



Super160

Welding & Cutting Machine

Operating Manual

Introduction

The Riland Multipurpose series of Welders is a revolutionary new approach to Welding technology. Riland introduced a more efficient way to manufacture top quality machines while keeping the cost of operation and repairs lower. This was accomplished using several new approaches to the mainstream technology. One of these methods is our proprietary plug & play main circuit boards which allows ease of repair, reducing the downtime to only hours rather than days, while also reducing repair costs averaging less than \$75! The CT & Super Series uses special safety redundant circuitry with built in auto-protection and self adjusting circuitry to keep your machine running in a safe threshold. This helps protect your machine from over-voltage, power spikes, burn-outs and shorting. The Super160 is the best multipurpose machine available on the market with a generous 160amps of Tig amperage in AC and DC, with a current variable foot pedal, stick option and 40amp plasma cutter.

Warranty

The machine is insured against damage upon shipping. If your machine is damaged in any way when you receive it, you must retain all shipping materials and packing. Call our customer service department and report the damage immediately.

There is a 1 year warranty on all internal electronic parts. The torch, power cord, clamps, air regulator, hoses, case & paint and consumables and cables are not covered under warranty. You must use dry gas in your machine and keep it indoors away from rain and moisture.

This machine is designed to operate from 200-240vac at 50-60Hz Only. Operating outside of limits will void warranty.

Warranty coverage covers repair or replacement of damaged machine or damaged circuit board. Warranty does not cover shipping from the customer but does cover return shipping within the Cont. United States. If you are going to return a machine to us for repairs, it must be well packed in original or better (with more than 2" of dense foam around the machine) and insured for full value.

Customers who own machines that require warranty coverage should contact our warranty department by email at warranty@rilandusa.com to obtain a return authorization code.

Customers who own an out-of-warranty machine that require repairs should contact us for an estimate.

WARNINGS!



You may be faced with dangers during the course of welding, so please be careful 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.**
- **The workers should be qualified for welding.**

Electric-shock: it may be fatal to life.

- Install the 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 operating, please first consult this manual.
- If you still can not understand after reading this manual, please contact your supplier or manufacturer to get professional help.

A BRIEF INTRODUCTION TO THE PRODUCTS

The Super160 series is our newly-developed Multipurpose Tig, Plasma cutter and Stick Machine, whose main character is that it can not only weld steel, alloy steel and carbon steel and other nonferrous metals with DC function, but also it can weld aluminum, alloy aluminum and copper with AC function. For instance, for welding skateboard and bicycle made of aluminum. The total power exchange rate of the machines is over 85%, and they are energy-saving.

The use and development of inverter technology 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 disturbance of electric magnetism.

AC/DC 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 square wave, which makes the arc straighter, heat more concentrating, anti-clearance stronger and wider clearance, etc to make sure the high quality of the machines.

The Super160 series is equipped with foot switch, thus liberating the workers' hands, and they can adjust the current with their foot freely. As a result, at the very beginning or wire-adding, we can speed up the current; while at the end slow down the current in order to form a good welding line. In a word, the use of foot switch helps raise the welding efficiency and reduces the welding difficulty as well as make sure of the welding quality. If you need pulse welding, we have foot-control switch with the function of pulse welding.

Inverter welders are also equipped with TIG torch, and cable of suitable length. 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!**

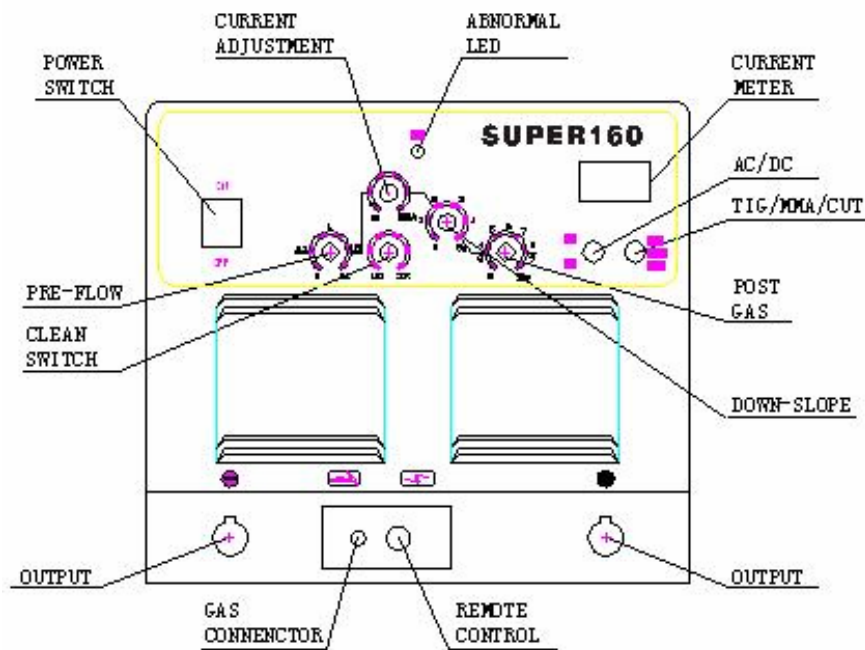
This equipment is used mainly in metal technology. Under room temperature, this equipment may have wireless emission, please keep away from sensitive electronic equipment.

Main Specifications:

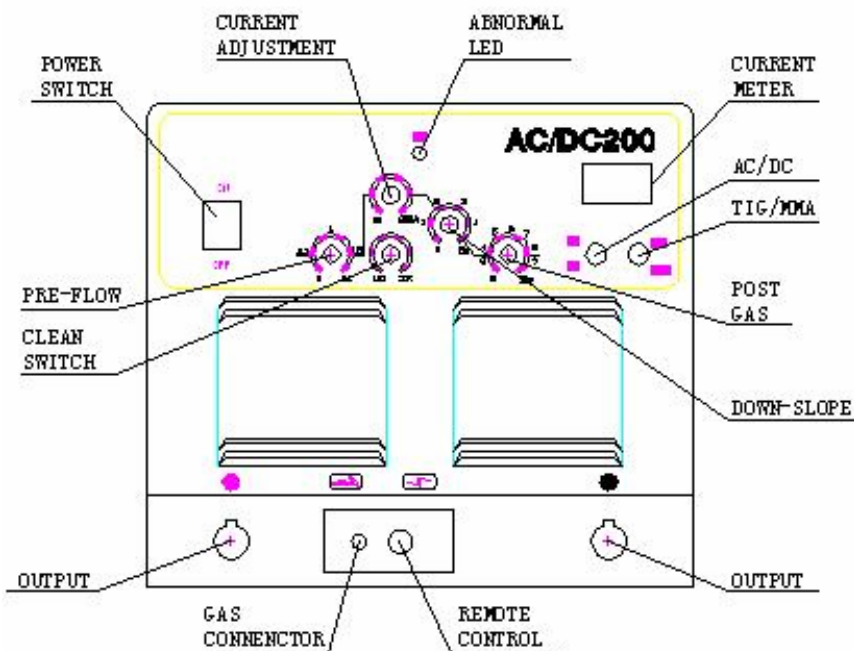
TYPE	TIG200AC/DC <i>Shown for Comparison</i>	Super160 ACDC
Power voltage	AC220V \pm 10% 50/60Hz	AC220V \pm 10% 50/60Hz
Rated input current	20A	22
Power capacitance	4.5KVA	4.8KVA
Rated output current	200A	160A Tig / 40A Plasma
Range of output current	20-200A	20-160A (15-40A)
No-load voltage	56V	56V Tig (220V Plasma)
Working voltage	18V	28V Tig (100V Plasma)
Pressure		Tig- Standard 15-30 Plasma- 55-75psi 2.4cfm
Pre-flow (S)	0-2	0-2
AC output frequency (Hz)	60	60
Clean width (%)	20-60	20-60
Slope-down time (S)	0-5	0-5
Post-gas time (S)	2-10	2-10
Remote control/ Foot	YES – Trigger Only	YES – Foot or Trigger
Arc-leading – HF start	HF vibration start	HF vibration start
Efficiency (%)	85	85
Rated duty cycle (%)	60	60
Power factor	0.93	0.93
Insulation class	B	B
Protection class	IP21	IP21
Weight (kg)	20	20
Size (mm)	493*330*320	493*330*320
Max welding thickness (mm)	10-14	10-12

Panel board functions & instructions

SUPER160 Panel



TIG200AC/DC Panel



Panel Switch Functions and Operation:

ARC/TIC/CUT exchange switch: placing the switch on ARC is for MMA/Stick welding. Placing the switch on TIG is for AC or DC tig welding. Placing the switch on CUT is for plasma cutting.

AC/DC exchange switch: placing the switch on AC is AC Mode for welding aluminum, copper, brass, etc... Placing the switch on DC is DC Mode for welding steel, iron, stainless, etc...

Adjustment Knobs: (if applicable)

Pre-flow time: adjust the pre-gas flow to allow air flow prior to arc initiation.

Current: adjust the RMS real current flow to the work piece.

Clean width: when the machine is in AC Tig mode the current fluctuates from positive to negative. Clean width adjust it's positive current flow which is convenient for welding metals with oxidation on them. This knob is for adjusting the current time between positive and negative. When in the middle, the proportion is 50%, the maximum is 80% and the minimum is 20%. If in clockwise position the positive current time is longer and negative current time is shorter and vice versa.

Slope-down: After lifting foot pedal or releasing trigger, the current is required to reduce gradually until it stops. This knob is to adjust the time slope from I_{max} to I_{zero} .

Note: If using "foot pedal", this knob is adjusted to "0" in counterclockwise direction for proper operation.

Post-flow: 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 knob is for adjusting the post-flow time.

Arc force: if you adjust this switch at MMA, then it can change the welding characteristic of the current.

Base current: at DCTIG pulse, this button can adjust the amplitude of the valley current.

Pilot light function

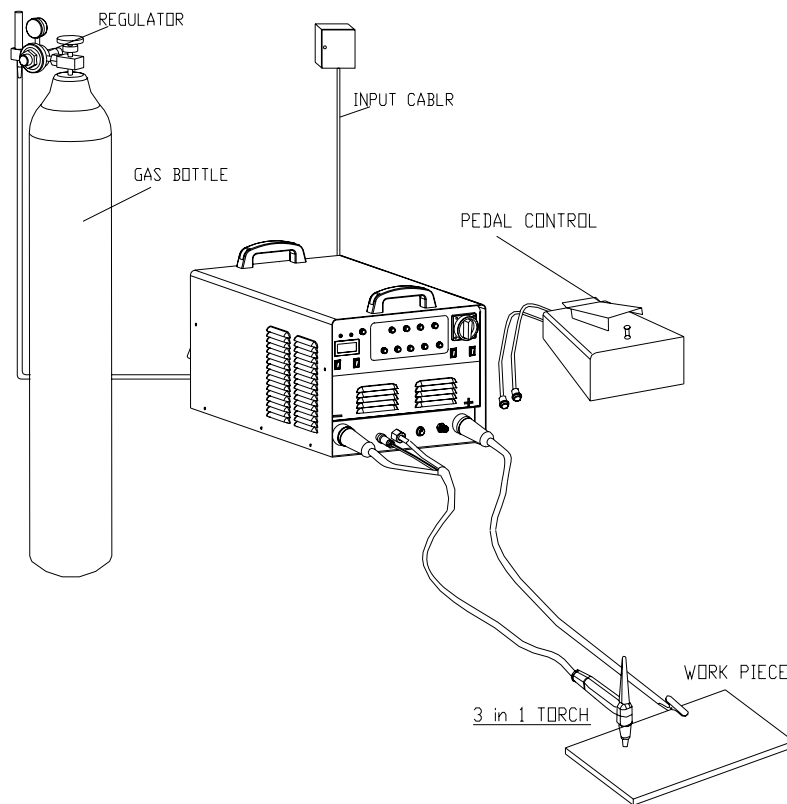
The Red LED or OC/OV is an error indicator which alerts the user to problems or overheating. If you are using the machine for a prolonged period of time and the light comes on, please stop welding or cutting and allow the machine to cool down with the power switch in the ON position, do not turn it off. Let it cool for 5 minutes.

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 a professional or the manufacturer for help.

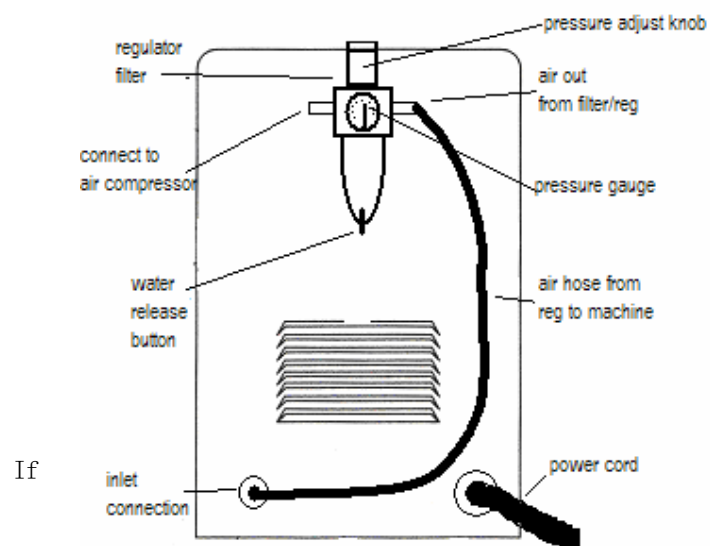
INSTALLATION

This machine comes standard with an air regulator for use during plasma cutting mode or it can also be used during tig welding mode to help regulate the argon gas flow into the torch. Use of an extended welding or ground cable may cause low quality welds unless you choose one with a thicker cable to reduce current losses.

1. Locate an electrical plug suitable for your outlet. It should be rated for your machine.
2. Connect your gas source. Air for plasma cutting and argon or co2 for Tig. Make sure your pressure is accurate for the type of material you are dealing with.
3. Connect the ground cable, torch cable and screw in the connectors snug with a wrench.
4. This machine is rated for 220vac 1phase input only. Do not attempt to use on 110vac.
5. Set up your torch consumables for your work. Clamp the ground on your work.
6. Connect the foot pedal plug to the 7pin socket on the panel board and turn the current to it's lowest setting to allow the foot pedal to adjust the current.
7. Adjust your knobs on the panel and switches to the correct settings based upon your work. You are ready to weld.



Connecting the Air Supply to the Machine for Cutting



If

your machine comes with an air regulator/filter you will need to secure the bracket to the machine and then fasten the

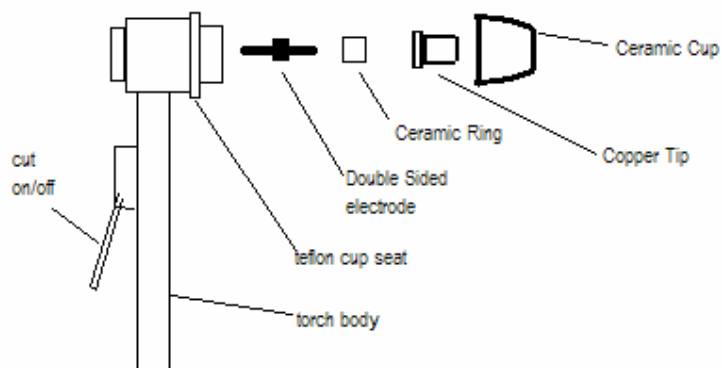
regulator to the bracket. Locate the in and out labeled on the regulator body. Cut a section of hose long enough to bend around the back of the machine as pictured and secure it to the outlet on the regulator and the inlet to the machine.

Next you will need to connect an air compressor to the inlet to the regulator. The air compressor should be set to a higher pressure than the compressor requires.

Set the knob on the regulator to the specified pressure your machine requires.

After each long duration of use you will need to push the water release button to release water from the water separator section of the regulator. It is designed to remove water from the air.

Assembly of the Torch Consumables Cut40 Torch Head



The torch handle is made of ceramic which is fire and heat resistant. Do not drop or strike anything with the torch. The on/off switch can be positioned on the top, side or bottom of the torch body to allow ease of use. The assembly of the consumables is as pictured. The electrode is inserted in first, then seat the ring on the electrode. The copper tip should be placed on the ring and it should seat well and flat. Last you will secure all parts in place by turning the ceramic cup clockwise until it is snug. Do not over tighten and make sure the tip seats properly under the cup.

OPERATION of Cutting Mode

1. Plug the machine to the electrical outlet, first making sure the machine on/off switch is in the off position.
2. Connect the air compressor supply line to the input side of the air regulator/filter (if applicable).
3. Turn the on/off switch of your cutter to the ON position. The cooling fan(s) should come on and the ON indicator LED (if applicable) should come on.
4. At this point you should already have your cables connected to your machine, if they are not then turn off your machine and do this now and start over.
5. Connect the ground clamp to your work piece to be cut. Make sure there is no rust or paint creating an open circuit. You should clean the contact point on the work piece to ensure a good electrical connection.
6. Make sure your protective clothing and eye protection is on before going any further. Work in a well ventilated area to avoid smoke.
7. Bring the torch tip into direct contact with your work piece edge or over a predrilled pilot hole if cutting very thick material. See Cutting Guideline table below for more details about cutting. Depress the button on your torch to start the arc and begin cutting.
8. After performing the desired cut you may need to clean off slag from the under part of the cut. Do this with a grinder or chisel.

CUTTING Mode (40Amp) Cutting Guideline Table	
Steel, Stainless Steel, MOLY, Iron, etc...	Aluminum, Copper, Brass, etc...
Thin = 0-1/8"	Thin = 0-1/16"
Medium = 1/8" – 3/8"	Medium = 1/16" – 3/16"
Thick = 3/8" – 1/2"	Thick = 3/16" – 3/8"
Severance cut = 3/4"	Severance cut = 9/16"

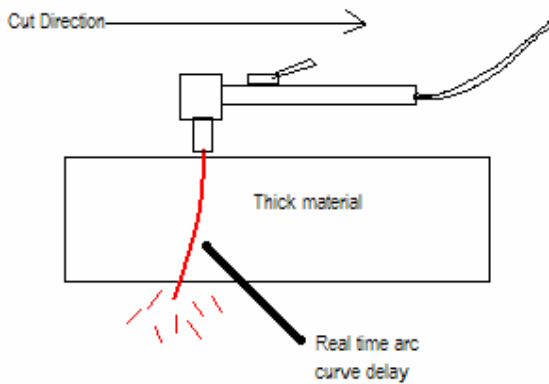
When cutting thin material, you may start directly perpendicular to the work piece, there is no need to angle or start on the edge as the arc will pass through quickly.

When cutting medium material, you should angle the torch tip to avoid damaging the tip. Once the arc passes through the material you may begin cutting normal.

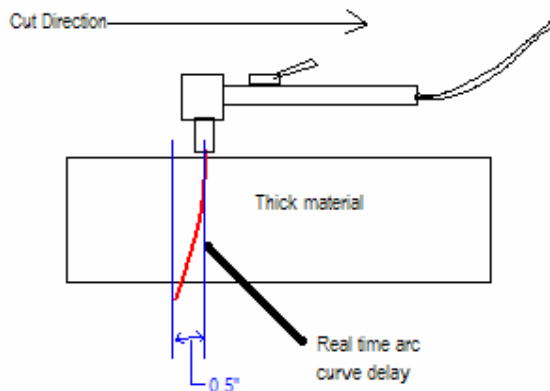
When cutting thick material, you should drill a pilot hole to start your arc through or start on the edge of the work piece.

Do not cut any material on a flat surface. The work piece should be raised off the ground to avoid blow back which may burn you or cause fires.

Real time arc curve delay issues



When cutting thick materials you will need to keep a steady pace in the direction of your cut. Do not move the torch too quickly or you will experience an arc curve delay. This delay can cause your work piece to have sections which are uncut and thus you will need to go over those sections a second time which may distort or damage your work piece. To avoid arc curve delay you should allow the arc to pass completely through the work piece before moving too far ahead. Your arc curve should not lag more than the thickness of the material being cut. Eg... if your work piece is $\frac{1}{2}$ " thick then you will not want your arc curve to lag more than $\frac{1}{2}$ " behind your torch. See below picture for details.



Error Codes

Do not attempt to repair, open or service machines unless authorized. Electrical shock hazard. Danger.

BREAKDOWN	POSSIBLE CAUSES	SOLUTION
1. No reflection after turn-on	<ol style="list-style-type: none"> No power supply or short of phase. Power cable in break circuit. Assistant power off in the phase. 	<ol style="list-style-type: none"> Check the power supply. Open the case to check the voltage. Contact the supplier or specialist.
2. The regulator indicates, no sound of releasing electricity, no show of breakdown.	<ol style="list-style-type: none"> Something wrong with the switch. Releasing nozzle in short circuit. Air-socket wrongly set up. 	<ol style="list-style-type: none"> Use screw knife to make the two-cored air socket short circuit. Adjust the distance between electri-releasing nozzle. 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.	<ol style="list-style-type: none"> Earth cable not well connected. Torch cable in short circuit. 	<ol style="list-style-type: none"> Check the earth cable. Check or renew the torch.
4. Have current output, but cannot adjust.	<ol style="list-style-type: none"> Hand-control and foot switch in wrong place. Potentiometer in the foot switch broken. 	<ol style="list-style-type: none"> When using foot switch, the exchange switch should be in "on" place. Renew the potentiometer.
5. Hand-control normal, while foot switch abnormal.	<ol style="list-style-type: none"> Slight switch in foot switch broken. Sliding potentiometer in the foot switch broken. 	<ol style="list-style-type: none"> Renew the slight switch. Renew 1K sliding potentiometer.
6. Abnormal pilot light on	<ol style="list-style-type: none"> Spontaneous over-current protection. Too much dust causes short circuit. Some parts in the machine broken. 	<ol style="list-style-type: none"> Turn off the machine, and restart after the light on. Open the case, use the compressed air to clear the dust. Contact professionals or suppliers.
7. Can not remove the oxidized coating in AL-welding	<ol style="list-style-type: none"> Choose the wrong welding button. Clear width too low. Damage the MOSFET in second inverter. 	<ol style="list-style-type: none"> Choose AC button in AL welding. Make clear width high or remove the oxidized coating. Contact professional.
8. Current normal, but no gas out.	<ol style="list-style-type: none"> Have sound of electromagnetic valve <ol style="list-style-type: none"> gas nozzle blocked up gas hose broken No sound of electromagnetic valve <ol style="list-style-type: none"> valve damaged valve-controlled circuit in trouble 	<ol style="list-style-type: none"> clear the blockings. Repair and change tig torch <ol style="list-style-type: none"> change the valve ask professional to repair the board
		Adjust the clear width in

9. Tungsten terribly damaged	Clear width adjust too much	counterclockwise.
10. Earth cable too hot.	Earth cable not well connected	Better tie the cable screw to the work table.

Typical Startup Problems to avoid:

1. Make sure you connect your plug to the input wires correctly. Green or Green with yellow stripe is always ground. The other two wires are for your 220vac line in.
2. Make sure you have positive gas flow at the rated pressure of the machine will not operate correctly.
3. Make sure you are using dry air, moisture in the air will cause malfunctions.
4. Make sure your cables are correct for the function you have chosen. Tig mode requires tig torch, etc...
5. Observe proper torch consumable assembly. Improper assembly of consumables will damage the machine.