PRIMEWELD
CUT 60

PrimeWeld
CUT 60

CALL US AT
856-500-2000

PRIMEWELD
CUT 60

Preface

This manual includes hardware description and operation introduction of the equipment. For your and other people's safety, please read the manual carefully.

Pay attention

Pay attention to the words after the signs below

Sign	Description
DANGER	The words after this sign means there is great potential danger, which may cause major accident, damage or even death, if it is not followed.
WARNING	The words after this sign means there is some potential danger, which may cause hurt or property lose, if it is not followed.
ATTENTION	The words after this sign means there is potential risk, which may cause equipment fault or break, if it is not followed.

Version

The contents of this manual are updated irregularity for updating of product. The manual is only used as operation guide, except for other promises. No warranties of any kind, either express or implied are made in relation to the description, information or suggestion or any other contents of the manual.

The images shown here are indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern.

CONTENTS

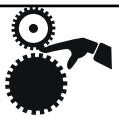
Section 1 Specification

Safety warning

The safety notes listed in this manual is to ensure correct use of the machine and to keep you and other people from being hurt.

The design and manufacture of welding machine considers safety. Please refer to the safety warning listed in the manual to avoid accidents.

Different damage would be caused by wrong operation of the equipment as follows. Please read the user manual carefully to reduce such damage.

Sign	Description
	• Any contact of electric parts may cause fatal electric shock or burnt.
	• Gas and fumes are harmful to health. • Operation in narrow space may cause choke .
	• Spark and hot workpiece after welding may cause fire. • Bad connected cable may cause fire. • Incompletion connection of workpiece side circuit may cause fire. • Never weld on the case of tinder stuff, or it may cause explode. • Never weld airtight containers such as slot, pipe etc., or it may break.
	• Arc ray may cause eye inflammation or skin burnt. • Spark and residue will burn your eyes and skin.
	• Toppling over of the gas cylinder will cause body hurt. • Wrong use of the gas cylinder will lead to high-pressure gas eruption and cause human hurt.
	• Never let fingers, hair, clothes or etc. near the moving parts such as the fan.
	• The wire shoot out of the torch may stab eyes, face and other naked parts.
	• Never stand in front of the swang equipment or under it, or it may fail and cause injury.

Section 1 Specification

DANGER

Please follow the rules below to avoid heavy accidents.

- Never use the equipment to do other things but welding.
- Follow related regulations for the construction of the input-driven power source, choice of place, usage of high-pressure gas, storage, configuration, safe-keeping of workpiece after welding and disposal of waste, etc.
- Nonessentials do not enter the welding area.
- People using heart pacemaker is not allowed to get close to the welding machine or area.
- Without doctor's permission, the magnetism created by energizing the welding machine can have a bad effect to the pacemaker.
- Install, operation, check and maintain the equipment by profession personnel.
- Understanding the contents of the user manual for safety.

DANGER

Please follow the rules below to avoid electric shock.

- Keep away from any electric parts.
- Earth the machine and workpiece by professional personnel.
- Cut off the power before installation or checking, and restart 5 minutes later. The capacitance is chargeable device. Please ensure it has no voltage before start again even if the power source is cut off.
- Do not use wire with inadequate section surface or damage insulation sleeve or even exposed conductor.
- Do ensure well isolation of wire connection.
- Never use the device when the enclosure is removed.
- Never use broken or wet insulation gloves.
- Use firenet when work at high position.
- Check and maintain regularly, don't use it until the broken parts are fixed well.
- Turn off the power when not in used.
- Follow the national or local related standard and regulations when using the AC welding machine at narrow or high position.

Section 1 Specification

DANGER

Please follow the below notes to avoid fire and explode, etc.

- No combustible in welding area.
- Keep off combustible when welding.
- Keep hot workpiece after welding away from flammable gas.
- Do move away the combustible around when weld the dooryard, ground and wall.
- The wire connection of base metal should be as close to the welding place as possible.
- Never weld those facilities with gas pipe or airtight slot.
- Put fire extinguisher around the welding area to prevent fire.

DANGER

The gas and fumes are harmful to health, please wear protective device according to regulations.

- Wear exhaust equipment and breathe preventive facilities to prevent gas poisoning or choke.
- Use suggested part exhaust equipment and breathe preventive facilities to prevent hurt or poisoning by gas and other powder, please.
- To prevent oxygen-deficiency, air out the gas-filled room which is full of CO2 and argon on the bottom, When operating on trunks, boilers, cabins, etc.
- Please accept the supervisor's inspection when operating in narrow space. Air the room and wear breathe preventive facilities.
- Never operate in degrease, washing or spray space.
- Using breathe preventive facilities when weld shielded steel for it will cause poisonous dust and gas.

Section 1 Specification

WARNING

The arc, spark, residue and noise are harmful to health, please wear protective appliance.

- Eye protection against arc is recommended when welding or supervise welding.
- Please wear preventive spectacles.
- Welder's gloves, welder's goggles, long sleeve clothes, leather apron, and other standard protection equipments must be worn for welding operation.
- A screen to protect other people against the arc must be set in the welding place.

WARNING

Please follow the notes below to avoid gas cylinder toppling over or broken.

- Use the gas cylinder correctly.
- Use the equipped or recommended gaseous regulator.
- Read the manual of gaseous regulator carefully before using it, and pay attention to the safety notes.
- Fix the gas cylinder with appropriative holder and other relative parts.
- Never put the cylinder under high temperature or sunshine environment.
- Keep your face away from the gas cylinder exit when opening it.
- Put on the gas shield when it is not used.
- Never put the torch on the gas cylinder. The electrode can not meet the gas cylinder.

WARNING

Any touch of the switch part will cause injury, please note the following.

- Never use the machine when the enclosure is off.
- Install, operate, check and maintain the machine by professional person.
- Keep your fingers, hair, clothes etc. away from the switch parts such as the fan.

Section 1 Specification

WARNING

The wire end may deal damage, please note the following.

- Never look into the electric conduction hole when checking the wire feeding is normal or not, or the shooting wire may stab your eyes and face.
- Keep your eyes, face or other naked parts away from the end of torch when feeding the wire manually or pressing the switch.

WARNING

For better work efficiency and power source maintenance, please note the following.

- Precautions against toppling over.
- Never use the welding equipment for pipe thawing.
- Lift the power source from side when use the up-down forklift truck to avoid toppling over.
- When using the crane for lift, tie the rope to the ears with an angle no more than φ15 to the vertical direction.
- When lifting the welding machine which equipped with gas cylinder and wire feeder, download them from the power source and ensure the horizontal of the machine. Do fix the gas cylinder with belt or chain when moving it to avoid body hurt.
- Ensure fastness and insulation when lifting the wire feeder through the swing ring for welding.

WARNING

Electromagnetic interference needing attention.

- It may need extra preventive measures when the equipment is used in particular location.
- Before the installation, please estimate the potential electromagnetism

problems of the environment as follows.

a. Upper and lower parts of the welding equipments and other nearby power cable, control cable, signal cable and phone cable.
b. Wireless electric as well as TV radiation and reception equipment.
c. Computer and other control equipments.
d. Safety-recognition equipment etc. Such as supervise of industrial equipments.
e. Health of people around. Such as personnel using the heart pacemaker or audiphone.
f. Equipments for adjustment and measurement.
g. Anti-disturb capability of other used equipments .Users should ensure these equipments and the environment are compatible, which may need extra preventive measures.
h. Practical state of the welding and other activities.

- **Users should observe the following dos and don'ts to decrease radiation interference.**

i. Connect the welding equipments to the power supply lines.
j. Maintain the welding equipments regularly.
k. The cable should be short enough to be close to each other and the ground.
l. Ensure the safety of all the welding metal parts and other parts nearby.
m. The workpiece should be well earth.
n. Shield or protect the other cable and equipments to decrease the effects of disturbances. The welding equipments can be complete shielded in some special conditions.

- **Users are responsible for interference due to welding**

Section 1 Specification

Product Introduction

The CUT60 is made by international most advantaged invert technology. 50/60Hz frequency is inverted to high frequency (frequency is over 43KHz) by IGBT, then reduce voltage and commute current, inverter power supply generates powerful DC welding current through PWM technology. Because inverter technology of switch power is used, volume and weight of main transformer has reduced substantially and efficiency has been increased by 30%.

The CUT60 is a non-high frequency start machine. The “blow-back” type start that is used is generally safe for use in CNC applications and is ideal for general use. Blow-back type start involves a rearward movement of the electrode within the torch head when forced by the air pressure. When air pressure is applied the movement of the electrode off its seated position against the inner surface of the circuit grounded nozzle creates a spark, energizing the plasma stream. With this machine’s start type and pilot arc design, you are able to cut on any metal surface without having to contact to strike an arc which is ideal for cutting items like expanded metal or uneven surfaces. This Cutting machine has a wide range of uses which is suitable for cutting: stainless steel, alloy steel, mild steel, copper and other color metal materials.

Cutting machine has characteristics as following:

1. Stabilizing.
2. Reliability.
3. Lightness.
4. Energy-saving and no noise.
5. High cutting speed.
6. Cutting smoothly and no polish demands.

Thanks for purchasing Primeweld products and looking forward to your precious advice. We will be dedicated to provide our best products and service.

Specification

Parameter	CUT60	
Inverter type	IGBT	
Input voltage	1 Phase AC, 120V +/- 15%	1 Phase AC, 240V +/- 15%
Input frequency	50/60Hz	50/60Hz
Input connector type Pre-wired for NEMA 6-50P *adapter provided for NEMA 6-50 to NEMA 5-15 (for 240V or 120V operation)	 **5-15P** NEMA *See note	 **6-50P** NEMA
Rated input current	39.4	44.5
Rated output voltage	92	104
Cutting output current	20-30	20-60
Gouge output current	None	25-60
No-Load voltage	339V	
Arcing start mode	Non HF style non contact start	
Duty Cycle	60% @ 30 A/92 V 100% @ 23A/89.2 V	60% @ 60 A/104V 100% @ 46 A/98.4V
Recommended Operating Air Pressure	55-75 psi	
Nozzle Inside Hole (mm)	1.1mm	
Cutting thickness	1/3" (8mm)	4/5"(20mm)
CNC port	yes	
2T/4T	yes	
Air Post Flow Timer	4-60s adjustable	
Set Air	yes	
Efficiency	>=80%	
Power factor	0.73	
Insulation grade	F	
Ingress protection Rating (IP)	IP21	
Weight	14kg/30.86lbs	
Overall dimensions	460x217x396mm/18.11x8.54x15.59 inches	

Duty Cycle

The duty cycle of this unit has been tested and established at 60% at full Amp Output. This duty cycle has been established under the standard rating temperature of 104 F (40 C). If you are not familiar with Duty Cycle ratings, duty cycle is the percent of time out of a 10 minute time period at which a welder or plasma cutter can operate continuously without overheating. Lowering output increases duty cycle. It is possible to achieve a 100% duty cycle by lowering the output Amps. However, 100% duty cycle is still based off a 10 minute time period and does not mean it has an “infinite” duty cycle. Theoretically, if the machine were to go 11 minutes of uninterrupted operation even at a 100% Duty Cycle level of operation, you could incur an overheat condition. Duty cycle on this machine is not controlled by a timer, but rather by one or more temperature sensors strategically located on the heat sink(s) of the machines internal circuitry. If an overheat is detected the cutting output will be interrupted. A code of “E03” will be displayed. If this happens, allow the unit to continue to run and cool for at least 15 minutes. Do not turn the unit off during this time! If the unit does not automatically reset after this time, cycle the machine off and back on to clear the code. If the code does not clear at this time, contact Primeweld for further remedy. Intentionally and repeatedly triggering the duty cycle can damage the unit over time. This type of damage becomes apparent during repair and service and is not covered under warranty.

CNC Use and Duty Cycle Concerns:

CNC use demands more out of plasma cutter than normal hand cutting operations. Always be aware of your Amp output level and use patterns during CNC operation. If operating in CNC mode for thick, long cuts, or when doing repeated and rapid high input Amp demand activities, i.e. rapid, successive starts, consider lowering the Amp output of the machine to at least the 100% duty cycle rating of this unit for best results. (See page 11 for exact duty cycle specifications). Of course this lowers maximum cut capacity, but it is also part of the reason why CNC cutting has lower stated cut capacities across most all brands of plasma cutters.

Occasionally, you may exceed the duty cycle cutting through thick materials or with constant use. This usually causes no harm. However, if you are regularly exceeding the duty cycle, this is a sign that you may need to use a larger plasma cutter or your unit may need to be cleaned and/or serviced.

Over Voltage

This unit is equipped with a over voltage device which senses over voltage conditions caused by internal faults and shuts down output. If you observe an error code “E05” immediately turn the machine off. Evaluate the input power supply for proper voltage. If code does not clear, after remedying common issues stated below, contact Primeweld. Do not continue to try to clear the code if it does not appear to have been corrected.

Common Items That Can Trigger the Over Voltage:

- Improperly grounded service/ power supply.
- Operating on too small of a generator or on a generator not rated as “Clean Power” (5% or less THD).
- Excessively worn or missing consumables or damaged torch head.
- Internal machine fault. (If code cannot be cleared after correcting other issues, call Primeweld.)

Generator Requirements And Operation

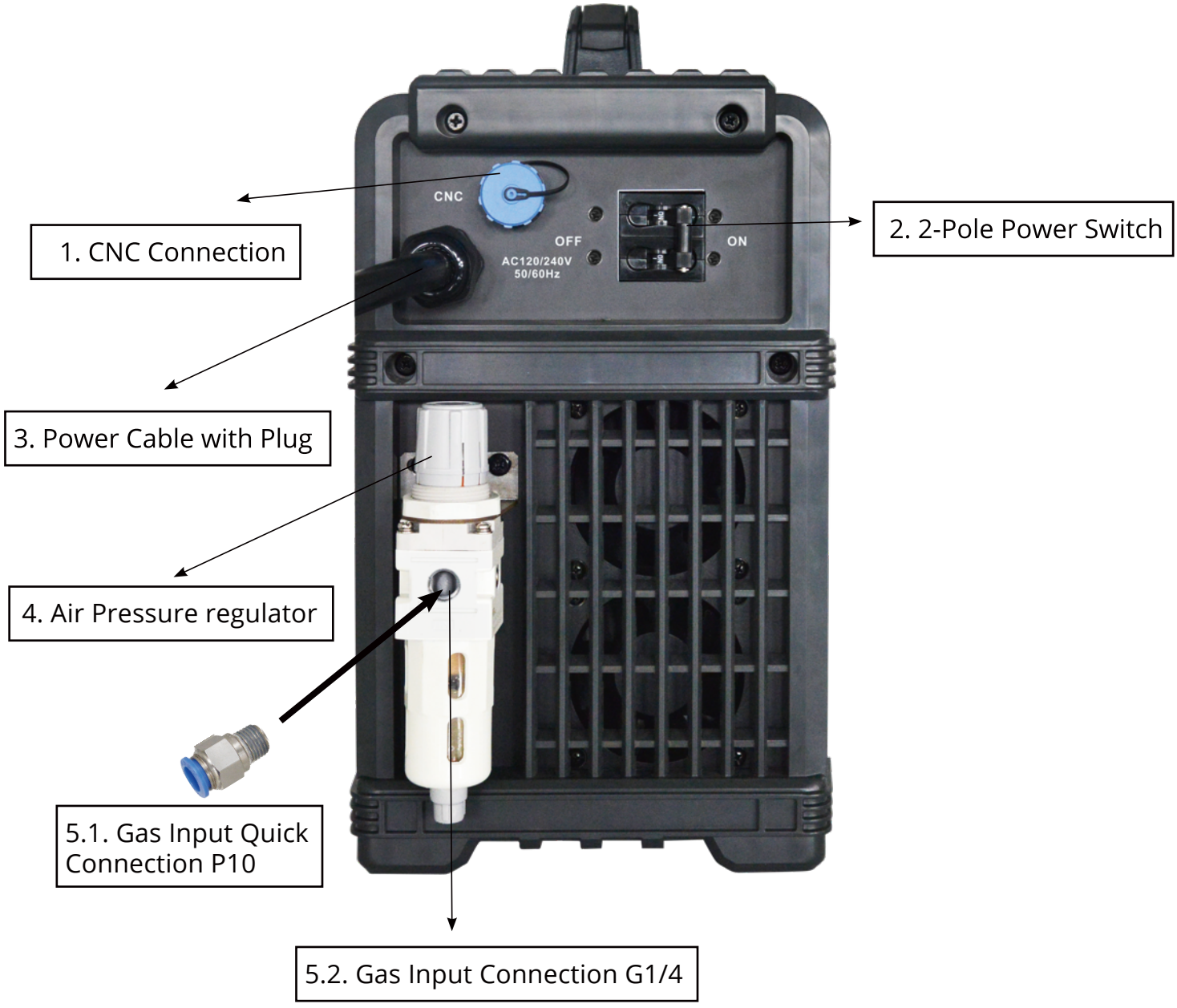
This unit may be run on a generator capable of 8500 Surge Watts. Additionally, the generator must provide “clean power” . Clean power is de-fined as having 5% or less Total Harmonic Distortion (THD). This is a rating given by the manufacturer of the generator, and not Primeweld. This is similar to the power normally supplied at a wall outlet. This represents a sine wave (AC) that is mostly free of voltage spikes and electronic noise. Many general purpose (GP) generators are not rated to produce clean power and are designed for emergency or construction use with resistive loads such as lights or heaters. These generators can damage the plasma cutter. If damage does not occur immediately, the effect can be cumulative, depending on how “dirty” the power actually is. Damage created by running this unit off a generator, or welder/generator not rated for clean power output by its manufacturer will not be covered under warranty. If you are in doubt about your generator or welder/generator, contact the manufacturer. Primeweld does not keep an authorized list of generator brands or models. However, if the manufacturer rates its generator for 5% or less THD, this is sufficient to meet our standards. However, do some additional research on the brand and model of the generator to make certain there are no issues, recalls or reported equipment (electronics in particular) damage related to malfunctioning genera-tors from the manufacturer. The generator should be properly grounded, according to the generator manufacturer instructions.

Never leave the unit on or connected while starting the generator. Never stop the generator while the unit is on or connected. Severe damage will occur. This includes running the generator low on or out of fuel. This damage is not covered under warranty, even if the unit is rated as “clean powered” . Always allow the generator to warm up before plugging the unit in and using it. A cold engine may not develop or maintain proper RPM needed to provide stable, clean power even if the unit is rated to be “clean power” . Never use economy idle (ECO mode), or auto idle modes with this unit. Always use maximum idle when this unit is turned on.

Front panel features and controls

PowerPlasma S Features	Parameters	Purpose
1. Amp Display	20-60	Displays selected amperage until cut starts. Once cut starts, then amps display dynamically by displaying the actual output amps while cutting. While Pilot arc is engaged or when cut starts, the amps will drop to 20-30 amps until continuity is sensed and cutting arc takes over and the pilot arc disengages.
2. Air Pressure Display	0-145 psi	The display registers up to 145 psi, but air pressure from the compressor to the cutter should never be set above 90 psi. Air pressure to the torch while cutting should ideally be around 55 - 75 psi. See the PSI setting reference section located on page 35.
3. Amp Control	Infinite	Adjusts and selects desired operating amperage.
4. Air Post Flow	4-60 Seconds	POST GAS time adjustment: Press the encoder button, you can select the POST GAS adjustment menu, select the corresponding light, you can adjust the post gas time. Select a post flow time that is appropriate to cool the torch and the consumables. Post flow time will depend upon the amps and length/severity of use.
5. Central Torch Connector	N/A	The central torch connector is an all-in-one connector. This is a universal style connection which allows greater interchangeability of torches. It also greatly simplifies torch connection. When installing the connector, line up the locating tab on the torch side with the slot on the connector on the machine side connector. Fully insert the coupling and then tighten the collar nut on the torc-side fitting hand tight. Do not use tools to tighten. Do not over tighten.
6. Work Piece Connector	N/A	The work lead (sometimes referred to as "ground") is used to complete the circuit. The torch pilot arc may activate, but the unit will not actually cut if the work lead is not connected to the work piece. If an arc is present but the unit will not easily cut or is very slow or poor cutting any material, check and make sure work lead is connected and is connected to a clean spot on the work.
7. 2T/4T Trigger lock	2T/4T	2T is the normal position while cutting. To operate, simply press and hold the switch and cut normally. Release the switch when the cut is finished. The 4 T setting allows the torch to be locked on during use. To cut in 4T mode, simply press and hold the trigger to start the arc. Release the trigger to continue cutting. Once the arc is ready to be terminated slowly press and release the switch again. **Caution:** Use 4T cautiously. This feature can leave the torch activated if the torch is improperly withdrawn from the cutting area. But is useful for long cuts or when mechanical cutting requiring remote activation of the torch, i.e. a linear track torch or a pipe bevel track cutter.
8 . Air Flow Function	Set Air	Select SET AIR to set air flow/air pressure for the torch. The operating pressure should always be set while this is in Test since it does not require the torch to be live. This allows the air to flow constantly until the switch is placed back into the normal, timed mode. To set the air pressure, turn the torch until the nozzle is facing up, then place the flow tube (clear plastic tube with ball in it) over the nozzle. Select SET AIR on the machine. With the air flowing, adjust the air pressure/flow up or down until the ball is floating in the sight window of the flow tube. If no flow tube is present or provided with your unit, then simply set the air pressure while SET AIR is selected until it is somewhere between 65-75 psi. Pressure over or under this can result in an unstable arc.
9. Cutting Mode Selection	N/A	The Expanded metal/CUT/Gouge mode can be changed by pressing the button. If selected, the corresponding red light is on. **Expanded metal Mode:** Mesh cutting mode, continuous cutting of metal mesh materials. In this mode, the pilot arc is designed to switch back on automatically if cut continuity is lost. Once continuity is regained, the cutting arc will re-energize and the pilot arc will shut off. This cycle will happen continuously as long as it is needed. Use this mode to cut expanded or rusty metal or in CNC mode. This mode results in more rapid wear of the consumables. **CUT Mode:** Metal plate cutting mode, can continuously cut metal sheet. In this mode the torch supplies the pilot arc for approximately 3 seconds before terminating the arc. This limits pilot arc on time and helps save consumables. Use this mode if you are hand cutting or cutting in CNC mode on long, continuous cuts. If the cut is lost, the torch must be retriggered to restart the cut. **Gouge Mode:** Plasma gouging mode. The cutting gun is replaced with a special shield cap and nozzle for gouging, which can be used for grooving the bevel of sheet metal processing. This feature is designed to quickly remove excess weld material or to correct defective welds or blemishes in metal. The torch is held at an shallow angle to the weld or area and the arc strikes the metal blowing a layer of metal away. The arc is less aggressive. Lower air pressure must be used along with large, special consumables (available separately from most OEM suppliers of the Innotec iPT series torch) designed for gouging. This unit is designed for light gouging only.
10. Cutting Status Indicator	N/A	Cutting status indicator: When the cutting machine has output current, the red indicator lights up.
11. Power Indicator	N/A	Power indicator: When the power switch of the cutting machine is ON, the green indicator is on.
12. Overheating Protection Indicator	N/A	Overheating protection indicator: When the temperature in the machine is too high for a long time, the yellow indicator lights up.

Rear panel features and controls



Features	Parameters	Purpose
1. CNC Connection	N/A	This allows the unit to be used with a CNC machine and provides the basic inputs for CNC operation. See pin-out section located in the back of this manual.
2. 2-Pole Power Switch	On/Off	The 2 pole breaker switch serves as the On/Off switch for the cutter. Always turn the cutter on and off by the switch first before using any disconnect switch.
3. Power Cable with Plug	220/240 V 1 phase (110 X2) Plug: NEMA 6-50P	The Plasma cutter 60 will operate on 220/240 V 50/60 Hz power, including good quality 208 V power. The wiring contains 3 separate wires. Primeweld uses standard sized wiring and correct plugs (NEMA 6-50P) for welders and plasma cutters in the US and Canada. (Other countries will vary according to regional requirements). Standard wire colors are L-1 black (hot), L-2 white (hot), and green (ground) for 1 phase 220/240 V. Do not attempt to use a 4 wire 1 phase 220/240 connection. **NOTE: In many home circuits, red and black are the power wires. But in standard welding/ plasma cutting circuitry, white and black are hot wires. Green is always the ground in both circuits. There is NO neutral in a standard welder circuit. The units are shipped with a standard NEMA 6-50P plug.** Always consult a licensed electrician who is aware of local codes before attempting any wiring of the welder or of the power supply circuits. Primeweld is not responsible for any mis-wiring or damage caused to the unit by incorrectly wiring the welder. If additional help is needed, contact Primeweld . **Disconnect the plasma cutter when not in use.**
4. Air Pressure regulator	N/A	This regulates the cutting pressure of the unit. To adjust: Pull up firmly but gently on the regulator knob until the detent clicks (about 1/8" or 3mm). Rotate clockwise to increase pressure. Rotate counterclockwise to decrease pressure. Observe the pressure on the front of the machine to reach the ideal pressure for the process you have selected. Push the knob back down after adjusting to lock-in the pressure setting. WARNING! Do not supply more than 90 psi to the regulator or damage and/or severe injury may occur.
5.1. Gas Input Quick Connection P10	N/A	The gas input connection is a gas quick connector P10, connect the gas supply to the power supply using a hose 6x10mm.
5.2. Gas Input Connection G1/4	N/A	The gas input connection is a thread connector with G1/4 , connect the gas supply to the power supply using a hose with a correct connector.

Installation

Input cable connection (enclose installing diagram)

1. Every machine has been supplied with the relevant voltage connecting plug. The power cable must be connected to the correct power source for either plug: 120v uses pigtail adaptor plug supplies, 240v uses plug already attached on power cord end. If the Plasma Cutter is connected to a 240v Power source using a 120v plug or if the 240v power plug is connected to 120v this may cause damage to the unit.

2. Make sure power cable is connected to power receptacle securely, to eliminate any arcing or oxidization.

3. Do not operate on a generator that does not have a clean sine wave and stable power output. Spiking on voltage output can cause damage to components in the Plasma cutter.

Output cable connection

1. Air input line needs to be securely pushed into the quick connect fitting so as to prevent any air leaks.

2. Connect the plasma torch central connector to the output terminal on the front panel using your hands.

Do not over tighten the connection as it can cause damage.

3. Finally connect the work lead (Ground clamp) connection to the black dinse connection.

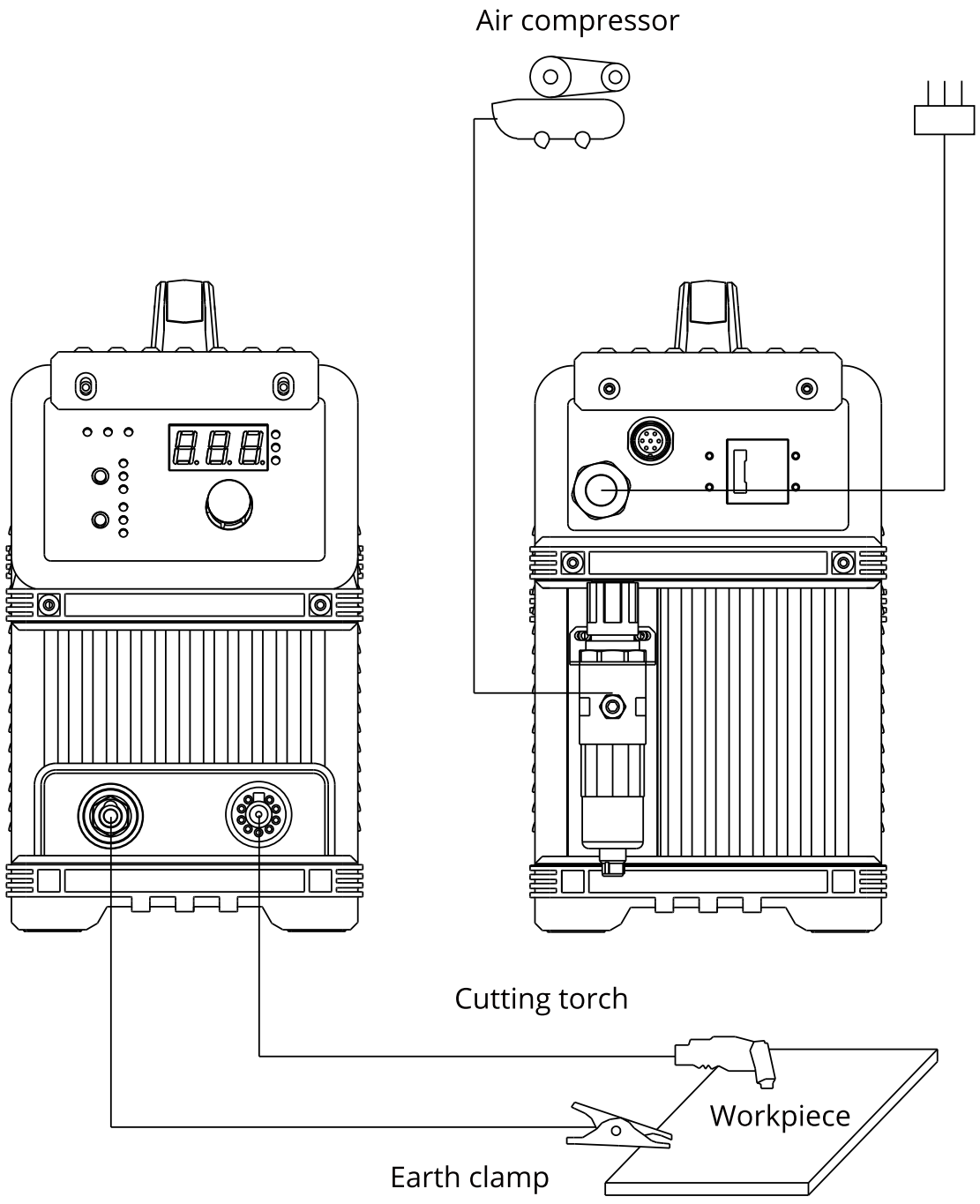
CHECK

1. Check if the plasma cutter is grounded reliably according to local standards. If used on standard breaker panel box the ground wire and panel should be already grounded according to your local code.

2. Check if all connectors are firmly connected.

3. Check if power voltage is correct.

Installation diagram



Operation

Turn the power switch to the “on” position. At this time, indicator light will be ON showing unit is powered on.

1. Press the front panel switch to SET AIR position, there will be constant air flow, adjust the air (gas) pressure and set to between 55 to 75psi. Please refer to the air pressure setting on page35.

2. Press the torch trigger and you should have a plasma arc from the tip. Caution: the plasma arc can cause extreme burns, keep tip away from your body at all times.

3. Set the amps to your required cutting thickness.

4. Keep tip approximately 1/8” from workpiece and move the tip as you see the cutting arc below the workpiece showing you that the cut is completely through the metal. Move the torch in a smooth continuous motion for best cutting results.

5. Recommended compressor capacity 5cfm @ 80psi, 20 gallon tank.

6. 2T/4T SWITCH:

2T – press this button on the cutting torch to start the metal cutting process, release this button to end this process.

4T – press this button on the cutting torch to start the metal cutting process, releasing this button does not end this process. Press and release this button again to end the metal cutting process.

Operation environment

1. The Plasma cutter can perform in temperatures between –10 and +40 degrees centigrade with a maximum dampness level of 80%.

2. Avoid operating with the sun directly on the unit as this will increase the insidetemperature and decrease duty cycle.

3. Keep machine dry and stored or use in a dry location out of the elements.

4. Do not use the Plasma cutter in environments that have a high concentration of dust or corrosive gas in the air.

SAFTY

1. Make sure the work area is adequately ventilated.

The Plasma cutter is supplied with Axial-flow fan to cool both upper and lower heat sinks and boards.

NOTES: Exhaust and Intake vents must be clear of any obstructions in order to allow the Plasma cutter to adequately get air flow for cooling. A minimum of twelve inches is required for air flow to and from all vents.

2. Correct voltage must be used for all amp settings either on 120v or 240v the voltage drop cannot go lower than 105 volts on 120v or 210 volts on 240v Do not exceed load or operate at maximum duty cycle on a constant basis as this will shorten the life of various internal components.

3. Voltage Range

The power voltage range of the plasma cutter is shown on the technical data page. Automatic voltage compensation circuits will help prevent the unit from exceeding the allowable range. However, if the input voltage is too high, it could damage components.

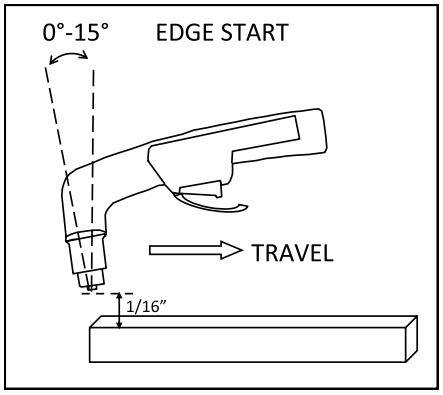
4. Thermal overload sensors will switch on if the unit exceeds the duty cycle. Fans will continue to run but no power is available. Once the unit is cooled down, the power switch can be turned OFF and then back ON to continue cutting. Powering the unit OFF and ON resets the thermal overload switch. The red O.C. overload light appears when the Plasma cutter hits the duty cycle.

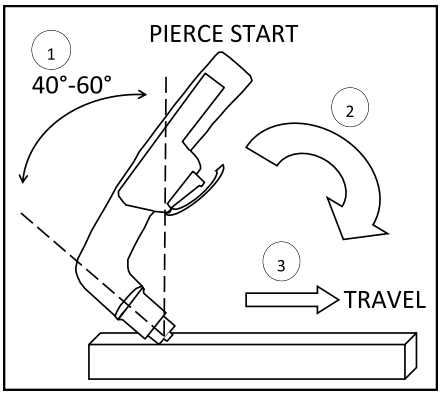
CUTTING NOTES

1. When cutting thinner material, up to 2 to 3 mm, you can drag tip the torch and the cutting tip can touch the material as you cut. For thicker materials it is recommended that a distance of 3 mm (1/16”to 1/8”)distance be kept from the cutting surface. This not only gives better consumable life but it increases cut quality.

2. The Work piece clamp or grounding clamp must be placed on a clean section of metal, as close as possible to the cutting area in order to have a good ground and maximum efficiency. If the ground is bad, problems will arise with poor cutting quality and loss of cutting arc.

The design of the blow back start may cause a slight delay in the arc as the air pressure must built inside the torch tubing and head to create the pressure needed to force the electrode off the nozzle seat. This may take up to a second. If the torch does not light after 3 seconds, let go of the trigger and press it again. If the start or arc is erratic check nozzle and electrode for tightness and wear.





Edge Starts are the best type of start if possible to promote consumable and torch life. This reduces blow back of molten material and allows a smooth gradual start of the cut.

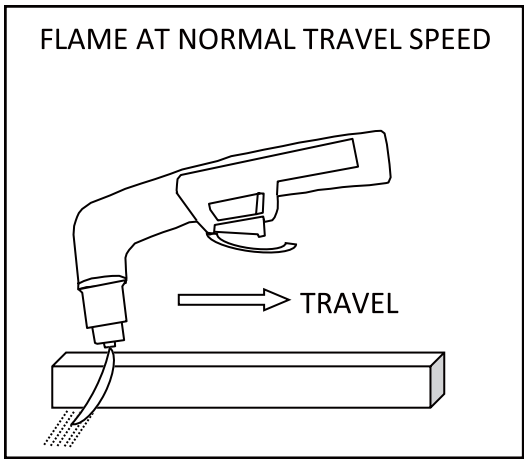
1. Line up the hole on the tip of the electrode on the edge of the cut. Hold torch perpendicular to the cut initially, about 1/16” off the metal. Slide the yellow safety lock and squeeze the trigger. Wait for arc to start.
2. Once the arc starts, wait for the arc to penetrate all the way through the metal.
3. As the torch penetrates its flame all the way through the metal, tilt the torch so there is a slight lead in the flame if metal is thin. If it is thick, keep holding torch in a nearly vertical position.
4. Begin moving the torch in the direction of the cut. Maintain 1/16” standoff height.
5. Move the torch fast enough so the sparks and flame trail from the bottom edge at an angle of no more than 30° and no less than 10° from perpendicular to the metal. Excess angle of sparks/flame indicate too fast of travel speed or practical cut capacity has been reached. Little or no angle indicates too slow of travel speed.

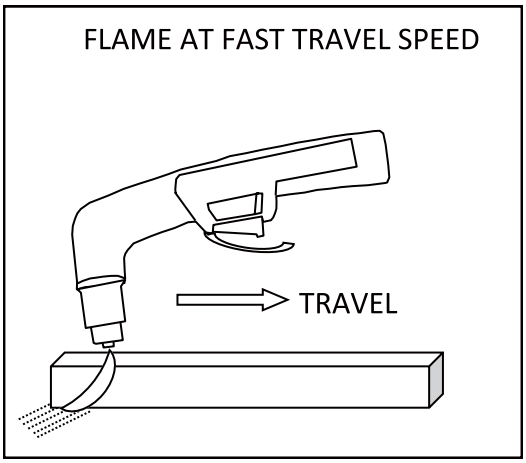
Piercing starts often result in rapid consumable wear and excess blow back of molten metal deposited onto torch and consumables. This should be done only as necessary.

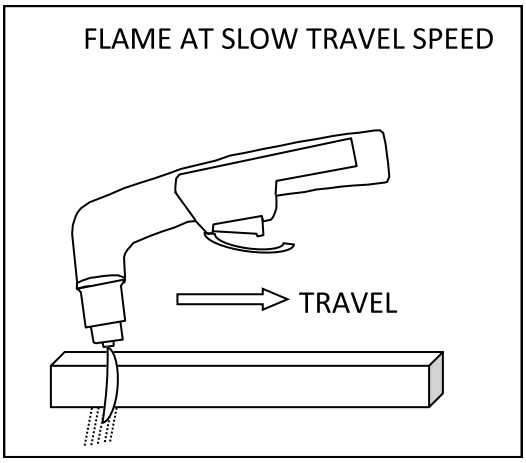
1. Tilt the torch in the direction of travel or toward the side of the metal to be discarded or wasted at a 40° to 60° angle. Slide the yellow safety lock and squeeze the trigger. Wait for arc to start.
2. Once the arc starts, wait for the arc to transfer from pilot arc to the cutting arc.
3. As the torch penetrates it flame at an angle rotate the torch slowly to the vertical position, as the arc penetrates the metal. Tilt the torch from 0°-15° for thin metal cuts, or hold it nearly perpendicular for thicker metal cuts.
4. Begin moving the torch in the direction of the cut. Maintain 1/16” standoff height.
5. Move the torch fast enough so the sparks and flame trail from the bottom edge at an angle of no more than 30° and no less than 10° from perpendicular to the metal. Excess angle of sparks/flame indicate too fast of travel speed or practical cut capacity has been reached. Little or no angle indicates too slow of travel speed.

IMPORTANT: If you use a standoff guide with the torch, it must be adjusted to provide no more than 1/8” standoff, less if possible. Long standoff heights reduce cut capacity and quality. It also promotes rapid consumable wear and can prevent the pilot arc from transferring.

TIP: For longer consumable life do not use the pilot arc unnecessarily. Do not fire the torch unless you are near the metal and ready to cut.







IMPORTANT: Check consumables regularly for wear and change them out before they are completely worn. Allowing the consumables to wear until they quit working may damage related torch components, creating a more costly repair.

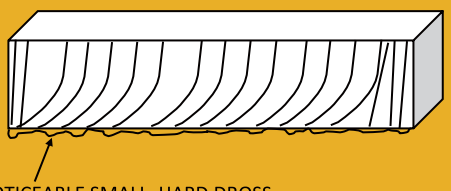
RESULTS OF CUT AT CORRECT SPEED, AIR PRESSURE AND TORCH ANGLE

SMOOTH, EVEN CUT LINES WITH A S REARWARD SWEEP

MINIMAL EASY TO CLEAN DROSS

RESULTS OF CUT AT FAST SPEED

ROUGH, DISTINCT CUT LINES SPACED FAR APART



NOTICEABLE SMALL, HARD DROSS

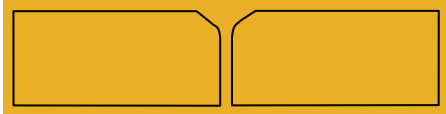
RESULTS OF CUT AT SLOW SPEED

VERTICAL CUT LINES

SIGNIFICANT SOFT, POROUS DROSS

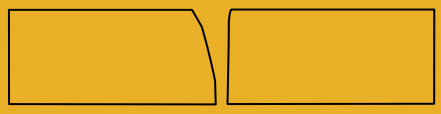
RESULTS OF TOO MUCH CURRENT OR TOO MUCH STAND OFF HEIGHT (SIDE VIEW)

MELTED TOP EDGE

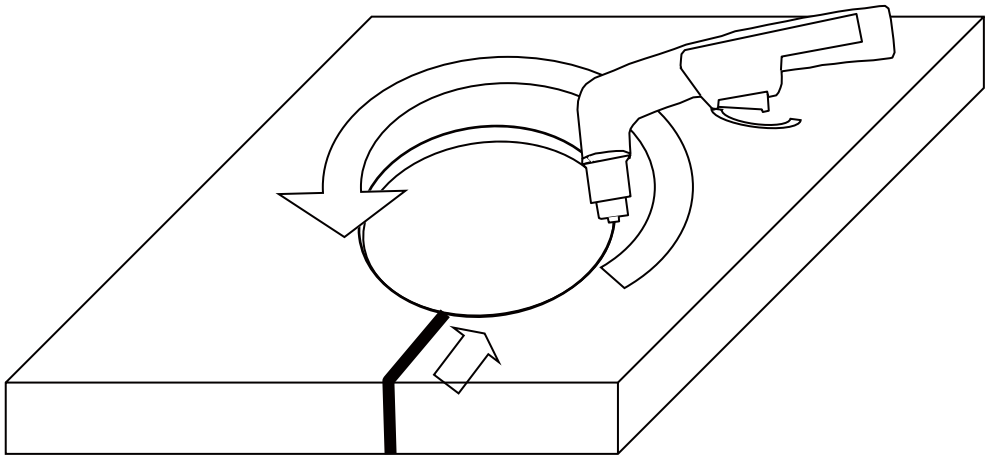


RESULTS OF WORN CONSUMABLE OR LOW AIR PRESSURE (SIDE VIEW)

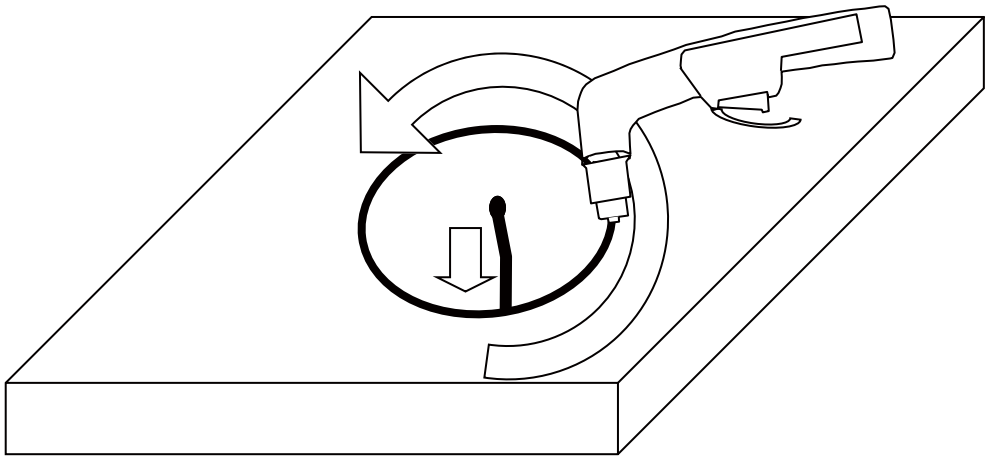
SEVERLY ANGLED CUT AT TOP



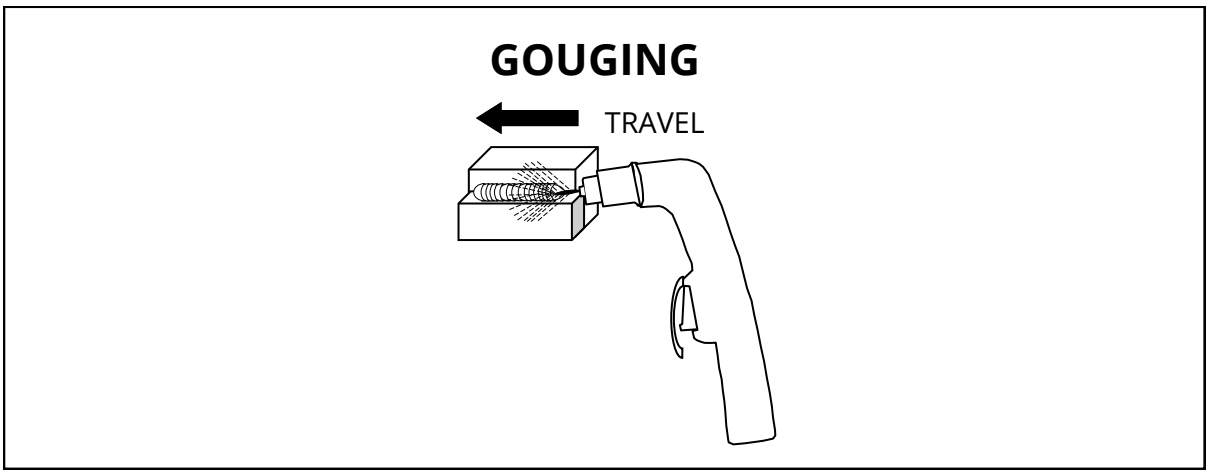
AN EXAMPLE OF CUTTING A LEAD-IN WHEN CUTTING OUT A DISK SHAPED OBJECT



AN EXAMPLE OF CUTTING A LEAD-IN WHEN CUTTING HOLE IN AN OBJECT



When cutting an object, particularly a pattern shape, where the torch must pierce or re-fire in-line at an intersection of a cut, a lead-in cut should be employed. A lead-in is a cut that is made in the disposable part (also known as a drop) of the object to "lead" into the main part of the cut so that the destructive force of the arc is not directed into the desirable side of the cut itself. Also, all plasma cutters exhibit some angularity or bevel in the cut which is greater on one side than the other. Keep this in mind when cutting an object to size so that too much metal is not accidentally removed.



GOUGING

Gouging is used to remove metal, usually a weld or surface defect by “washing” away the surface metal with an arc flame. Gouging should be performed with a consumable with a large diameter orifice or special gouge consumable with a large diameter orifice. These consumables are available from some OEM suppliers of the Innotec iPT series torch. If no gouging consumable is available, use a 1.1mm tip and lower amps to 40A.

To gouge, the torch tip should be oriented inline with the weld, with a slight converging angle (45 to 65 degree angle) to the weld or part being gouged so that the metal begins to slough away. This will allow the arc to contact, but not cut through the surface, with an extended, softer arc flame. This unit is not designed for heavy duty use, but is designed for light gouging activities only. Metal removal is limited to a relatively shallow trench and multiple passes may need to be used.

When set to “Gouge” , the unit will require readjustment of the air pressure to a lower PSI setting. Too low of an air pressure will cause issues with arc stability.

Extreme angles where continuity cannot be sensed will cause loss of gouging arc, and the pilot arc will reignite (if not in CUT mode). Be sure to notice if you see any sudden change in arc intensity or aggressiveness of gouging. If this is noticed, stop and steepen the torch angle to the part being gouged. Restart the arc, and gradually lean the torch until effective gouging is taking place, but continuity is not lost.

Gouging tends to be a relatively long and continuous process. Because of this, the duty cycle may be exceeded if the operator is not aware of the amount of time the unit is in use performing gouging operations.

WARNING!

Gouging creates large showers of sparks. These sparks exit the gouge and are traveling 30 feet or more horizontally. Always be aware of the spark direction and travel distance. Have a fire extinguisher at hand, and a responsible person watching for fires and smoldering areas where the sparks may have traveled. Never leave an area where you have cut or gouged unattended for at least 30 minutes to ensure no fires occur. Thoroughly inspect the area before leaving for embers or smoldering materials. Never direct sparks/metal dross toward any area where there are bystanders. Use proper face and body/hand protection while gouging.

Section 4

Maintenance and Troubleshooting

Procedures not specifically explained in this manual must be performed only by a qualified technician.

⚠ WARNING

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION OR ELECTRIC SHOCK:

Make sure the power Switch of the Plasma Cutter is in its "OFF" position and that the Plasma Cutter is unplugged from the electrical outlet before performing any inspection, maintenance, or cleaning procedures.

TO PREVENT SERIOUS INJURY FROM PLASMA CUTTER FAILURE:

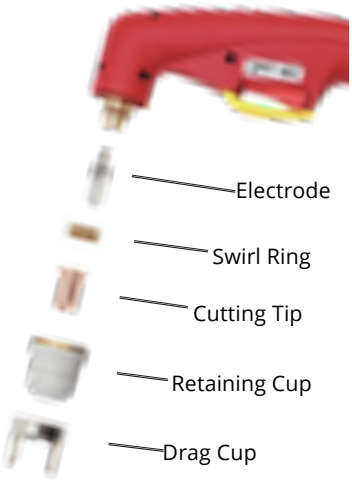
Do not use damaged equipment.If abnormal noise, vibration, or leaking air occurs, have the problem corrected before further use.

Cleaning and Maintenance

Note: These procedures are in addition to the regular checks and maintenance explained as part of the regular operation of the air-operated tool.

1. **BEFORE EACH USE,disassemble Torch, inspect and replace worn components, then reassemble Torch tightly.**

   a. Disassemble Torch.



   b. **Inspect the Cutting Tip. Replace if interior is damaged, or if opening is enlarged or gouged.** Clean inside as needed with steel wool, (remove any pieces of steel wool afterwards).

   c. Inspect the Electrode. Replace if pitted 1/16" or more or if misshapen.

IMMEDIATELY REPLACE WORN COMPONENTS.

   d. Make sure all other internal torch components are undamaged, clean, and free of debris.

   e. **NOTICE : Assemble Electrode just snug using the included wrench, but do not overtighten.**

   f. Insert the Swirl Ring and Cutting Tip into the torch.

g. Assemble the Retaining Cup tightly.

DO NOT USE WITH WORN COMPONENTS. USING WORN COMPONENTS WILL VOID THE WARRANTY AND DAMAGE THE PLASMA CUTTER.

2. **Daily - Air Supply Maintenance:** Every day, maintain the air supply according to the component manufacturers' instructions. **Drain the dryer regularly.** Performing routine air supply maintenance will allow the tool to operate more safely and will also reduce wear on the tool.
3. **PERIODICALLY,** blow the dust from the cooling vents with compressed air. If the unit repeatedly shuts down from thermal overload, stop all use.
4. Have the Plasma Cutter inspected and repaired by a qualified service technician.
5. **Opening the Plasma Cutter will void the warranty, and may result in damage to equipment or possible personal injury. DO NOT OPEN THE HOUSING** Any repairs must be completed by a qualified technician.
6. Store the Plasma Cutter and accessories in a clean and dry location out of reach of children.
7. **WARNING! If the supply cord of this Plasma Cutter is damaged, it must be replaced only by a qualified service technician.**

ERROR CODES	
E02	The temperature sensor is open circuit faulty
E03	Overheating fault
E04	Underpressure protection
E05	The input voltage is too high
E06	The output voltage is too high

IMPORTANT!

Be CERTAIN to shut off the Plasma Cutter, and disconnect it from power and air before adjusting, cleaning, or repairing the unit. A technician should discharge all capacitors before performing any internal procedures.

FAN RUNS WHEN SWITCHED ON BUT ARC WILL NOT IGNITE

Check Air Switch

AIR SWITCH SET TO "SET AIR"

Set Air Switch to "2T" or "4T". "SET AIR" is ONLY used to set air pressure, it does not allow normal operation.

AIR SWITCH SET TO "2T" or "4T"

Air pressure too high or too low. Check the Cutter's Air Pressure Gauge. Set between 60 - 75 PSI.

AIR PRESSURE TOO HIGH

Set Compressor's Air Pressure Regulator between 80 - 120 PSI.

AIR PRESSURE CORRECT

Check that the grounding point and the metal being cut are both clean, dry, and free from paint, oil, or dirt. These sections need to conduct electricity efficiently.

AIR PRESSURE TOO LOW

a. Verify that the compressor is delivering 5 CFM @ 80 PSI.

b. Set Cutter's Air Pressure Regulator between 60 - 75 PSI.

DIRTY OR COATED METAL

Use a wire wheel brush or sander (not included) to thoroughly clean both the grounding point and the area that will be cut. If any cleaners are used, allow them to dry thoroughly before continuing.

METAL IS CLEAN IN BOTH AREAS

Torch isn't maintaining contact with the workpiece.

a. Maintain a 1/16" distance from workpiece at all times.

b. Disassemble Torch, inspect and replace worn components, then reassemble Torch tightly according to on page 28.

c. Torch is moving too slowly across the metal and cutting the material from underneath, breaking contact. Move Torch more quickly.

IMPORTANT!

Be CERTAIN to shut off the Plasma Cutter, and disconnect it from power and air before adjusting, cleaning, or repairing the unit. A technician should discharge all capacitors before performing any internal procedures.

ARC IGNITES FOR SEVERAL SECONDS BUT THEN GOES OUT

Air pressure too high or too low.
Check the air pressure setting on both the Compressor and the Cutter.

AIR PRESSURE TOO HIGH

Set Compressor's Air Pressure Regulator between 80 - 120 PSI.

AIR PRESSURE CORRECT

Check that the grounding point and the metal being cut are both clean, dry, and free from paint, oil, or dirt.
These sections need to conduct electricity efficiently.

DIRTY OR COATED METAL

Use a wire Wheel brush or sander (not included) to thoroughly clean both the grounding point and the area that will be cut.
if any cleaners are used, allow them to dry thoroughly before continuing.

METAL IS CLEAN IN BOTH AREAS

Torch isn't maintaining contact with the workpiece.

a. Maintain a 1/16" distance from workpiece at all times.
b. Disassemble Torch, inspect and replace worn components, then reassemble Torch tightly according to on page 28.
c. Torch is moving too slowly across the metal and cutting the material from underneath, breaking contact. Move Torch more quickly.

AIR PRESSURE TOO LOW

a. Verify that the compressor is delivering 5 CFM @ 80 PSI.
b. Set Cutter's Air Pressure Regulator between 60 - 75 PSI.
c. Verify air flow by performing "Test Air Flow " on page 16.

IMPORTANT!

Be CERTAIN to shut off the Plasma Cutter, and disconnect it from power and air before adjusting, cleaning, or repairing the unit. A technician should discharge all capacitors before performing any internal procedures.

CUT GOES ONLY PARTIALLY THROUGH THE WORKPIECE

Material being cut is too thick.
See Maximum Cutting Thickness on page 35.

WITHIN THICKNESS RANGE

Turn up the Output Current Knob and try again at a slower Torch travel speed.

PROBLEM CORRECTED

Take note of the setting required for this metal thickness.

PROBLEM PERSISTS AT MAXIMUM CURRENT SETTING

Air pressure too low.
Set Cutter's Air Pressure Regulator between 60 - 75 PSI.

AIR PRESSURE CORRECT

Disassemble Torch, inspect and replace worn components, then reassemble Torch tightly according to on page 28.

TORCH IN GOOD CONDITION

Cut at a slower pace, the arc may not have enough time to cut through the workpiece.

Maximum cutting speeds:

5/8" Mild Steel @ 17.7 IPM (Rated)

3/4" Mild Steel @ 11.8 IPM (Severence)

DAMAGED COMPONENTS FOUND

Disassemble Torch, inspect and replace worn components, then reassemble Torch tightly according to on page 28.

AIR PRESSURE TOO LOW

a. Verify that the compressor is delivering 5 CFM @ 80 PSI.

b. Set Cutter's Air Pressure Regulator between 60 - 75 PSI

TOO THICK

Use a more powerful PlasmaCutter.

IMPORTANT!

Be CERTAIN to shut off the Plasma Cutter, and disconnect it from power and air before adjusting, cleaning, or repairing the unit. A technician should discharge all capacitors before performing any internal procedures.

FAST CUTTING TIP WEAR OR EXCESSIVE SLAG FORMATION

These two problems have similar causes and will often appear simultaneously. The same diagnostic procedures and remedies apply to both.

Current set too high; cut at lowest setting possible for the metal being cut.

PROBLEMS REDUCED

Take into account the thickness and type of metal to be cut before starting. Thinner materials require lower amp settings.

PROBLEMS PERSIST AT LOWEST PRACTICAL SETTING

Disassemble and inspect Torch according to on page 28.

TORCH IN GOOD CONDITION

Air supply pressure may be inadequate:

a. Verify that the compressor is delivering 5 CFM @ 80 PSI.

b. Set Cutter's Air pressure Regulator between 60 - 75 PSI.

Additional factors:

a. Maintain a 1/16" distance from workpiece at all times.

b. Move Torch at proper rate. Maximum cutting speeds:

5/8" Mild Steel @ 17.7 IPM (Rated)

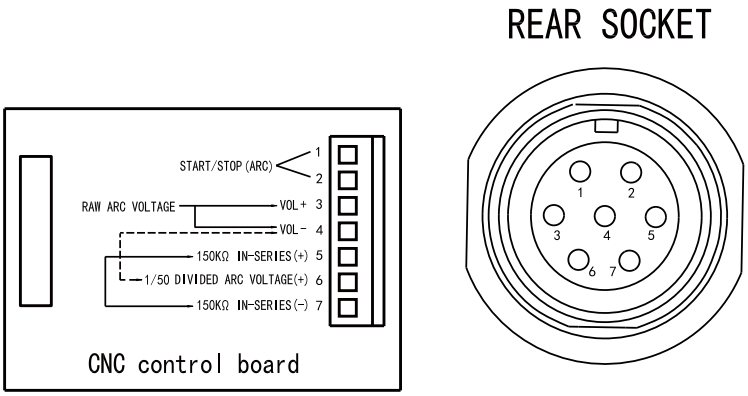
3/4" Mild Steel @ 11.8 IPM (Severence)

c. Compare workpiece thickness to Maximum Cutting Thickness on page 35.

DAMAGED COMPONENTS FOUND

Replace worn components, then reassemble Torch tightly according to on page 28.

CNC CONNECTOR PIN OUT



Pin and board numbers correspond to each other.

- Pins1 and 2 activate (turn on) the plasma cutter.
- Pin3 and 4 provide the raw, undivided arc voltage. The CNC circuit board to create 1/1 of the raw arc voltage. It may be used by some controllers for torch height control (HTC).
- Pins 4 and 6 provide the divided arc voltage. The CNC circuit board to create 1/50 of the raw arc voltage. It may be used by some controllers for torch height control(HTC).
- Pins 5 and 7 provide the raw, undivided arc voltage, which is used by some controllers to adjust the height of the torch(THC). This is the actual cutting voltage. It runs through 2-150kΩ resistors to prevent arcing at the connector plug. Some controllers may use the raw voltage, and is dependent upon the impedance of the input.

NOTE: Do not connect anything directly to the output terminals or leads. Do not connect anything from the controller to the chassis of the cutter, especially a ground lead. Do not install any kind of converter or divider inside the machine.

* Prime Weld does not particularly endorse or recommend these brands and is not affiliated with them in anyway. They are mentioned as a common reference only. For specific recommendations regarding connection, contact the manufacturer of the CNC equipment/controllers

PSI SETTING REFERENCE TABLE

Output AMP	Air Pressure （PSI） Cutting
20 A	55
30 A	55
40 A	55
50 A	65
60 A	75

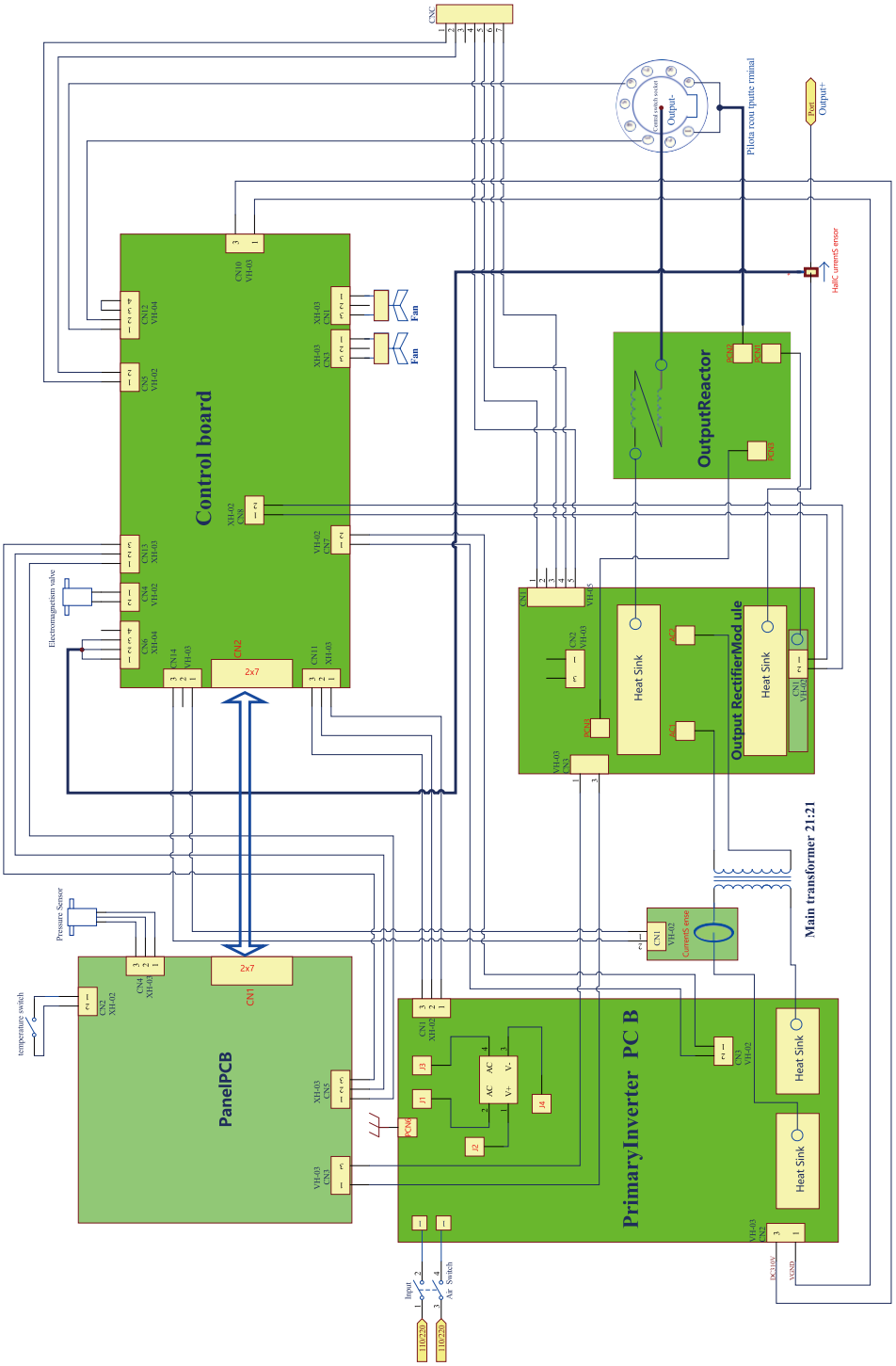
CUTTING SPEED REFERENCE TABLE

Mild Steel							
AMPS	PSI	Material Thickness		Torch - to- Work Distance		Optimum Cut Speed	
		Inch	mm	Inch	mm	IPM	mm/min
20	55	26GA	0.5	0.06	1.5	236.22	6000
30	55	16GA	1.6			110.24	2800
40	55	10GA	3.4			86.61	2200
45	60	3/16"	5			62.99	1600
45	60	1/4"	6			47.24	1200
50	65	1/3"	8			43.31	1100
55	70	2/5"	10			39.37	1000
60	75	1/2"	12			23.62	600
60	75	5/8"	16			17.72	450
60	75	3/4"	20			11.81	300

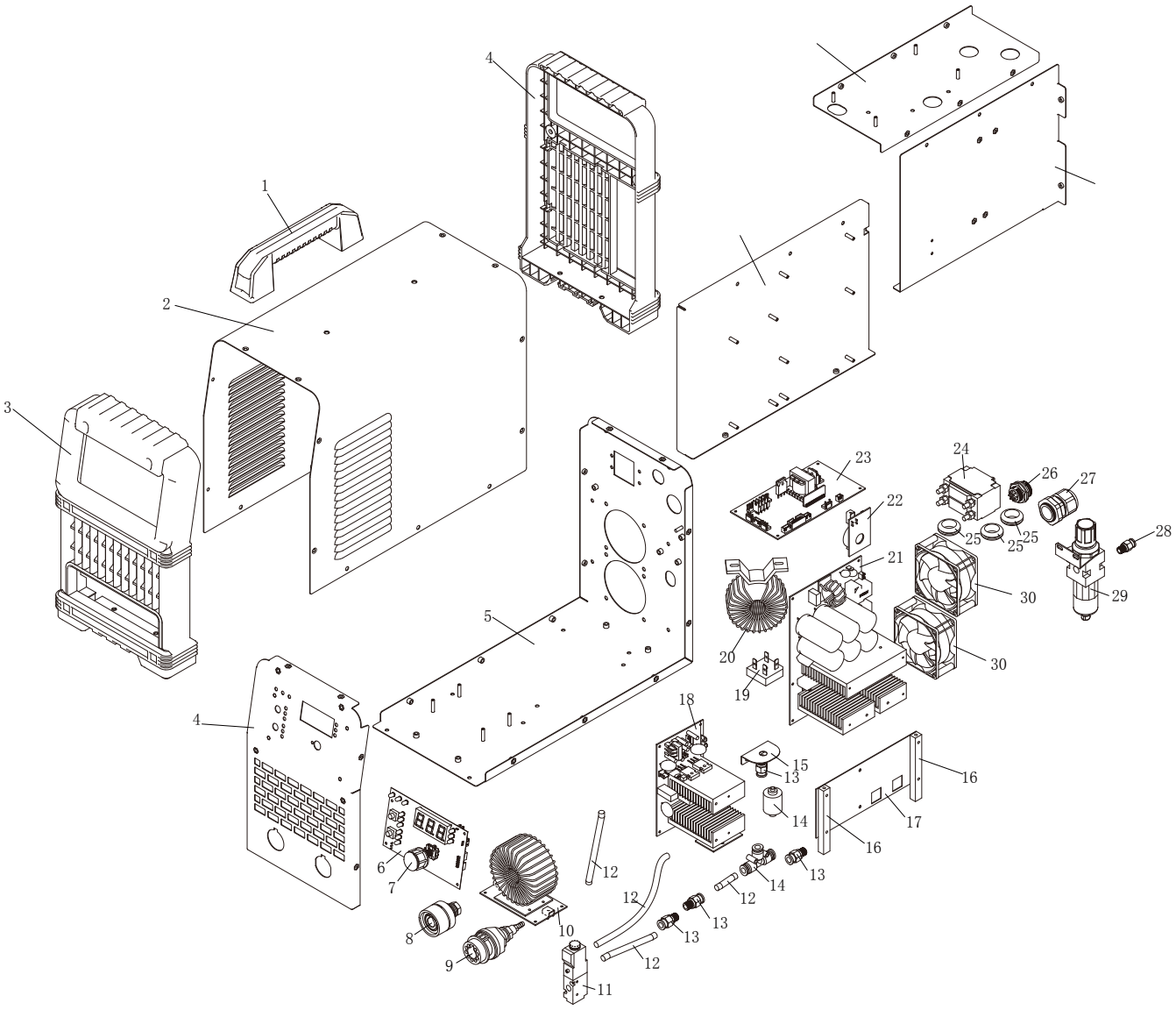
Stainless							
AMPS	PSI	Material Thickness		Torch - to- Work Distance		Optimum Cut Speed	
		Inch	mm	Inch	mm	IPM	mm/min
20	55	26GA	0.5	0.06	1.5	188.98	4800
30	55	16GA	1.6			88.19	2240
40	55	10GA	3.4			69.29	1760
45	60	3/16"	5			50.39	1280
45	60	1/4"	6			37.80	960
50	65	1/3"	8			34.65	880
55	70	2/5"	10			31.50	800
60	75	1/2"	12			18.90	480
60	75	5/8"	16			14.17	360
60	75	3/4"	20			9.45	240

Aluminum							
AMPS	PSI	Material Thickness		Torch - to- Work Distance		Optimum Cut Speed	
		Inch	mm	Inch	mm	IPM	mm/min
20	55	26GA	0.5	0.06	1.5	271.65	6900
30	55	16GA	1.6			126.77	3220
40	55	10GA	3.4			99.61	2530
45	60	3/16"	5			72.44	1840
45	60	1/4"	6			54.33	1380
50	65	1/3"	8			49.80	1265
55	70	2/5"	10			45.28	1150
60	75	1/2"	12			27.17	690
60	75	5/8"	16			20.37	517.5
60	75	3/4"	20			13.58	345

Circuit diagram Appendix



Diagram


1
2
3
4
4
5
4
6
7
8
9
10
11
12
12
12
12
13
13
13
13
14
14
15
16
16
17
18
19
20
21
22
23
24
25
25
25
26
27
28
29
30
30

Section 6

Parts List and Diagram

Parts List

part	Description	Qty
1	Handle	1
2	Top Housing	1
3	Front Plastic Cover	1
4	Front Iron Panel	1
5	Bottom Housing	1
6	Front Panel PC Board	1
7	Knob	1
8	Quick Connector	1
9	Central Connector	1
10	Reactance PC Board	1
11	Air Flow Control Valve	1
12	Air Tube	4
13	Tube Connector	4
14	Pressure Sensor	1
15	Pressure Sensor Base	1

part	Description	Qty
16	Bracket	2
17	Epoxy Plate	1
18	Rectifier PC Board	1
19	Silicon Bridge	1
20	Main Transformer	1
21	Upper PC Board	1
22	Current Sample PC Board	1
23	Control PC Board	1
24	Circuit Breaker	1
25	Protective Ring	3
26	CNC Socket	1
27	Power Cord Clip	4
28	Air Inlet	4
29	Oil Water Filter	1
30	80 Cooling Fan	2