



# SWS

## *SPEEDCUT 50*

### **PLASMA CUTTING SYSTEM**

## Operating Manual



MAX  
OUTPUT  
**50**  
AMPS

INPUT  
POWER  
**1PHASE**  
~

INPUT  
VOLTAGE  
**240V**  
⚡

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**THANK YOU FOR YOUR PURCHASE OF THE SWS SPEEDCUT™ 50 PLASMA CUTTING SYSTEM.**

At SWS, we take pride in the professional quality, innovation, and support we deliver to our customers and the welding industry as a whole. The SPEEDCUT™ 50 is the next step in our progression as the new standard in welding and cutting products delivered fast marking the continuing evolution of SWS. This Plasma Cutting system is the latest development in inverter technology. It has been tested and approved by production welders and the best fabricating professionals in the industry.

Providing better outcomes through innovation and new product creation have been staples of SWS since its inception. It is the very principle by which we do business. Our goal has always been to provide an outstanding product that not only stands out from the competition but also reflects the quality we strive for in every aspect of our business philosophy. From our second to none customer service excellence to technical support, we work hard at what we do so that you can too.

We know you will enjoy using this machine!

The SPEEDCUT™ 50 is manufactured and compliant with AS60974.1:2006, IEC60974.10, CE  
Guaranteeing you electrical safety and performance.

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**CAUTION!** The SPEEDCUT 50 Operating Manual has been designed to instruct you on the proper use and operation of your SWS product. Your satisfaction with this system and its safe operation is our primary concern. It is important to take the time to read the entire manual, especially the safety sections. They will help you to avoid potential hazards that may exist when working with this product.

# WARRANTY INFORMATION

This product comes standard with a 3-year warranty, but if you register your product with us here <https://www.sws welding.com.au/pages/product-registration> you will receive an extra 2 years coverage this also helps us to assist you quickly in case of a claim.

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## **Terms of Warranty**

This SWS product has a limited warranty that covers manufacturing and material defects only. The warranty commences on the day of purchase and does not cover any freight, packaging and insurance costs. Verbal promises that do not comply with terms of warranty are not binding on SWS.

## **Limitations on Warranty**

The following conditions are not covered under terms of warranty: loss or damage due to or resulting from natural wear and tear, non-compliance with operating and maintenance instructions, connection to incorrect or faulty voltage supply (including voltage surges outside equipment specs), incorrect gas pressure overloading, transport or storage damage or fire or damage due to natural causes (e.g. lightning or flood).

This warranty does not cover direct or indirect expenses, loss, damage of costs including, but not limited to, daily allowances or accommodation and traveling costs.

Modification of the 15A primary input plug or fitting of a lower rated primary input plug will render the warranty null and void.

**NOTE:** Under the terms of warranty, welding torches and their consumables are not covered. Direct or indirect damage due to a defective product is not covered under the warranty. The warranty is void if changes are made to the product without approval of the manufacturer, or if repairs are carried out using non-approved spare parts. The warranty is void if a non-authorized agent carries out repairs.

## **Warranty Period**

The warranty is valid for \*5 years from the date of purchase provided the machine is used within the published specification limits.

## **Warranty Repairs**

A SWS approved service provider must be informed within the warranty period of any warranty defect. The customer must provide proof of purchase and serial number of the equipment when making a warranty claim using the form on our website <https://www.sws welding.com.au/pages/warranty>

**NOTE:** Store the product box and packaging materials for ease of return if in the event of a claim.

\*5-Years warranty website registered users / 3-years standard warranty

Where Purchased: \_\_\_\_\_

Purchase Date: \_\_\_\_\_

Power Supply Serial #: \_\_\_\_\_

## **SWS WELDING & CUTTING**

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EMAIL: [SUPPORT@SWSWELDING.COM.AU](mailto:SUPPORT@SWSWELDING.COM.AU)

TELEPHONE: (03) 5766 2331

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# INTRODUCTION

## 1.0 Welcome

The SWS SPEEDCUT™ 50 is one of the highest quality and most affordable plasma systems on the Australian market for cutting and gouging of all conductive metals. Featuring pilot arc with auto ignition and automatic air regulation for optimum performance, you can now depend on a machine that cuts all day at its rated cutting capacity and to pack more punch when you need it most.



<p><b>Latest Inverter Technology</b> Embedded microprocessor with Infineon components delivers ultimate durability and perfect cutting characteristics.</p>	<p><b>Revolutionary Digital Display</b> Large high visibility durable display allows easy viewing from a distance and continually provides you with necessary feedback for optimum cuts.</p>
<p><b>Smart Programming</b> The system programming tells you when it's time to change consumables, let it cool if the duty cycle is reached and gives constant feedback with real time cutting amps displayed maintaining optimal performance and cut quality.</p>	<p><b>Pilot Arc</b> With pilot arc, you benefit from being able to cut rusty and painted metals while significantly increasing consumable life.</p>
<p><b>Automatic Pilot Arc Restart</b> This feature gives you the ultimate in efficiency by automatically controlling the pilot arc when cutting expanded metal or multiple cuts. The pilot arc will switch on and off when cutting expanded metal and provides maximum performance when cutting thicker metal. You benefit from this with less hand fatigue and the best cutting performance.</p>	<p><b>Thermal Overload Protection</b> You can depend on your SWS machine to withstand harsh working conditions. Thermal overload protection will kick in once the 50% duty cycle limit is reached (40° C). Duty cycle will increase as environmental temperature decreases.</p>
<p><b>Highly Portable</b> Dependable IGBT inverter technology ensures a highly portable and lightweight unit weighing only 11kg.</p>	<p><b>Meets the Highest Standards</b> Meets and exceeds the latest Australian, NZ and International electrical and electromagnetic compatibility standards. AS60974.1:2006, IEC60974.10, CE</p>

# INTRODUCTION

## 1.2 Specifications

Cuttable Metals	Aluminium, Mild Steel, Stainless Steel, Specialty Metals
Industries	General Aluminium Fabrication, Steel and Stainless Steel Fabrication, Stainless Steel Tank and Pipe Fabrication, Boat Building / Shipyards, Motorcycle custom shops, Automotive customs shops, Automotive Components and Repairs, Motorcycle Components and Repairs, Technical Schools, Aerospace, Agriculture, Farming, Building and Construction, Home Repair Workshops.
Mild Steel Cutting Capacity	16mm (5/8 in) @ 380 Millimetres/minute (20mm severance cut)
Stainless Steel Cutting Capacity	12mm (1/2 in) @ 380 Millimetres/minute
Aluminium Cutting Capacity	10mm (3/8 in) @ 380 Millimeters/minute
Input Voltage	1 Phase 230V +/- 15% (15 Amp Plug)
Input Hz	50/60 Hz
Minimum Air Compressor Requirements	100 L/m - 60 psi
Minimum Generator Requirements	6.6kW (8.5kVA at 0.8 PF)
Duty Cycle 40° AMB	45% @ 50A 100% @ 26A
Duty Cycle 25° AMB	60% @ 50A 100% @ 40A
Cutting Current Range	20A - 50A
Dimensions	L 410mm H 180mm W 250mm
Weight	11Kg
Manufactured to Standards	AS60974.1:2006, IEC60974.10, CE

# SAFETY

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## 2.0 Hazards



### WARNING!

Arc welding and plasma cutting can be dangerous to yourself and others. Take special care when welding and cutting. Note your employer's safety practices which should be based on manufacturers' hazard data documents.

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#### **ELECTRIC SHOCK** - Can kill

- Connect and earth (ground) the welding or plasma cutting unit adhering to applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from the natural ground and the workpiece.
- Ensure your working stance is safe.

#### **FUMES AND GASES** - Can be dangerous to health.

- Keep your head out of the fumes.
- Use ventilation, extraction at the welding or cutting arc, or both, to take fumes and gases away from your breathing zone and the surrounding area.

#### **ARC RAYS** - Can injure eyes and burn skin.

- Protect your eyes and body. Use an approved welding/plasma cutting helmet and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

#### **FIRE HAZARD**

- Sparks (spatter) can cause fires. Make sure therefore that there are no flammable materials nearby.

#### **NOISE** - Excessive noise can damage hearing.

- Protect your ears. Use ear muffs or other suitable hearing protection.
- Warn all bystanders of the risk.

#### **MALFUNCTION** - Call an for expert assistance in the event of a malfunction.

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#### **CAUTION**

This product is only intended for metal removal and cutting. Any other use may result in personal injury and equipment damage.



#### **CAUTION**

Read and understand the instruction manual before installing or operating.

# SAFETY

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## 2.1 Precautions

Users of SWS welding and plasma cutting products have the primary responsibility for ensuring that anyone who works on or near this equipment adheres to all the relevant safety precautions. The following listed recommendations must be observed along with the standard regulations that apply to the workplace.

All use must be carried out by trained personnel well versed with the safe operation of the equipment. Incorrect operation of plasma cutting or welding equipment may lead to hazardous events which can result in serious injury to the user and damage to the equipment. Safety precautions must meet the requirements that apply to this type of welding or plasma cutting equipment.

1. Persons who use welding or plasma cutting equipment must be familiar with the following:
  - Welding and plasma cutting machine operation
  - Location of emergency stops
  - The machines purpose
  - Relevant safety precautions
  - Arc welding and / or hand held plasma cutting
  
2. The user must make sure that:
  - No unauthorized person in the vicinity of the working area of the equipment when it is used.
  - No person is unprotected when the arc is started.
  
3. The workplace must:
  - Be suitable for the purpose
  - Be free from weather
  
4. Personal safety equipment:
  - Always wear approved personal safety equipment, such as welding helmets, safety glasses, flame proof clothing and safety gloves.
  - Never wear loose fitting items, such as hooded jumpers, bracelets, rings, etc., which can become trapped or cause serious injury burns.
  
5. General safety precautions:
  - Ensure the return cable is connected securely.
  - Work on high voltage equipment must only be carried out by a qualified electrician or electrical technician.
  - Approved fire extinguishing equipment must be clearly marked and in the vicinity.
  - Lubrication and maintenance must not be carried out on the equipment during operation.



**READ AND UNDERSTAND THE OPERATING MANUAL BEFORE  
INSTALLING OR USING THIS EQUIPMENT - ALWAYS PROTECT  
YOURSELF AND OTHERS!**



# PLASMA CUTTING

## 3.0 Plasma cutting process

Plasma is a type of gas which has been heated to an extremely high temperature and ionised so that it becomes electrically conductive. The plasma arc cutting and gouging processes uses this plasma to transfer an electrical arc to the conductive material being cut. The metal to be cut or gouged is melted by the extreme heat of the arc and then blown away by the air stream. While the primary goal of plasma arc cutting is a cut through the material, plasma arc gouging is used to remove material to a controlled depth and width.

In a Plasma Cutting Torch, a cool compressed gas enters Area 2, where an arc between the electrode and the torch nozzle tip heats and ionises the gas. The main cutting arc then transfers to the workpiece through the column of plasma gas in Area 3. By forcing the plasma gas and electric arc through a small hole, the torch delivers a high concentration of heat to a concentrated area. The stiff, constricted plasma arc is shown in area 3.

Direct current straight polarity (DC) is used for plasma cutting, as shown.

Area A channels a secondary gas that cools the torch. This gas also assists the high-velocity plasma gas in blowing the molten metal out of the cut allowing for a fast, slag-free cut.

By forcing the plasma gas and electric arc through a small hole, the torch delivers a high concentration of heat to a concentrated area. The stiff, constricted plasma arc is shown in Area 3. Direct current straight polarity (DC) is used for plasma cutting, as shown.

Area 1 channels a secondary gas that cools the torch. This gas also assists the high-velocity plasma gas in blowing the molten metal out of the cut allowing for a fast, slag-free cut.

### 2. Gas Distribution

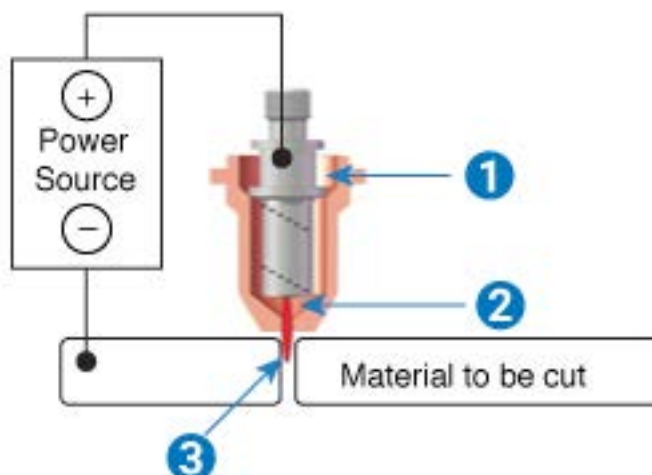
The gas used is internally split into plasma and secondary gases. The now plasma gas flows into the torch through the negative torch lead then through the starter cartridge, around the electrode, and out through the tip. The secondary gas flows down around the outside of the torch starter cartridge, and out between the tip and shield cup around the plasma arc.

### 2. Pilot Arc

When the torch trigger is pulled and started a pilot arc is established between the electrode and nozzle tip. This arc creates a path for the main arc to transfer to the work.

### Main Cutting Arc

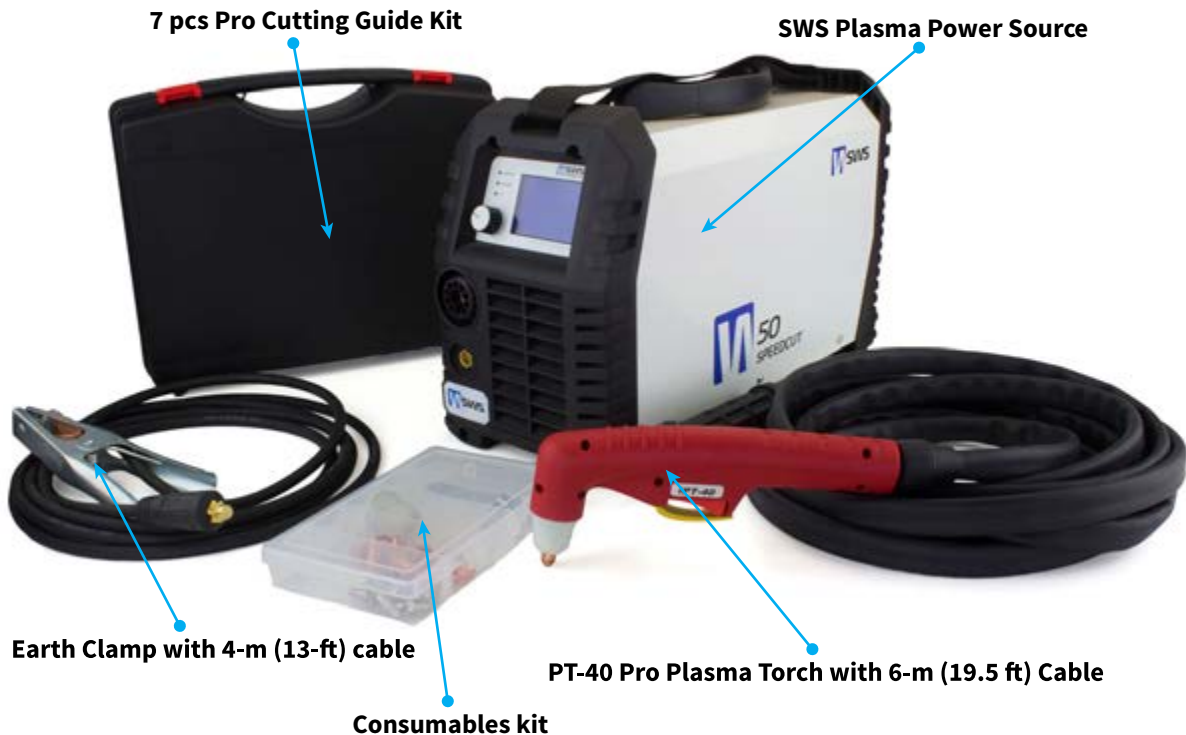
DC power is used for the main cutting arc. The negative output is connected to the torch electrode through the lead. The positive output is connected to the material to be cut via the work cable and to the torch through a pilot wire.



# RECEIPT OF EQUIPMENT

## 4.0 Unboxing

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify us immediately so that we can file a claim. Please Include all equipment identification numbers as on parts or a full description of the parts in error.



1

**NOTE:** Quick Reference Guide (not pictured)

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# INSTALLATION

## 5.0 Working Environment

- The workspace in which this equipment is installed must be free of excessive grinding dust, natural dust, flammable and corrosive chemicals, flammable gas or materials, etc. And at no more than a maximum of 80% humidity.
- When using the equipment outdoors protect the machine from precipitation and direct sun light. The working temperature environment should be kept within  $-15^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ .
- Keep this machine as least 250mm away from walls.
- Ensure the working environment is well ventilated with fan extraction when necessary.

## 5.1 Preliminary Checks

- Always turn the machine on and let it perform boot cycle before connecting pressurised air line.
- Ensure compressor/gas regulator pressure is set between 75 - 100 PSI.

## 5.2 Machine Installation



**1** Plug machine into a suitable mains power supply or generator and turn on using the ON/OFF switch (Located on the back of the machine).

**2** Connect the plasma torch lead to the torch socket and secure using the retaining nut.

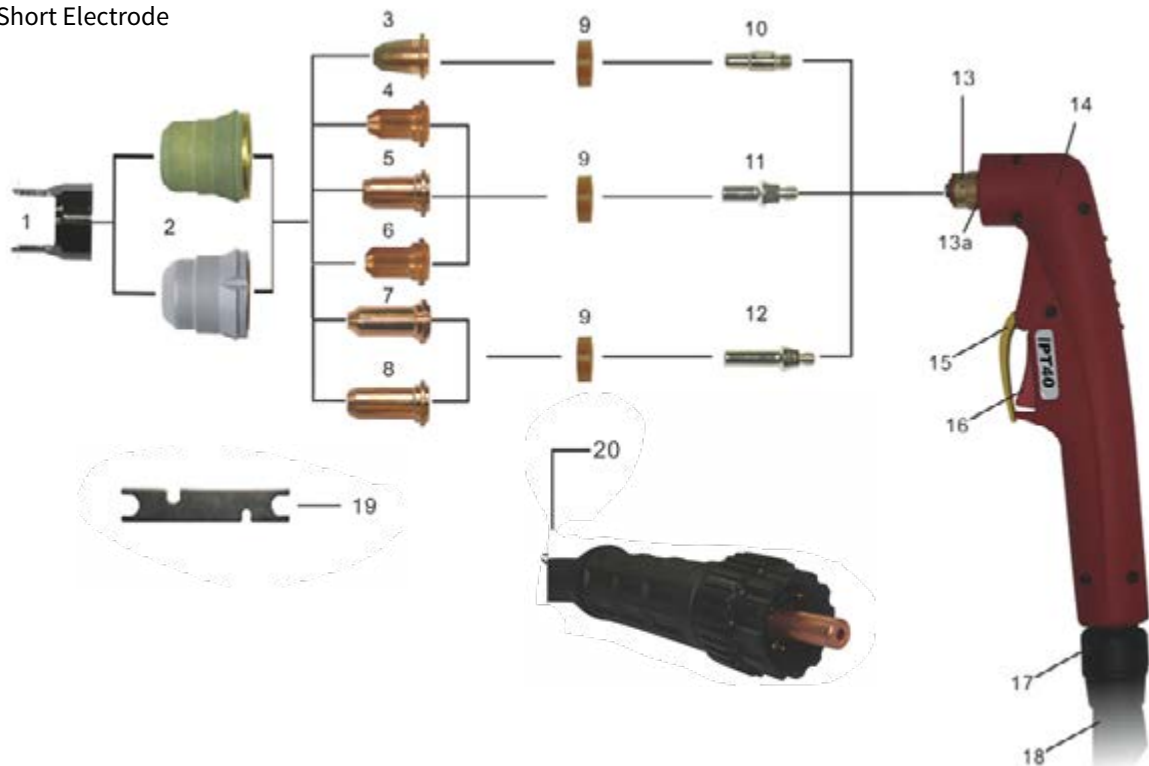
**3** Connect the ground cable connector to the positive terminal and turn clockwise to lock in place.

**4** Secure quick connect fitting to the airline using supplied hose clamp and connect to male inlet fitting (Located on the back of the machine).

# PLASMA TORCH

## 6.0 Plasma Torch Parts

- |   |                           |
|---|---------------------------|
| 1-Stand Off Guide                                     | 12-Long Electrode         |
| 2-Outside Nozzle/Outside Nozzle 6 Holes (Longer life) | 13-Plasma Torch Head      |
| 3-Short Tip   | 14-Plasma Torch Handle    |
| 4-Short Tip 2   | 15-Trigger Safety         |
| 5-Medium Tip  | 16-Trigger                |
| 6-Flat Tip  | 17- Joint                 |
| 7-Extended Tip  | 18- Cable Assembly        |
| 8-Extended Flat Tip                                   | 19- Electrode Spanner     |
| 9-Diffuser  | 20- 6 Pin Central Adapter |
| 10-Short Electrode                                    |                           |



## 6.1 Consumables Wear

Worn torch consumables will cause poor cutting performance and will cause the ERROR! Missing electrode or Nozzle code to display once exhausted. The diagram below illustrates an excessively worn nozzle and electrode.



**Consumables that are made for this torch model are to be used only.**  
**Not using the correct consumables may result in damaging the plasma torch head.**

**Worn Nozzle    Worn Electrode**



# MACHINE OPERATION

## 7.0 Trigger



### WARNING!

The pilot arc can cause serious burns - Never engage trigger switch when torch is directed towards the eyes, face and body of yourself and others.

## 7.1 Operation



### CAUTION!

Protect your eyes and body. Use an approved welding/plasma cutting helmet at and filter lens shade #5 and wear protective clothing.



**NOTE:** Cut quality is highly dependent on setup and the cutting parameters such as alignment with the workpiece, torch standoff, cutting speed, gas pressures, and operator ability.



Push safety switch away with finger.



Pull trigger system will adjust air pressure then start pilot arc after 2 seconds.



Release trigger to stop arc and start the cooling cycle (15 seconds).



Pull then release trigger to stop cooling cycle prematurely. (Will cause premature tip wear if large amounts of cutting have been performed).

Place standoff guide, drag tip, or position torch tip 3-9mm off the metal at 90 degrees and pull the trigger. Once the cutting starts begin to slowly move across the workpiece.



Adjust your speed so that sparks are coming from the backside of the metal. If sparks are not visible at the bottom of the metal, you are not penetrating the metal. This can be caused by moving too fast, insufficient amperage or too thick of material for the rated capacity. At the end of the cut angle, your torch past 90 degrees to completely sever the metal.



When cutting thinner materials typically under 3mm, you can safely drag the tip. Materials over this thickness may prematurely wear the torch consumables.



To make a pierce cut sit the edge of the nozzle on the metal and direct the torch angle away from your body.



Once the material starts being removed slightly lift and slowly rotate the torch towards 90 degrees until you see sparks coming from the underside of the metal.



Once you have pierced a hole through the material, begin to make the cut at 90 degrees.



# SERVICE

## 8.0 General Maintenance



**Warning!**

There is extremely dangerous voltage, and power levels present inside this product. Do not attempt to open or repair unless you are a qualified electrical tradespersons and you are qualified in training in power measurements and troubleshooting techniques. If major complex sub-assemblies are faulty, then the Cutting Power Source must be returned to an accredited service provider.

**Each Use**

Visual Check of torch tip and electrode.



**Weekly**

Visually inspect the torch body tip, electrode, start cartridge and shield cup and torch lead.



**3 Months**

Clean exterior of power source with a dry brush.



**6 Months**



Unplug the power source remove cover and visually check and carefully clean the interior without touching any internal electrical components wires or boards.



Inspect the internal filter regulator/filter for contamination remove and clean if needed.

**NOTE:** Never use any alcohol based cleaners to clean filter or assembly use warm mildly soapy water to clean catchment and rinse thoroughly. Replace filter if necessary.



# TROUBLESHOOTING

## 9.0 Machine Codes

<b>ERROR! Under Pressure</b>	Adjust air pressure to 75 PSI
<b>ERROR! Missing Shield Cup</b>	Turn machine off and check shield cup is firm.
<b>ERROR! Missing Electrode or Nozzle</b>	Turn Machine off and check electrode is secure replace worn electrode & nozzle replace.
<b>ERROR! Over Temperature</b>	Let machine finish cooling cycle until error message has gone.
<b>ERROR! Electrode Short Circuit</b>	Turn Machine off and check electrode is secure and correct type replace worn electrode & nozzle.

## 9.1 Other Troubleshooting

<b>Machine over heats easily</b>	Check that there is no obstruction to the fan or cooling vents.
<b>Insufficient Penetration</b>	<ol style="list-style-type: none"> <li>1.Cutting too fast.</li> <li>2.Torch angle wrong.</li> <li>3.Metal over maximum cutting thickness.</li> <li>4.Worn torch consumables.</li> <li>5.Cutting Amperage to low.</li> <li>6. Mains power supply not sufficient</li> </ol>
<b>Arc Extinguishes</b>	<ol style="list-style-type: none"> <li>1.Cutting speed to slow.</li> <li>2.Torch standoff too far from workpiece.</li> <li>3.Cutting current to high for workpiece.</li> <li>4.Ground working lead not connected.</li> <li>5.Worn torch consumables.</li> <li>6. Mains power supply not sufficient</li> </ol>
<b>Excessive Slag</b>	<ol style="list-style-type: none"> <li>1.Cutting Speed to slow.</li> <li>2.Torch standoff too far.</li> <li>3.Worn torch consumables.</li> <li>4.Improper cutting Amperage.</li> </ol>
<b>Machine won't switch on</b>	<ol style="list-style-type: none"> <li>1.Check power supply and breakers.</li> <li>2.Check Power cable for damage.</li> <li>2.Air pressure connected before turning unit on.</li> <li>3. Air pressure set past 100 PSI limit.</li> <li>3.If there is power supply and no cable damage your machine may need to be repaired contact us for further information.</li> </ol>
<b>Pilot Arc Wont Start</b>	<ol style="list-style-type: none"> <li>1.Switch machine off wait until display goes blank wait 10 seconds then switch on again.</li> <li>2.Check consumables for wear and replace.</li> <li>3.Check for loose consumables.</li> <li>4.Press control dial for air test then retry.</li> <li>5.Check that torch connector is tightened.</li> </ol>

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TELEPHONE: (03) 5766 2331