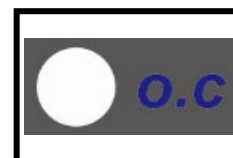
- ② CURRENT:

Adjust welding current;



- ③ O.C indicator light:

Send signals of machine over current;

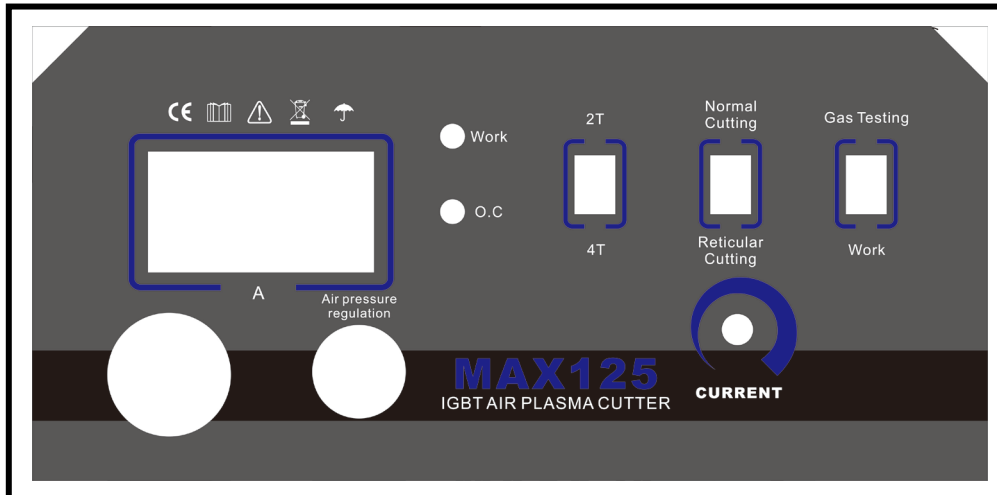


Over current: there may be some components broken. Be cautious restart the machine after checking.If misjude, please just restart the machine.

- ④ Over heat indicator light:

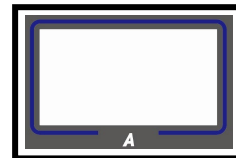


Over heat: machine is protected from over temperature ,
leave the machine unloaded ,after cooling it can work as usual;



1.1.2 MAX125 Functions selection and data setting.

- ① Displayer:



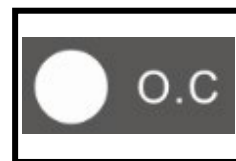
Display the current value;

- ② CURRENT:



Adjust welding current;

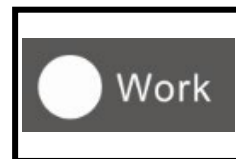
- ③ O.C indicator light:



Send signals of machine over current;

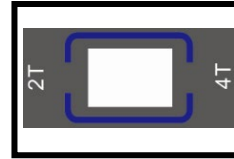
Over current: there may be some components broken. Be cautious restart the machine after checking.If misjude, please just restart the machine.

- ④ Work indicator light:



When there is ouput , the work indicator light is on,
otherwise it is not.

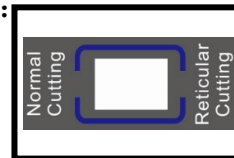
⑤ 2T/4T change-over switch :



Under 2T operation, the machine starts working after pressing the switch of torch, the machine stops welding when releasing the switch.

Under 4T operation, press the switch for the first time, it gives machine start-arc current, release the switch, current begins climbing to the normal welding current. Press the switch again after the welding is finished, release the switch, machine stops working.

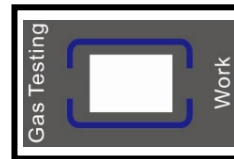
⑥ Normal cutting / Reticular cutting change-over switch:



Normal cutting: pilot arc keeps 5seconds and then break automatically; applied to flat ad seamless plate cutting

Reticular cutting: pilot arc is always on; applied to plate cutting with big gap and gap density, such as reticular material

⑦ Gas testing/ Work change-over switch:



Gas testing: check the gas loop works well or not.

Work:machine is in working condition;

⑧ Air pressure regulator:

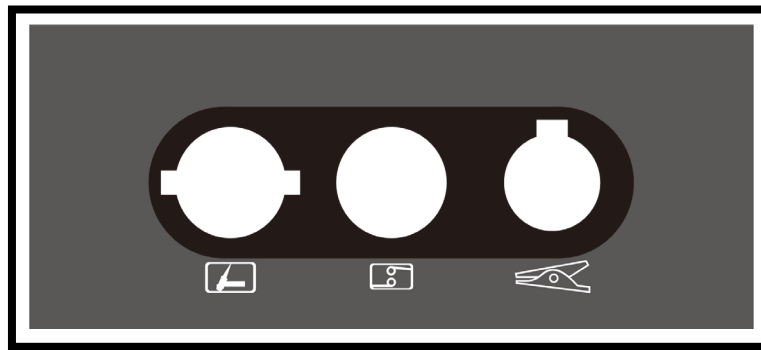


Pressure meter and pressure regulator.

1.1.3 Welding output interface

From left:

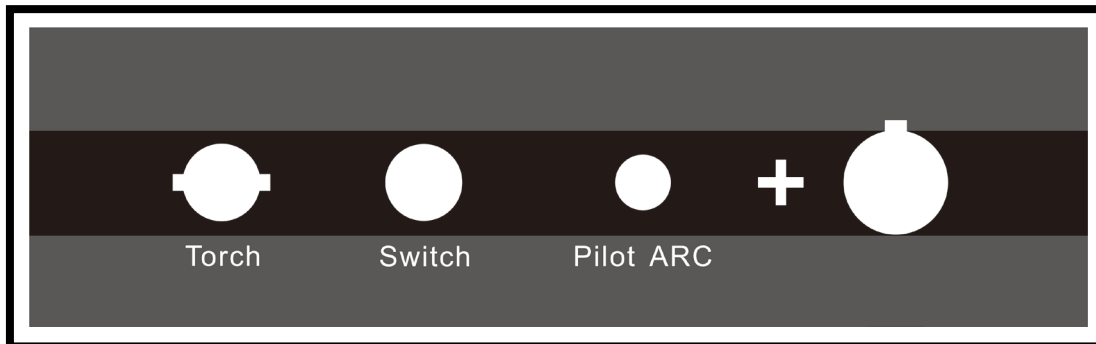
- ① Cathod output gas-electric connector: connect cut torch under mode;
- ② Torch switch inferface:connect cut torch swith;
- ③ Anode output inferface:connect earth clamp under mode;



(MAX45)

From left:

- ① Cathod output gas-electric connector: connect cut torch under mode;
- ② Torch switch inferface: connect cut torch swith;
- ③ Pilot arc: pliot arc cable of the cutting torch;
- ④ Anode output inferface: connect earth clamp under mode;



(MAX125)

2. Installation instruction:

Note: Please strictly follow below steps to install and debug!

Before electrical connect operation the user has to turn off the power switch of the distribution panel!

This equipment protection level is IP21, avoid using in rain!

- ◆ Connect the welding input power wire to the corresponding voltage level and $\geq 60\text{A}$ circuit breaker (connect the power wire $\geq 4^2$);
- ◆ The input power wire should be in good contact with the correspond power terminal or switch ,to prevent oxidation
- ◆ Use a multimeter to measure whether the input voltage is in the fluctuation range;
- ◆ Connect the yellow-green wire on the power cable and the grounding screw on the rear panel to $\geq 4^2$ wire and ground well.;
- ◆ If the welder is placed on an inclined plane, the welder should be secured so that it does not slip;
- ◆ Each welder is equipped with an insulated handle, which can be lifted by hand when moving the welder

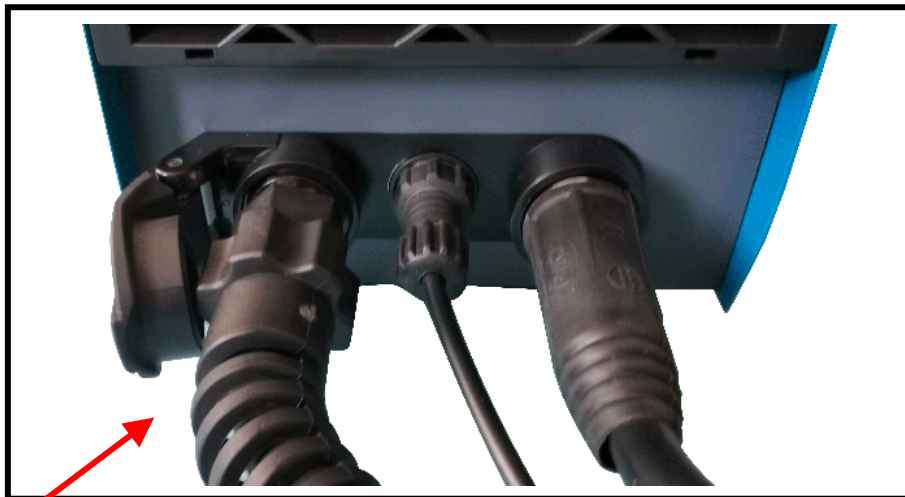
2.1 CUT welding

2.1.1 MAX-45

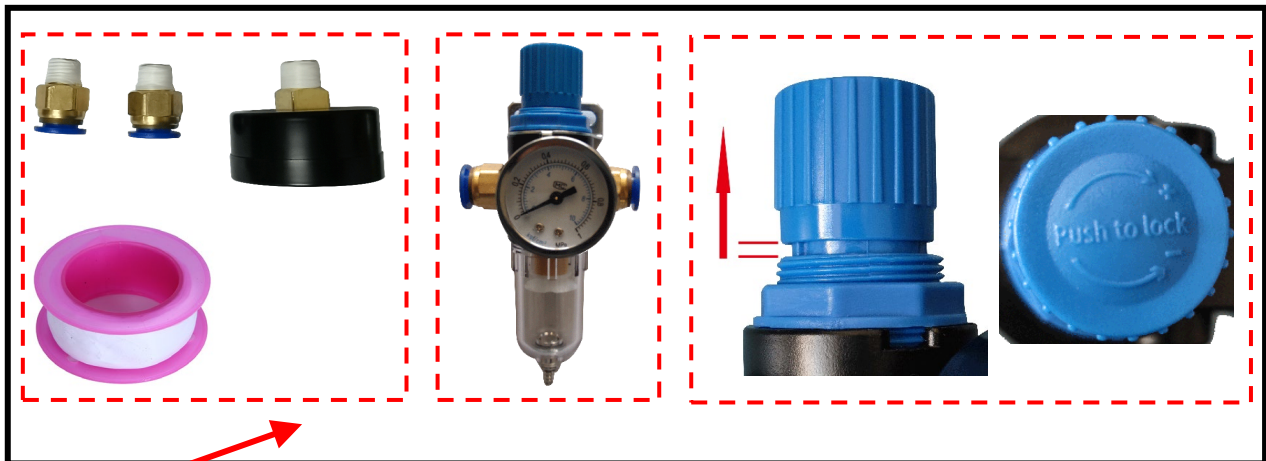




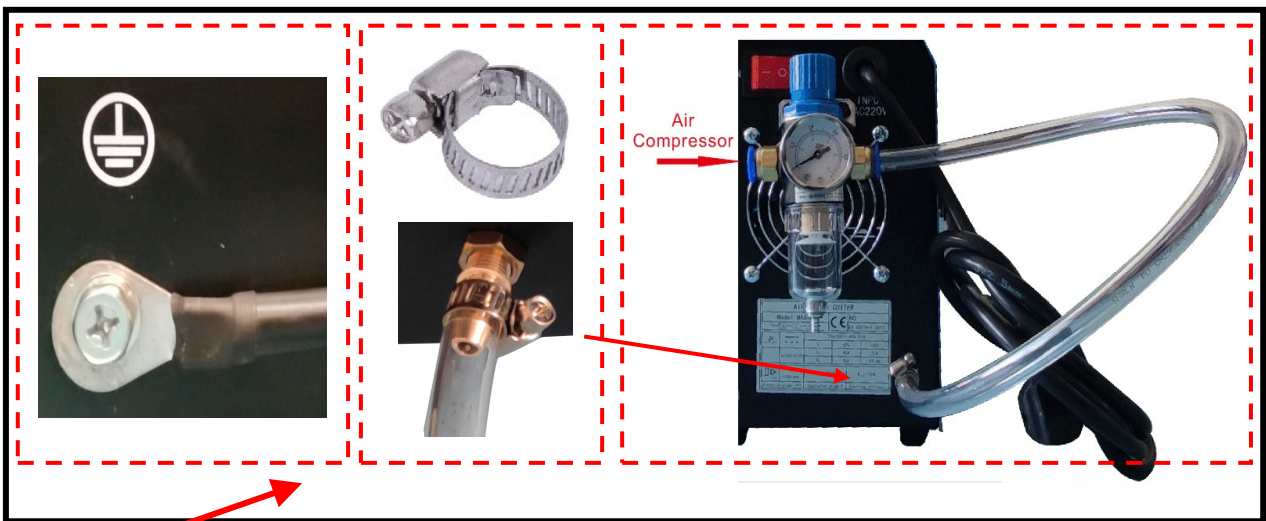
1 Adjust electric current



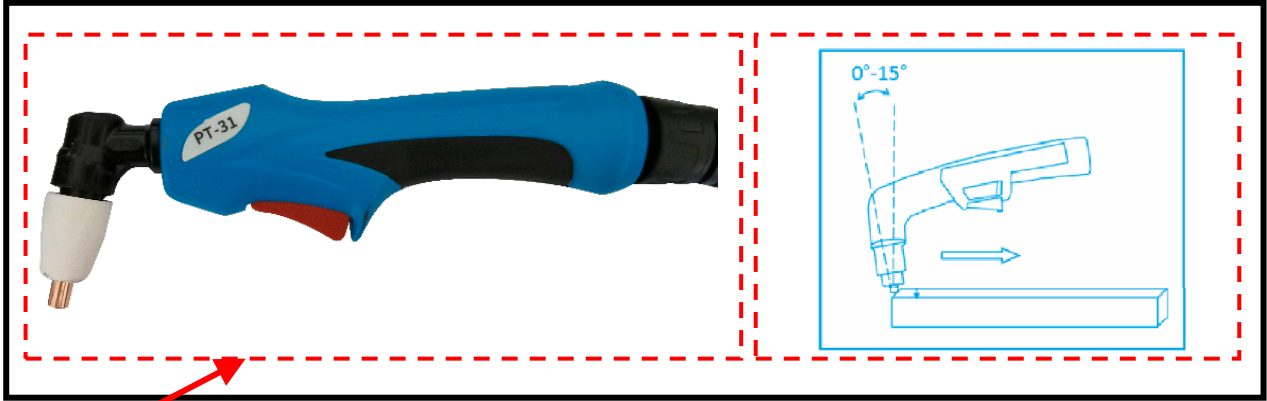
2 Connect cutter torch, torch switch, workpiece clamp.



3 Using Teflon tape to wrap the pressure reducing value components, and install into the reducing pressure reducing; Open the lid, Rotate through the direction of “+” until adjust the pressure to around 0.4Mpa, Install the lid back. .



4 Intall ground wire($\geq 2.5\text{mm}^2$); fix pressure reducing value , connect air compressor, Using hose clamp to tighten hose(8*12mm)。



5 Turn on the air compressor, set up cutting electric current, tilt estimated 0-15degree angle, Turn on the torch switch when the nozzle connect the workpiece, move slowly. Turn off the torch switch when finish.

2.1.2 MAX-125



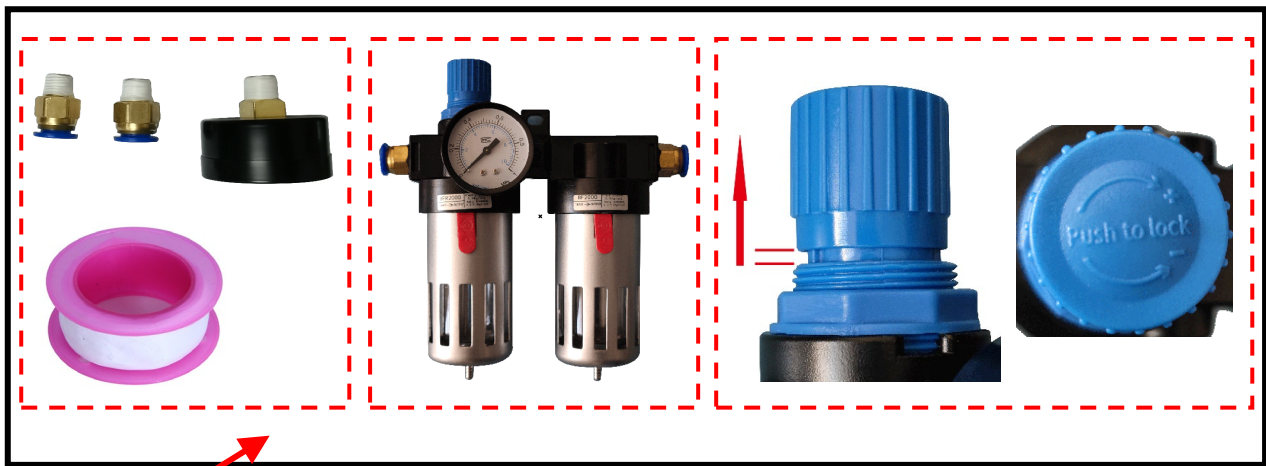


1 Adjust the button into the “2T”, “Normal cutting”, “Work”, Adjust the electric currency suitable, meanwhile adjust the air compressor into 0.4-0.6Mpa.

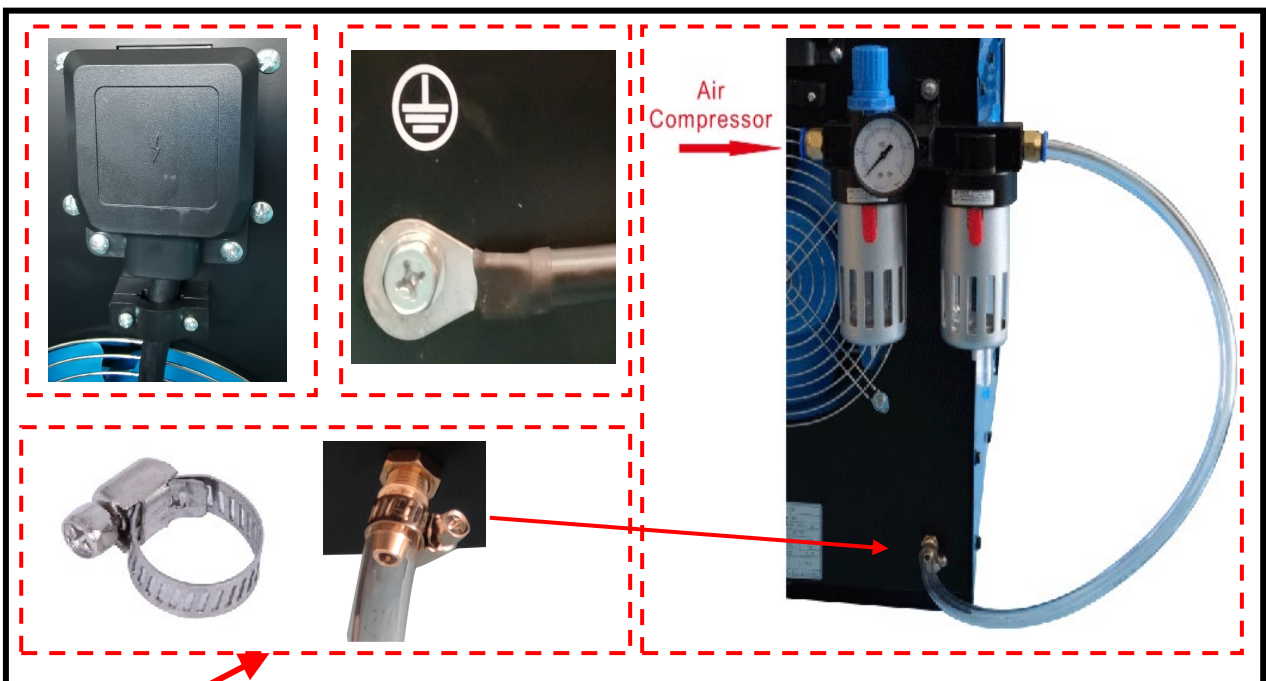
Adjust the button “2T/4T” “Normal cutting/Reticular cutting” according to needs.



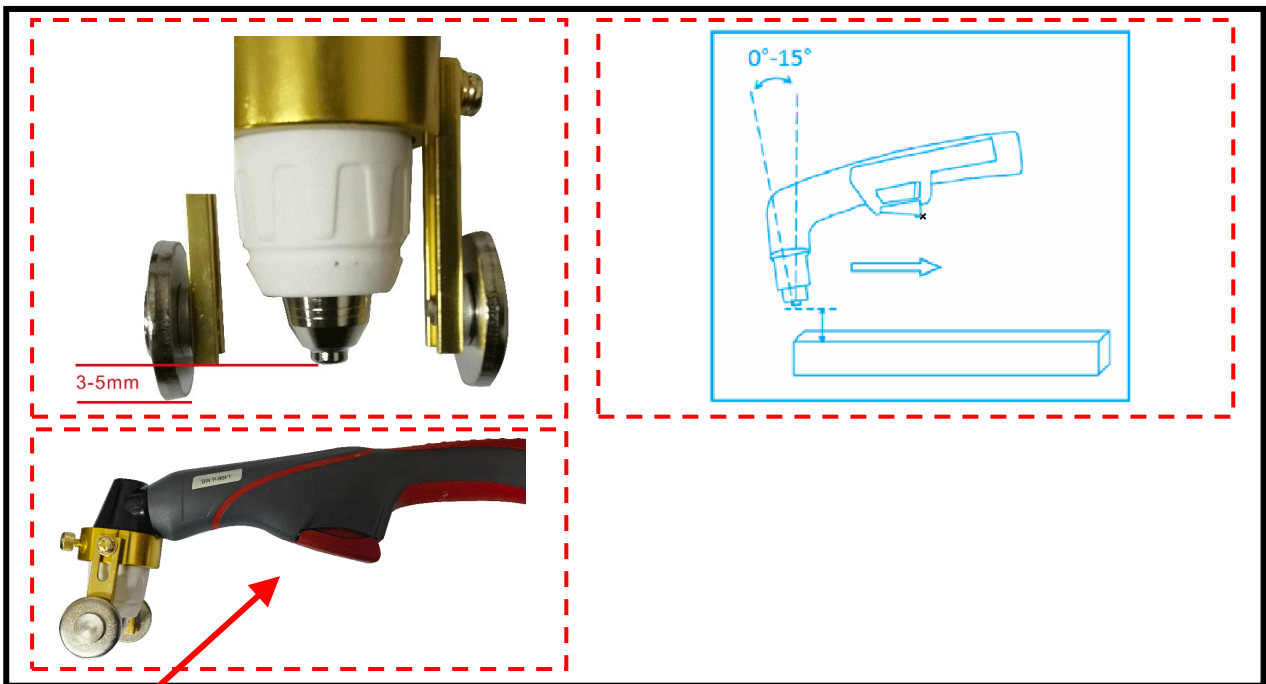
2 Connect cutting torch , torch switch, ARC, workpiece clamp.



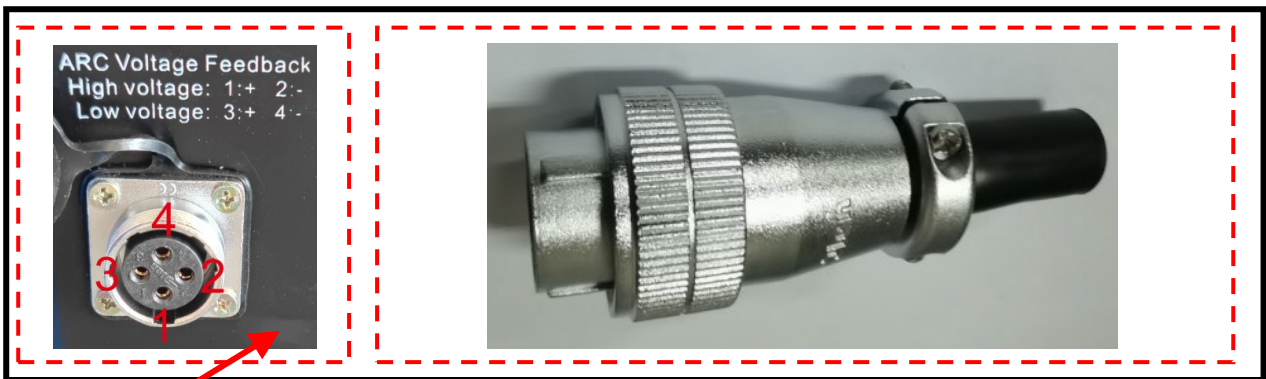
3 Using Teflon tape to wrap the pressure reducing value components, and install into the pressure reducing value; Open the lid, Rotate through the direction of “+” until adjust the pressure to around 0.8Mpa, Install the lid back.。



4 Install input cable ($\geq 4\text{mm}^2$), Intall ground wire($\geq 4\text{mm}^2$); fix pressure reducing value , Using hose clamp to tighten hose(8*12mm)



5 Turn on air compressor, set up cutting electric current, Adjust the rolling wheel and nozzle to keep estimated 3-5mm、tilt estimated 0-15degree angle , Turn on the torch switch when the rolling wheel connect the workpiece, move slowly. Turn off the torch switch when finish.



6 CNC interface: Two ways of arc voltage feedback, the DC voltage between Pin 1 and 2 is 160V, Pin 3 and 4 is 20V。 (There was numbers on the socket)

Please choose a voltage value according to your CNC equipment, as shown below。

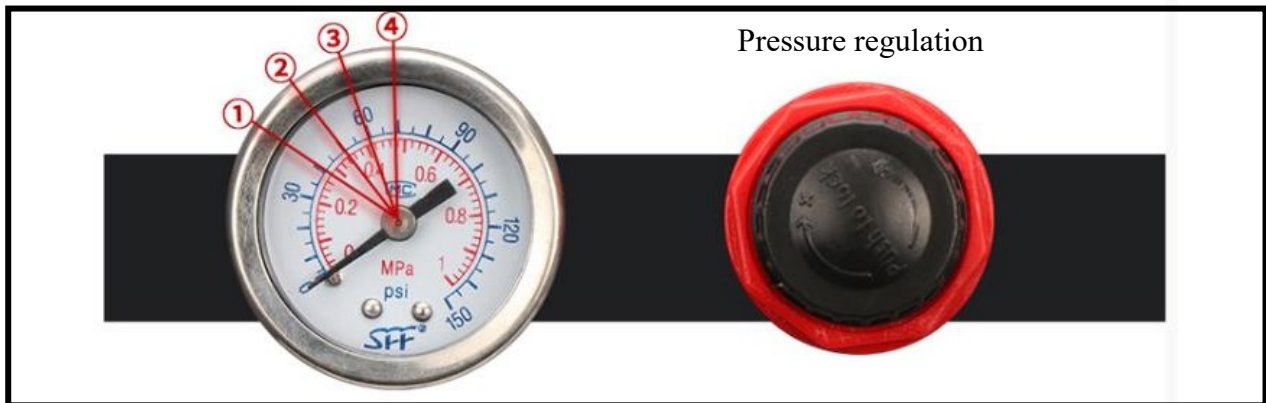
2.1.3 How to adjust the electric current, pressure, nozzle.

Keep the pressure 0.4-0.6Mpa: bigger current, thicker metal plate, increase the pressure appropriately.

Small cutting current and too big air flow leads to arc breaking due to the strong cooling effect.

The size of electrode and cutting tip should match the cutting current well. Matching relation between cutting current and cutting tip as shown in the table below:

| Current | 10-30 | 30-50 | 50-100 | 100-160 |
|------------------|---------|---------|---------|---------|
| Cutting tip size | Φ 1.0mm | Φ 1.2mm | Φ 1.3mm | Φ 1.4mm |



Current matches pressure to reduce the consumption of cutting tip and nozzle and the waste of material.

| | |
|-------------------------|-------------------------------------------------|
| Pressure 0.4(Mpa) | recommended cutting thickness is 1-6mm |
| Pressure 0.5(Mpa) | recommended cutting thickness is 6-10mm |
| Pressure 0.6(Mpa) | recommended cutting thickness is 10-20mm |
| Pressure above 0.6(Mpa) | recommended cutting thickness is more than 20mm |

The cutting thickness of stainless steel and aluminum is half of normal material.

Welding machine precautions and maintenance

1. Safety points

The welding machine is equipped with overcurrent and overheat protection circuits. When the grid voltage, output current and internal temperature exceed the set standard the welding machine will automatically stop working, but excessive use (such as excessive voltage) will still lead to welding. The machine is damaged, so you still need to pay attention to the following:

◆ Make sure the ventilation is good!

When the machine is in operation, a large working current passes, natural ventilation can not meet the cooling requirements of the welder, so a fan is installed to effectively cool the welder to make it work smoothly. The user should confirm that the ventilation area is not covered or blocked, and the distance from the surrounding objects should be no less than 0.3 meters. Users should always pay attention to maintain good ventilation, which is very important for better working of the welding machine and guaranteeing longer service life of.

◆ It is forbidden to overload!

The user should pay attention to the use of the welder according to the allowable load duration of the welder (refer to the welder nameplate parameters) to keep the welding current not exceeding the maximum allowable load current. Current overload will significantly shorten the life of the welder and may even burn the welder. Load continuation rate: that is the current welding time under the load continuation rate, 10 minutes is a cycle, working time + rest time = 10 minutes; For example, 30%, 200 A/28 V, that is the output current 200 A state, should work for 3 minutes. Rest for 7 minutes; 60%, 141 A/25.6 V, in the state of output current 141 A, should work for 5 minutes, rest for 4 minutes.

Current overload will significantly shorten the life of the welder

◆ Forbidden voltage too high!

The power supply voltage is listed in the "main performance parameters" table. In general, the automatic voltage compensation circuit in the welding machine will ensure that the welding current remains within the allowable range. If the power supply voltage exceeds the allowable value, it will damage the welder. The user should fully understand this situation and take

corresponding preventive measures.

- ◆ It is forbidden to use the welding machine for thawing pipes.
- ◆ The back of each welding machine is attached with a ground screw, and marked with a ground mark. Before use, select a cable with a section greater than 2.5mm² and ground the welding machine shell reliably to release static electricity or prevent accidents that may occur due to electricity leakage.
- ◆ If the welding machine exceeds the standard load duration, the welding machine may suddenly enter the protection state and stop working, which means that the welding machine exceeds the standard load duration. If the temperature is too high, the temperature control switch will be triggered and the welding machine will stop working. Meanwhile, the yellow indicator light on the front panel will be on. In this case, you do not need to unplug the power supply so that the cooling fan can continue working to cool the welder. When the yellow indicator light is off, the temperature drops to the standard range and the welding can be resumed.

2. Maintenance



Warning:

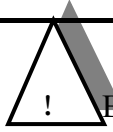
All maintenance, service and cleaning work must be performed with power removed.

Make sure you have unplugged the power cord before opening the casing.

- ◆ Dedust regularly. Use dry, clean compressed air to clean up the system. Dedust every day when operating in smoky conditions or severely polluted air.
- ◆ The compressed air should be delivered at the required pressure to avoid the destruction of the internal components.
- ◆ Check the internal contact areas to insure a tight connection (especially the plug-in joints or components) and reinforce the loose contact. If any rusting or oxidation occurs, use sandpaper to remove the oxide film and reconnect.
- ◆ Avoid water and moisture penetration. If this situation happens, apply a drying treatment to the inside of the welder and then start a megger insulation test which should include the insulation between connection joints as well as joints and casing. The welding operation could be continued only if no error detected.

-
- ◆ If the welder is not used for a long period of time, seal it in the original packaging and store in dry condition.

3. Before maintenance



Warning:

Blind experiments and imprudent overhaul could lead to the expansion of failure, and difficulty for a formal maintenance. Electronic equipment in the state of the exposed part of a voltage can lead to dangers. any direct or indirect contacts may lead to electric shocks incidents, and serious electric shock will cause death!!!

Attention: During the warranty period, if not allowed by this Company, if there is any wrong maintenance to any fault of the welding power source, the suppliers will not provide free repairs.