

OWNER'S MANUAL

MODEL: CUT50D
IGBT INVERTER PLASMA CUTTER

PrimeWeld

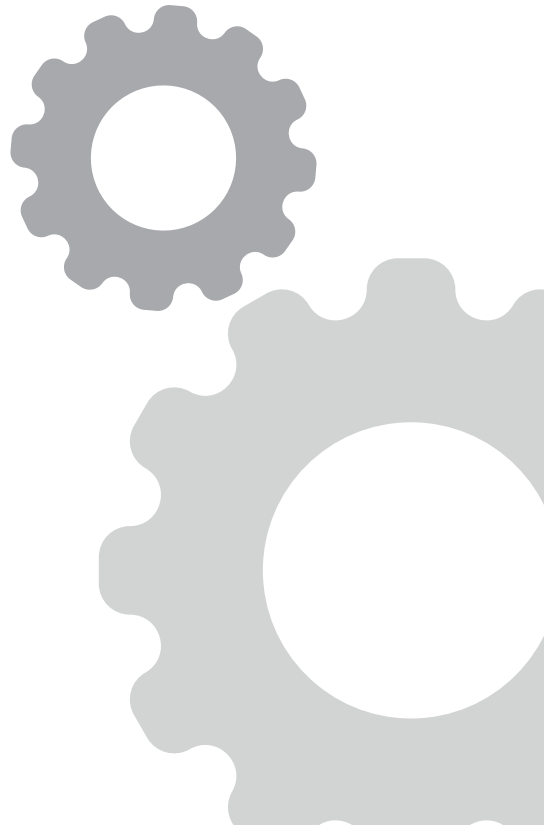


Need Help?

Please Call

856-537-4368

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www.primeweld.com



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EC DECLARATION OF CONFORMITY

We hereby declare that our machines for industrial and professional use as stated below.

Model: IGBT plasma cutting machine Cut50d, CUT50Pi, CUT50D, CUT50DP. Conforms with EMC Directives:

73/23/EEC and 89/336/EEC European Standard:

EN/IEC60974

Please read and understand this instruction manual carefully before the installation and operation of this equipment.








The contents of this manual may be revised without prior notice and without obligation.

This instruction manual is issued on 05st May 2019.

Dear Valued Customer. Thank you for purchasing our Plasma Cutter Read this manual thoroughly. Incorrectly installed or improperly grounded equipment is a hazard. And can cause serious damage. Properly install and ground this equipment according to this manual and national. State. And local codes.

WARNING

Welding and cutting is dangerous to the operator, people in or near the working and surrounding areas, if the equipment is not operated correctly. Therefore the performance of welding/cutting must only be under the strict and comprehensive observance of all relevant safety regulations.

Symbol	Description
	<p>Electric Shock: Maybe fatal</p> <ul style="list-style-type: none"> • Avoid all contact with live components of the welding circuit, Electrodes and Wires with bare bands. Wear dry gloves before start welding task. • Wires with bare bands Keep operator insurance from welding metal and welding pieces.
	<p>Smoke and gas generated while welding or cutting Harmful to health of people</p> <ul style="list-style-type: none"> • keep head distance away from gas. • Avoid breathing the smoke and gas of welding or cutting. • keep the working area in good ventilation.
	<p>Fire Hazard</p> <ul style="list-style-type: none"> • wetting sparks, Power cable leakage both can cause the fire. • Please do not welding in inflammable, its can cause explode. • Sparks may cause fire, Remove flammable material from the work place. • Keep fire extinguisher nearby and have a trained fire person ready to use it.
	<p>ARC light-emission: Harmful to the eyes & skin of people</p> <ul style="list-style-type: none"> • Wear a welding helmet, Anti-radiation glass and work clothes while the welding Operation is performed. • Keep working area in ventilation.
	<p>CYLINDER may explode if damaged.</p> <ul style="list-style-type: none"> • Always keep cylinders in an upright position securely chained to an Undercarriage or fixed support. • Never allow the electrode, electrode holder or any other electrically `hot" parts to touch a cylinder • Keep your face and head away from the cylinder valve outlet when it to be opening.
	<p>Engine fan can hurt the hands</p> <ul style="list-style-type: none"> • Do not put your hands near the engine fan. • Do not attempt to override the governor or idler by pushing on the throttle Control rods while the engine is running.
	<p>ELECTRIC SHOCK can kill.</p> <ul style="list-style-type: none"> • Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical. • Ground the work or metal to be welded to a good electrical ground. • Never dip the electrode in water for cooling. • Turn off input power using the disconnect switch at the fuse box before working on the equipment. • Install equipment in accordance with electric standard code.

CAUTION

1. Working Environment

- 1.1 The environment in which this welding equipment is installed must be free of grinding dust, corrosive chemicals, flammable gas or materials etc, and at no more than maximum of 80% humidity.
- 1.2 When using the machine outdoors protect the machine from direct sun light, rain water and snow etc:the temperature of working environment should be maintained within -14°F to + 104°F.
- 1.3 Keep this equipment distant from the wall.
- 1.4 Ensure the working environment is well ventilated.

2.Safety Tips.

2.1 Ventilation

This equipment is small-sized, compact in structure, and of excellent performance in amperage output.

The fan is used to dissipate heat generated by this equipment during the welding operation.

Important: Maintain good ventilation of the louvers of this equipment.

The minimum distance between this equipment and any other objects in or near the working area should be 1ft. Good ventilation is of critical importance for the normal performance and service life of this equipment.

2.2 Thermal Overload protection.

Should the machine be used to an excessive level, or in high temperature environment, poorly ventilated area or if the fan malfunctions the Thermal Overload Switch will be activated and the machine will cease to operate. Under this circumstance, leave the machine switched on to keep the built-in fan working to bring down the temperature inside the equipment. The machine will be ready for use again when the internal temperature reaches safe level.

2.3 Over-Voltage Supply

Regarding the power supply voltage range of the machine, please refer to ' Main parameter table.

This equipment is of automatic voltage compensation, which enables the maintaining of the voltage range within the given range. In case that the voltage of input power supply amperage exceeds the stipulated value, it is possible to cause damage to the components of this equipment. Please ensure your primary power supply is correct.

2.4 Do not come into contact with the output terminals while the machine is in operation. An electric shock may possibly occur.

Maintenance

Exposure to extremely dusty, damp, or corrosive air is damaging to the welding machine. In order to prevent any possible failure or fault of this welding equipment, clean the dust at regular intervals with clean and dry compressed air of required pressure.

Please note that: lack of maintenance can result in the cancellation of the guarantee: the guarantee of this welding equipment will be void if the machine has been modified. attempt to take apart the machine or open the factory-made sealing of the machine without the consent of an authorized representative of the manufacturer.

Trouble shooting

Caution: Only qualified technicians are authorized to undertake the repair of this Plasma cutter equipment. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed in this manual.

Note:

- Our equipment as described in this manual conforms to all applicable rules and regulations of the 'Low Voltage Directive' (European Council Directive 73/23/EEC) as set out and amended by Council Directive 93/68/EEC) and to the National legislation for the enforcement of this Directive.
- Our equipment as described in this manual conforms to all applicable rules and regulations of the European Council Directive 89/336/EEC. (EMC Directive) and to the National legislation for the enforcement of this Directive.

Air plasma cutting technology

Plasma cutters work by passing an electric arc through a air/gas that is passing through a constricted opening. The gas can be air, nitrogen, argon, oxygen, etc. The electric arc elevates the temperature of the gas to the point that it enters a 4th state of matter. We all are familiar with the first three: i.e., Solid, liquid, and gas. Scientists call this additional state plasma. As the metal being cut is part of the circuit, the electrical conductivity of the plasma causes the arc to transfer to the work. The restricted opening (nozzle) the gas passes through causes it to squeeze by at a high speed, like air passing through a venturi in a carburettor. This high speed gas cuts through the molten metal.

Plasma cutting was invented as the result of trying to develop a better welding process. Many improvements then led to making this technology what it is today. Plasma cutters provide the best combination of accuracy, speed, and afford ability for producing a variety of flat metal shapes. They can cut much finer, and faster than oxy-acetylene torches.

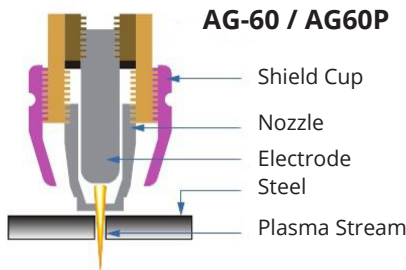
SAFETY

How a plasma Cutter works

Basic plasma cutters use electricity to superheat air into plasma (the 4th state of matter), which is then blown through the metal to be cut. Plasma cutters require a compressed air supply and AC power to operate.

Operation

1. When the trigger is squeezed, DC current flows through the torch lead into the nozzle.
2. Next, compressed air flows through the torch head, through the air diffuser that spirals the air flow around the electrode and through the hole of the cutting nozzle.
3. A fixed gap is established between the electrode and the nozzle. (The power supply increases voltage in order to maintain a constant current through the joint.) Electrons arc across the gap, ionizing and super heating the air creating a plasma stream.
4. Finally, the regulated DC current is switched so that it no longer flows to the nozzle but instead flows from the electrode to the work piece. Current and airflow continue until cutting is stopped.



Notes:

The nozzle and electrode require periodic replacement. The electrode has an insert of tough high conductive material such as hafnium and cerium. This insert erodes with use, also the nozzle orifice will erode with use.

Quality of the air used is paramount to longer life of electrodes and nozzles, in short clean dry air gives longer parts life, the cleaner and dryer the better. We recommend use of a Plasma Air Filter.

What kinds of materials can the plasma cut?

Virtually any metal can be plasma cut including steel, stainless steel, aluminium, brass, copper, etc. Any thickness from 30 gauge through 13116" can be cut, depending on the power of the plasma cutter used.

How Does Plasma Cutting Compare to Oxy-fuel (gas) cutting?

Plasma cutting can be performed on any type of conductive metal - mild steel, aluminium and stainless are some examples. With mild steel, operators will experience faster, thicker cuts than with alloys. Oxy-fuel cuts by burning, or oxidizing the metal it is severing. It is therefore limited to steel and other ferrous metals which support the oxidizing process. Metals like aluminium and stainless steel form an oxide that inhibits further oxidization, making conventional oxy-fuel cutting impossible. Plasma cutting however does not rely on oxidation to work and thus it can cut aluminium, stainless and any other conductive material. While different gasses can be used for plasma cutting, most people today use compressed air for the plasma gas. In most shops, compressed air is readily available, and thus plasma does not require fuel gas and compressed oxygen for operation. Plasma cutting is typically easier for the novice to master, and on thinner materials, plasma cutting is much faster than oxy-fuel cutting. However, for heavy sections of steel (1" and greater), oxy-fuel is still preferred since oxy-fuel is typically faster and, for heavier plate applications high powered plasma machines are required for plasma cutting applications.

What are the limitations to Plasma Cutting?

Where is Oxyfuel preferred?

The plasma cutting machines are typically more expensive than oxy/acetylene. Also, oxy/acetylene does not require access to electrical power or compressed air which may make it a more convenient method for some users. Oxyfuel can generally cut thicker sections (>63164 inch) of steel more quickly than plasma.

Plasma Introduction

The plasma Cutting process involves creating an electrical channel of super-heated, electrically ionized gas i.e. plasma from the plasma cutter itself, through the work piece to be cut, thus forming a completed electric circuit back to the plasma cutter via a grounding clamp. This is accomplished by a compressed gas (Oxygen, air, inert and others depending on material being cut) which is blown through a focused nozzle at high speed toward the work piece. An electrical arc is formed within the gas, between an electrode near or integrated into the gas nozzle and the work piece itself. The electrical arc ionizes some of the gas, thereby creating an electrically conductive channel of plasma. As electricity from the cutter torch travels down this plasma it delivers sufficient heat to melt through the work piece. At the same time, much of the high velocity plasma and compressed gas blow the hot molten metal away, thereby separating i.e. cutting through the work piece.

NOTE: This machine is designed to use only compressed air as gas.

PARAMETER

Cut50d with 50 Amps cutting current.
15mm Max Cutting thickness on Steel.
Inverter with Industrial Rated, Lightweight and Portable.

Amperage

- Latest IGBT Inverter Technology
- Safe torch connection
- High quality cutting torch with quality cable
- Industrial application
- Tolerant to variable power supply
- Quality Air regulator with preset air pressure
- Suitable to cut all electrically conductive materials
- Light weight and compact
- Strong metal housing



Amperage

Model	Cut50D (110/220V)	
	220V	110V
Power Supply / Phases (V-Ph)	220V +/-15%	110V +/-15%
Duty Cycle @ 78°F (25 C)	60%@ 50Amps	60%@ 40Amps
Rated Power (KVA)	5.90	4.40
Input Current Range (A)	35-40	40-45
Output Current Range (A)	20-50 Amps	20-40 Amps
Rated Output Voltage (V)	100	96
No-Load Voltage (Open CricuC(V)	260	260
Efficiency (%)	60	60
Insulation Class	F	F
Protection Class	IP21S	IP21S
Plasma Arc Starting	HF Touch	HF Touch
Air Flow Pressure Range (PSI)	40 - 65 psi	40 - 65 psi
Air Flow Rate (CFM)	5 L/min	5 L/min
Clean Cutting Thickness (mm)	12mm	12mm
Cutting Thickness Severance (mm)	16mm065psi	12mm065psi
Cutting speed 10mm	200mm/min(065 psi)	150mm/minG65 psi
Machine Dimenswns (inch)	13 7 x 5 6" x 9 2"	13 7 x 5 6" x 9 2"
Shipping Weight (kgs)	8.9kgs	8.9kgs

PARAMETER

Cutting Thickness chart

Need to adjust the current and air pressure properly under metal thickness to get best cutting surface

1	Cut50d -220V	20Amps	30Amps	40Amps	50Amps
	Thickness (mm)	5mm	6mm	10mm	12mm
	Air Pressure (psi)	40-50psi	40-50psi	50-60psi	60-70psi

2	Cut50d -110V	20Amps	30Amps	40Amps
	Thickness (mm)	5mm	6mm	10mm
	Air Pressure (psi)	40-50psi	40-50psi	50-60psi

SPECIFICATIONS

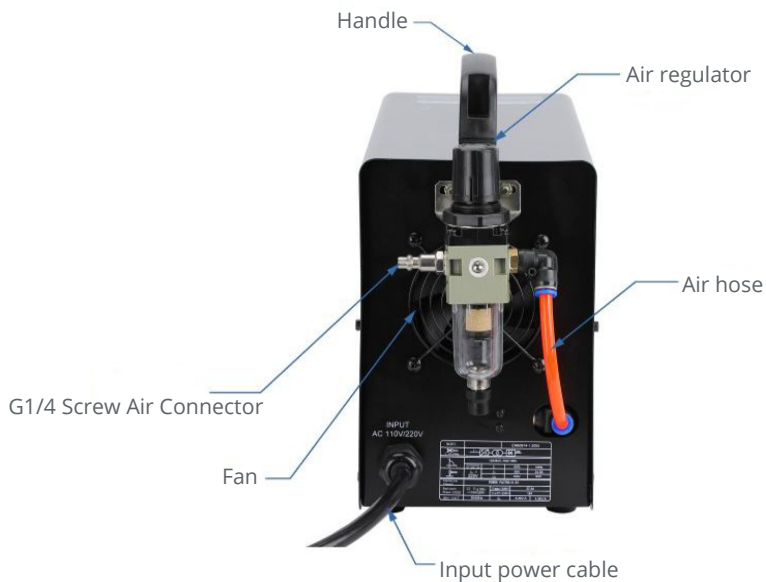
GENERAL DESCRIPTION

This unit is designed for light cutting project and weights only 11 kgs include accessories. This powerful unit is good enough to cut 12mm (75PSI air pressure) to 16mm severance thickness, making it an good idea for cost conscious DIY hobbyists.

1. 50Amps inverter plasma cutter
2. 120/220V automatic dual voltage and high frequency 50/60 Hz
3. suitable for stainless steel. Alloy steel, Mild steel. Copper and Aluminum, etc.

<p>Power source</p> 	<p>Earth Clamp & Cable</p> 	<p>Air hose</p> 
<p>Consumables</p> 	<p>AG60 Cutting Torch</p> 	

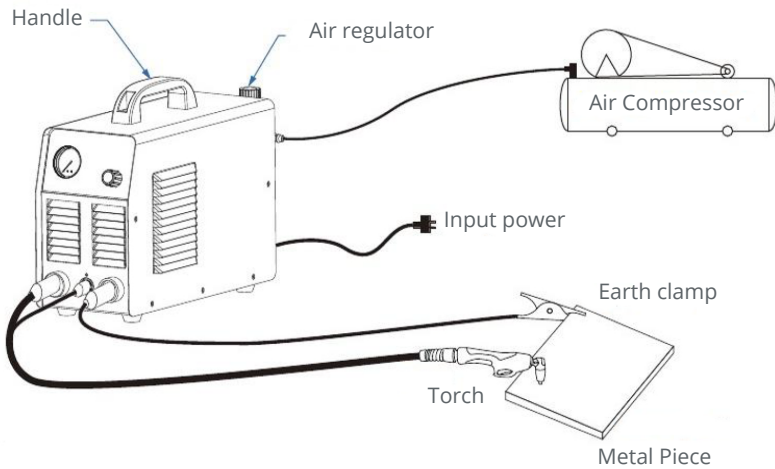
How to install machine



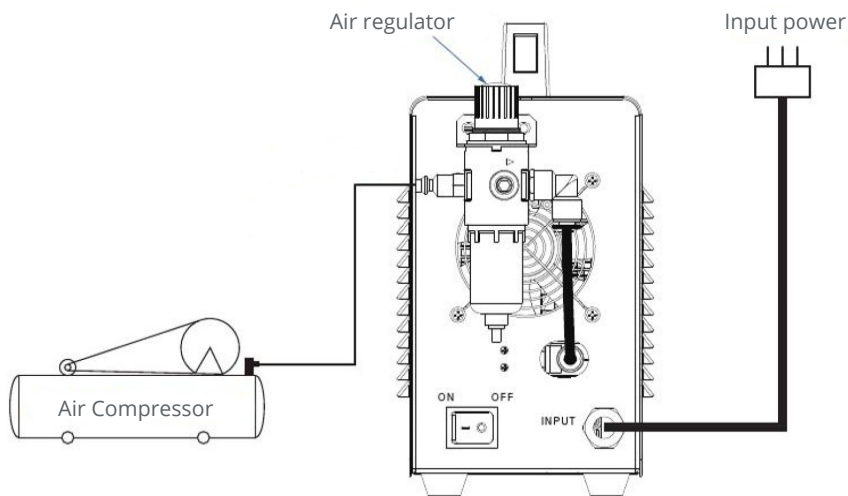
LAYOUT



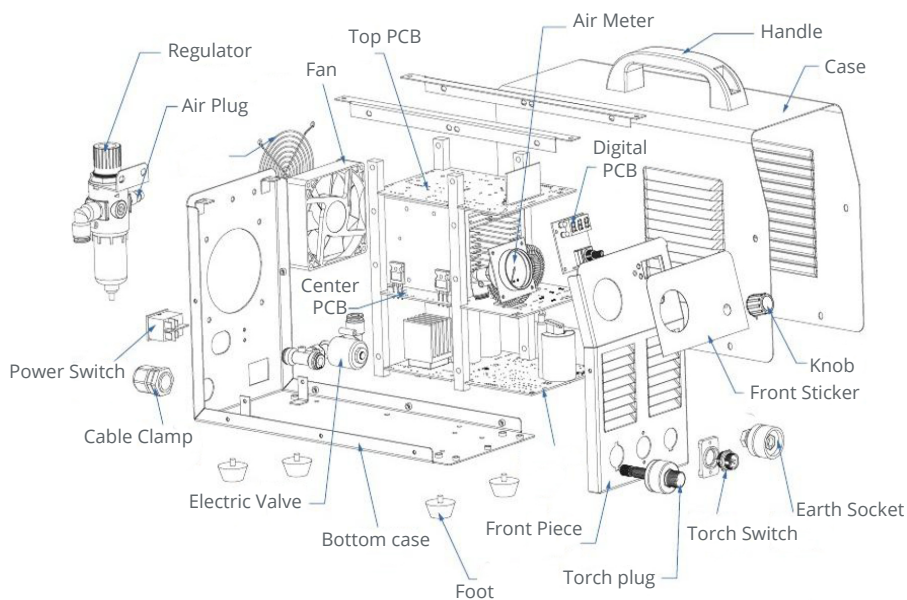
Connection



Back Connection



Explosive View of Machine



OPERATION

Start Cutting



Hold the torch vertical at the edge of the work piece



Pull the Trigger to start the arc, the cutting arc will initial when the Torch tip is close enough to the work Piece. Start Cutting on the edge until the Arc has cut completely through.



Then. Proceed with the cut.

Hand Torch cutting technique



When cutting make sure that sparks are exiting from the bottom of the work piece.

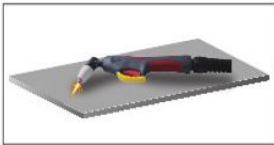


If sparks are spraying up from the work Piece, you are moving the torch too fast, or you don't have enough amps sel.



Hold the torch vertical and watch the arc as it cuts along the line.

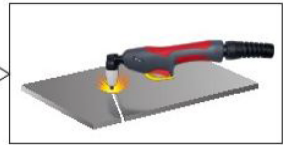
Piercing



Hold the torch at an angle to the work piece, pull the trigger to start the arc and slowly rotate it to an upright position.



When sparks are exiting from the bottom of the work piece, the arc has pierced through the material



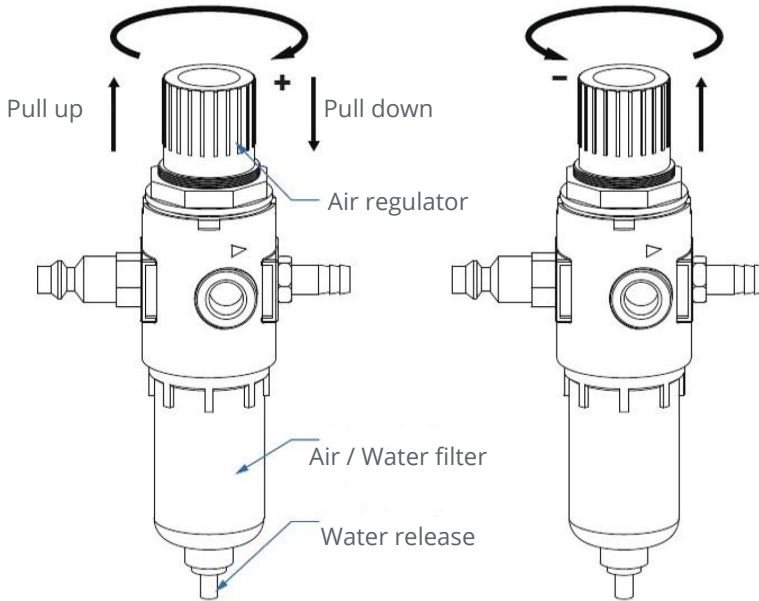
When the pierce is complete, proceed with cutting

OPERATION

How to use air regulator

— Clockwise increase air pressure —

— Anti-Clockwise Reduce air pressure —



Machine Dimensions



OPERATION

Amperage

Standard rule of thumb is the thicker the material the more amperage required. On thick material, set the machine to full output and vary your travel speed. On thinner material, you need to turn down the amperage and change to a lower-amperage tip to maintain a narrow kerf. The kerf is the width of the cut material that is removed during cutting.

Speed

Amperage and speed are critical to producing a good quality cut. The faster you move (especially on aluminium), the cleaner your cut will be. To determine if you're going too fast or too slow, visually follow the arc that is coming from the bottom of the cut. The arc should exit the material at a slight angle away from the direction of travel. If it's going straight down, that means you're going too slow, and you'll have an unnecessary buildup of dross or slag. If you go too fast, it will start spraying back onto the surface of the material without cutting all the way through. Because the arc trails at an angle, at the end of a cut, slow your cutting speed and angle the torch in to cut through the last bit of metal.

Direction

It is easier to pull the torch towards you than push it. The plasma stream swirls as it exits the tip, biting one side and finishing off on the other leaving a bevelled edge and a straight edge. The bevel cut effect is more noticeable on thicker material and needs to be taken into consideration before starting your cut as you want the straight side of the cut to be on the finished piece you keep.

Torch tip height & position

The distance and position of the plasma torch cutting tip has an effect on the quality of the cut and the extent of the bevel of the cut. The easiest way to reduce bevel is by cutting at the proper speed and height for the material and amperage that is being cut.



Correct torch height and
Square to the material
Minimum bevel & equal
bevel Longest
consumable life



Torch Angled to the
material unequal bevel,
one side may be
excessively beveled.

OPERATION



Torch height too high
excessive bevel; plasma
Stream may not cut all the
way through the material



Torch height too low Reverse
bevel. Tip may contact the work
piece and short out or damage
the tip.

Tip size and condition

The tip orifices focus the plasma stream to the work piece. It is important to use the correct size tip for the amperage being used. For example a tip with a 3/64" orifice is good for 0-40 amps whereas a 1/16" orifice is better for 40-80 amps. The low-amp tip has a smaller orifice which maintains a narrow plasma stream at lower settings for use on thin-gauge material. Using a 25 amp tip at an 60 amp setting will blow out and distort the tip orifice and require replacement. Conversely, using an 80-amp tip on the lower settings will not allow you to focus the plasma stream as well and creates a wide kerf. The condition of the tip orifice is critical to the quality of the cut result. A worn or damaged tip orifice will produce a distorted plasma stream resulting in a poor cut quality.

Electrode condition

A fixed gap is established between the electrode and the inside of the cutting tip. Electrons arc across the gap, ionizing and super heating the air creating the plasma stream. The electrode contains an insert in the end made of a highly conductive material called hafnium. This insert erodes with use and develops a pit in the end of the electrode, when the pit becomes too much poor quality cuts will result and necessitate replacement of the electrode.

Air pressure and volume

Air pressure, flow rate and air quality are critical to quality plasma cutting and consumable life span. The required air pressure and volume can vary from model to model and the manufacturer will provide the specs. The primeweld cut50 air pressure is pre-set at 4.5 psi and requires a flow rate of 6.0 CF/M. The volume capacity of your compressor is important. If you have a small compressor with exactly the same l/min rating as the plasma, then the compressor will run continuously when you are plasma cutting. A compressor with a l/min rating slightly higher than the plasma would be more adequate. If you are doing a lot of cutting, cutting thick plate (same air consumption but slower cut speeds = longer cut time) then choose a compressor at 1.5 to 2 times the plasma system requirement.

OPERATION

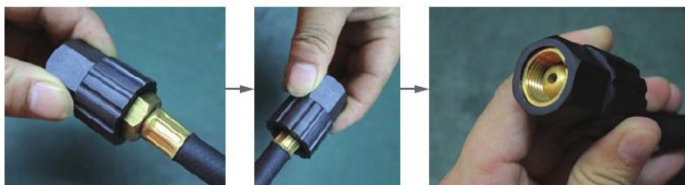
Air Quality

Good air quality is essential to quality plasma cutting and consumable life span. Compressors take in air at atmospheric pressure and increase the pressure and store it in a tank. Humidity in the air is condensed in the tank and in the airlines producing water, more so in humid environments. Moisture that forms in air lines has a tendency to condense into larger drops when the air pressure decreases as it is entering the plasma torch. When these droplets enter into the high temperatures (as much as 19832°F) in the plenum of the torch, they immediately break down into oxygen and hydrogen, which alters the normal chemical content of air in the torch. These elements will then dramatically change the plasma arc which causes the torch consumable parts to wear very quickly, alters the shape of the nozzle orifice, dramatically affecting cut quality in terms of edge squareness, dross formation, and edge smoothness. Minimising the moisture in the air supply is absolutely critical to quality plasma cuts and longevity of consumable parts. As a minimum be sure to drain the receiver (tank) on the air compressor at least daily. Most air plasma systems from reputable manufacturers have an on board particulate filter and or a coalescing filter with an auto drain that will remove some moisture from the air supply. For home workshop and light industrial users the on board air filter is adequate. Most situations however will require additional filtration to prevent moisture from affecting the quality of the plasma cutter and in most cases it is recommended to install a sub-micronic particulate filter that is designed to trap water through absorption. This style of filter has a replaceable filter cartridge that absorbs water and must be changed after it is near saturation, it should be installed close as possible to the air intake of the plasma cutter.

Technique Tips

- It is easier to pull the torch through the cut than to push it.
- To cut thin material reduce the amperage until you get the best quality cut.
- Use the correct size tip orifice for the amperage being used.
- For Straight cuts use a straight edge or cutting buggie as a guide. For circles, use a template or circle cutting attachment.
- Check that the front end consumable parts of the plasma cutting torch are in good condition.

Torch Connector cover



Problems	Analysis	Solution
1. Power indicate not lighting when power up , the fan not working , torch also not working while press torch trigger	<p>No power go into machine through power cable(AC220 orAC110) no input</p> <p>2.Power cable, switch or other wire loosen</p> <p>3.Power cable inside of machine connect not well</p> <p>4.Power board problem</p>	<p>2.Check the power cable: power switch, power plug and all wires inside of machine if any loosen, check if any wires loosen from power switch to main board.</p> <p>3 Change the board</p>
2. power indicator not lighting up after switch on , fan stop working only works some seconds, machine stop working once the torch touch the metal get arc starting.	<p>1.The starting circuit problem, or relay problem.</p> <p>2.Too many times switch on and off cause machine over heat can not get working</p>	<p>1 Check the power components or change the main board,.</p> <p>2.Let the machine rest some time restart it again.</p>
3. power indicator lighting after switch on machine, fan works, but machine not working while press torch trigger	<p>1.Check the torch switch or if any torch wires loosen from torch connection;</p> <p>2.The torch switch loosen or any wires loosen</p> <p>3. The switch wires loosen inside of machine for the torch</p>	<p>1 Check if any torch wires loosen;</p> <p>2.Check if any wires loosen on torch</p> <p>3.Check if any wires loosen inside of machine</p>
4. the power indicator lighting, the fan works, HF spark while press torch trigger but no air blow out of torch head or the air keep blowing out) The electric valve not working	<p>1.The electric valve problem it is DC24V)</p> <p>2.Maybe the air hose stuck</p> <p>3.The circuit for air valve control problem</p>	<p>1.Check it or replace it;</p> <p>2.Check or replace;</p> <p>3.Check it:</p> <p>4.Change the board,</p>

Problems	Analysis	Solution
5. Power indicator lighting up, 0.0 indicator not lighting, Fan works, The gas blow out of torch after pressure torch trigger (gas valve works)No HF, There is arc between metal and electrode	1.Arc striking coil loosen; 2 HF capacitor 102-10KV broken	1.Check if any wires loosen 2.Replace the HF capacitor.
6. Power indicator lighting up, Fan works, Gas blow out of torch while pressing trigger, 0.0 lighting while pressing torch trigger	1.Diode problem ; 2.IGBT problem ;	a1.Check every diode, replace it if any damaged 2.Check every IGBT to see if any one damaged , Resistor. Diode, Replace it if any one damaged
7. Power indicator lighting , Fan works, Air can blow out of torch head after press torch trigger, 0.0 indicator not lighting, But it is lighting up while cutting.	1.Circuit problem ; Check IC3140 and other components	1.Check the coil 5:5, fix it if any wires loosen. 2.Does the feedback wire loosen or broken , Check and replace. 3.Replace the board.
8. The cutting current can not be adjust	1.The wires loosen or potentiometer damaged ^o 2.The setting circuit problem.	1. Check the potentiometer if middle pin to earth get 0-5V voltage. Replace it if any damaged 2. Check if any wires loosen from front board to main board 3. Boards problem ^o

Problems	Analysis	Solution
9. Machine auto shut down after switch it on.	<ol style="list-style-type: none"> 1.Maybe Power cable or circuit board short circuit 2.Silicon bridge problem 	<ol style="list-style-type: none"> 1.Fix or replace it0 2.Check and replace it 3.Replace silicon bridge
10. After pressure torch trigger, there is HF sound and spark, but can not get arc start	<ol style="list-style-type: none"> 1.Welding torch broken or loosen or Earth clamp and cable connecting not good enough to the earth and metal piece; 2.The connector for positive or negative loosen 	<ol style="list-style-type: none"> 1.Check them and fix;
11. HF works but arc starting not good enough 0	<ol style="list-style-type: none"> 1.The Gap for tip to the metal not in good range, The tip and electrode damaged or oxidate 2.HF weak because the board leakage; 3.GAS/AIR connector damaged, power leakage between connector and front panel 	<ol style="list-style-type: none"> 1.Adjust the tip to metal in right gap ; 2.Check and fix 3.Check and fix
12. HF keep sparking after press torch switch	<ol style="list-style-type: none"> 1 .H F signal going to torch switch board and disturb it. 	<ol style="list-style-type: none"> 1.Check the GAS/AIR torch connector, earth female socket and torch switch connector, if there any HF spark between them to front metal

ACCESSORIES

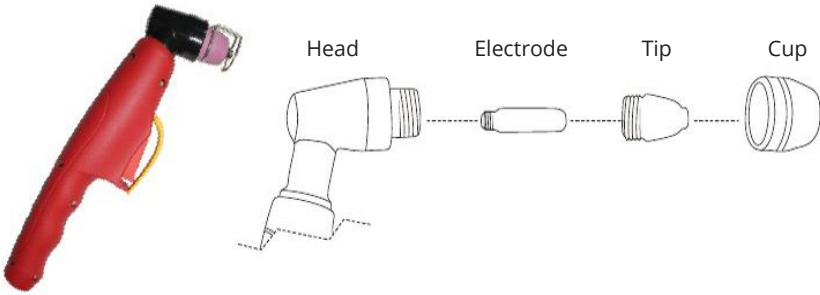
Connect your plasma cutting torch and ground cable to the front panel of the machine



ACCESSORIES

Torch Consumables

Model: AG-60P



Tip

Parts #

Description

AG60003

Tip



Electrodes

Parts #

Description

AG60002

Electrodes



Shield Cup

Parts #

Description

AG60001

Shield Cup



PLASMA CUTTER OPERATION MANUAL