

# XA XCEL-ARC



## RAZORCUT CUT45 PFC



XA-RZCUT45PFC-K | Operating Manual



## Thank you for choosing to purchase this RAZORCUT Plasma Cutting Machine.

We are proud of our range of welding & cutting equipment that has a proven track record of innovation, performance and reliability. Our product range represents the latest developments in inverter technology put together by our professional team of highly skilled engineers. The expertise gained from our long involvement with inverter technology has proven to be invaluable towards the evolution and future development of our equipment range. This experience gives us the inside knowledge on what the arc characteristics, performance and interface between man and machine should be. Within our team are specialist welders that have a proven history of welding knowledge and expertise, giving vital input towards ensuring that our machines deliver control and performance to the utmost professional level. We employ an expert team of professional sales, marketing and technical personnel that provide us with market trends, market feedback and customer comments and requirements. Secondly they provide a customer support service that is second to none, thus ensuring our customers have confidence that they will be well satisfied both now and in the future.

RAZORCUT Plasma Cutters are manufactured and compliant with - CAN/CSA E60974-1 & ANSI/IEC 60974-1, AS/NZ60974-1 guaranteeing you electrical safety and performance.

## WARRANTY

- 5 Years from date of purchase.
- Esseti NZ Ltd warranties all goods as specified by the manufacturer of those goods.
- This Warranty does not cover freight or goods that have been interfered with.
- All goods in question must be repaired by an authorised repair agent as appointed by this company.
- Warranty does not cover abuse, mis-use, accident, theft, general wear and tear.
- New product will not be supplied unless Esseti NZ Ltd has inspected product returned for warranty and agree to replace product.
- Product will only be replaced if repair is not possible
- Please view full Warranty term and conditions supplied with machine or at the back of this manual.

## ATTENTION! - CHECK FOR CLEAN DRY AIR

### • 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 11,000°C) 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.

<b>CONTENTS</b>	<b>PAGE</b>
Warranty	2
Safety - Cautions	4-6
Air Plasma Cutting Technology	7
Technical Data, Product Information	8
Machine Layout & Descriptions	9
Power Installation	10
Set Up and Operating Procedure	11
Control panel	12-14
Plasma Cutting Procedure & Techniques	15-18
SC40 Plasma Torch Parts Breakdown	19
Trouble Shooting	20



**REGISTER YOUR MACHINE ONLINE TO RECEIVE AN  
ADDITIONAL 6 MONTHS ON YOUR WARRANTY**

Visit [XcelArc.nz/warranty-registration](https://www.XcelArc.nz/warranty-registration) to register your machine.

## SAFETY



**IMPORTANT:** BEFORE INSTALLING, OPERATING OR CARRYING OUT MAINTENANCE ON THE PLASMA CUTTER, READ THE CONTENTS OF THIS MANUAL CAREFULLY, WHICH MUST BE STORED IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE. PAY PARTICULAR ATTENTION TO THE SAFETY RULES. THIS EQUIPMENT MUST BE USED SOLELY FOR PLASMA CUTTING.

### Machine Operating Safety

- Do not switch the function modes while the machine is operating. Switching of the function modes during welding can damage the machine. Damage caused in this manner will not be covered under warranty.
- Disconnect the electrode-holder cable from the machine before switching on the machine, to avoid arcing should the electrode be in contact with the work piece.
- Operators should be trained and or qualified.



**Electric shock: It can kill.** Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and internal machine circuits are also live when power is on. In MIG/MAG welding, the wire, drive rollers, wire feed housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is dangerous.

- Connect the primary input cable according to Australian and New Zealand standards and regulations.
- Avoid all contact with live electrical parts of the welding/cutting circuit, electrodes and wires with bare hands.
- The operator must wear dry welding gloves while he/she performs the welding/cutting task.
- The operator should keep the work piece insulated from himself/herself.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cable for wear and tear, replace the cable immediately if damaged, bare wiring is dangerous and can kill.
- Do not use damaged, under sized, or badly joined cables.
- Do not drape cables over your body.
- We recommend (RCD) safety switch is used with this equipment to detect any leakage of current to earth.



**Fumes and gases are dangerous.** Smoke and gas generated whilst welding or cutting can be harmful to people's health. Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

Do not breathe the smoke and gas generated whilst welding or cutting, keep your head out of the fumes

- Keep the working area well ventilated, use fume extraction or ventilation to remove welding/cutting fumes and gases.
- In confined or heavy fume environments always wear an approved air-supplied respirator.
- Welding/cutting fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld/cut in locations near de-greasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapours to form highly toxic and irritating gases.
- Materials such as galvanized, lead, or cadmium plated steel, containing elements that can give off toxic fumes when welded/cut. Do not weld/cut these materials unless the area is very well ventilated, and or wearing an air supplied respirator.



**Arc rays: harmful to people's eyes and skin.** Arc rays from the welding/cutting process produce intense visible and invisible ultraviolet and infrared rays that can burn eyes and skin.

Always wear a welding helmet with correct shade of filter lens and suitable protective clothing including welding gloves whilst the welding/cutting operation is performed.

- Measures should be taken to protect people in or near the surrounding working area. Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.



**Fire hazard.** Welding/cutting on closed containers, such as tanks, drums, or pipes, can cause them to explode. Flying sparks from the welding/cutting arc, hot work piece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding/cutting.

- The welding/cutting sparks & spatter may cause fire, therefore remove any flammable materials well away from the working area. Cover flammable materials and containers with approved covers if unable to be moved from the welding/cutting area.
- Do not weld/cut on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to the required Safety Standards to insure that flammable or toxic vapours and substances are totally removed, these can cause an explosion even though the vessel has been "cleaned". Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Do not weld/cut where the atmosphere may contain flammable dust, gas, or liquid vapours (such as petrol)
- Have a fire extinguisher nearby and know how to use it. Be alert that welding/cutting sparks and hot materials from welding/cutting can easily go through small cracks and openings to adjacent areas. Be aware that welding/cutting on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.



**Gas Cylinders.** Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Because gas cylinders are normally part of the welding/cutting process, be sure to treat them carefully. CYLINDERS can explode if damaged.

- Protect gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Insure cylinders are held secure and upright to prevent tipping or falling over.
- Never allow the welding/cutting electrode or earth clamp to touch the gas cylinder, do not drape welding cables over the cylinder.
- Never weld/cut on a pressurised gas cylinder, it will explode and kill you.
- Open the cylinder valve slowly and turn your face away from the cylinder outlet valve and gas regulator.



**Gas build up.** The build up of gas can causes a toxic environment, deplete the oxygen content in the air resulting in death or injury. Many gases use in welding/cutting are invisible and odourless.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



**Electronic magnetic fields.** MAGNETIC FIELDS can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near any electric welding, cutting or heating operation.



**Noise can damage hearing.** Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



**Hot parts.** Items being welded/cut generate and hold high heat and can cause severe burns.

Do not touch hot parts with bare hands. Allow a cooling period before working on the welding/cutting gun. Use insulated welding gloves and clothing to handle hot parts and prevent burns.



## CAUTION

### 1. Working Environment.

- 1.1 The environment in which this Plasma Cutter 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 -10°C to +40°C.
- 1.3 Keep this equipment 30cm 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 30 cm. 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 this plasma cutter. 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 warranty; the warranty of this plasma cutting equipment will be void if the machine has been modified, an 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 ‘LowVoltage 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 he enforcement of this Directive.

## AIR PLASMA CUTTING TECHNOLOGY

Plasma cutters work by passing an electric arc through a 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.

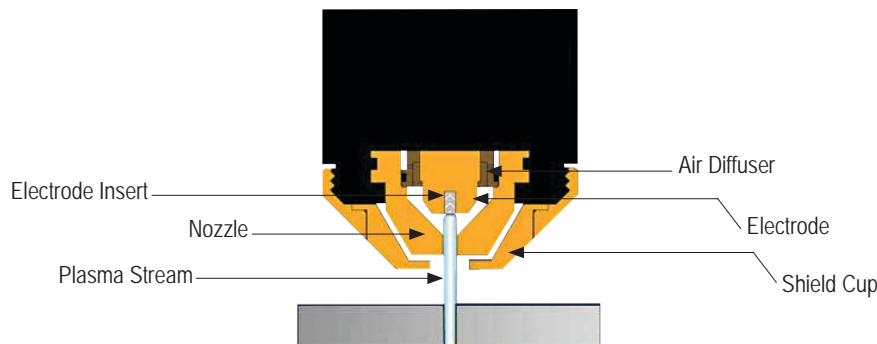
Plasma cutting was invented as the result of trying to develop a better welding process. Many improvements then led to making this technology what it is today. Plasma cutters provide the best combination of accuracy, speed, and affordability for producing a variety of flat metal shapes. They can cut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

### 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 30mm 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 (25mm 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 (>25mm) of steel more quickly than plasma.

# RAZOR CUT45 PLASMA

## 45 Amp Inverter Plasma Cutter

Cuts: Steels, Stainless, Cast Iron, Brass, Copper. Aluminium

**RAZORCUT**  
CUT45 PFC

## RAZOR CUT45 PFC

45Amp 240V Inverter Plasma Cutter  
16mm Cut on Mild Steel, Lightweight & Portable  
Industrial Rated with Power Factor Correction



### Features

- Clear Vision Technology
- Light Industrial application
- Outstanding performance from single-phase
- Pilot Arc Ignition (non-contact)
- Stand-off cutting with drag cut capability
- Maximum sever cutting thickness (steel) 25mm
- High quality Surecut SC80 Plasma Torch 6mtr
- Euro Style torch connection, low-cost consumables
- External Adjustable air regulator, self-drain type
- Suitable to cut all electrically conductive materials
- Lightweight & compact design
- Strong metal housing with plastic front & rear panels
- Generator compatible (recommend 6KVA minimum)
- Tolerant to variable power supply

XA-RZCUT45PFC-K  
Standard Package



Optional machine accessories available - refer [www.xcelarc.nz](http://www.xcelarc.nz)

### Overview

The RAZOR CUT45 is a highly advanced digital inverter plasma cutter designed to deliver exceptional performance and precision. It offers adjustable cutting torch length and post-flow time, making it a versatile tool for a variety of applications. Its unique electrical structure and air duct design enhance heat dissipation, improving duty cycle and reliability. The machine offers three cutting modes, step-less adjustment of cutting current, intelligent fan temperature control, and automatic parameter saving. With a reset function the RAZOR CUT45 is a reliable and efficient plasma cutting machine that is ideal for anyone looking for precision, versatility, and high-quality cutting.

In addition to its advanced features and cutting-edge technology, the RAZOR CUT45 is also incredibly durable and built to last. Its sturdy design can withstand even the most challenging cutting conditions, making it an excellent choice for heavy-duty industrial applications. Its compact size and lightweight construction also make it highly portable, allowing it to be easily transported to job sites or workshops. The

RAZOR CUT45 is also incredibly user-friendly, with its intuitive interface and simple controls making it easy to operate. With its exceptional performance, reliability, and ease of use, the RAZOR CUT45 is an excellent investment for anyone in need of a high-quality plasma cutting machine. Whether you're a professional welder or a DIY enthusiast, the RAZOR CUT45 is an ideal choice for anyone looking to achieve precise, clean cuts on a variety of materials.

### Product Code: XA-RZCUT45PFC-K

Standard Package includes: RAZOR CUT45 Machine, SC80 Plasma Torch 6m, Earth Lead & Spares Kit



### Technical Data

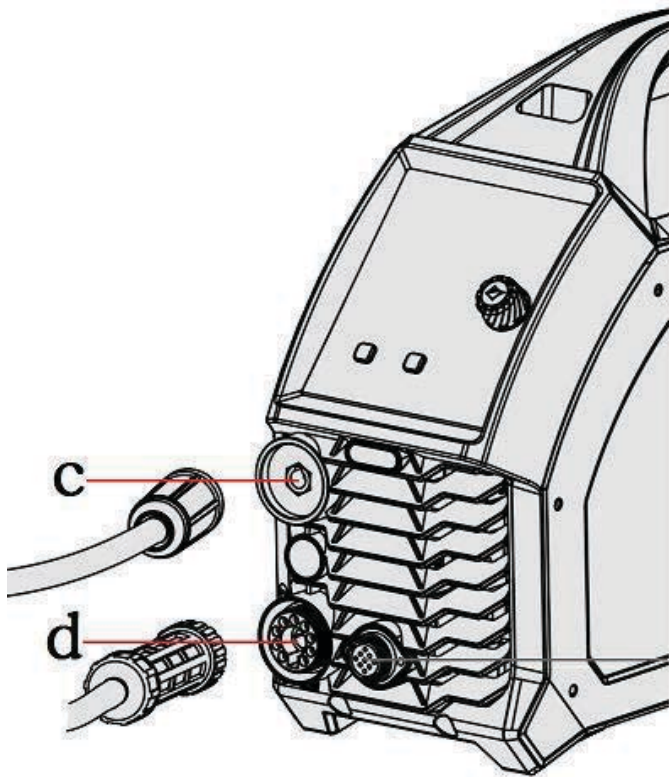
Power Supply / Phases (V-Ph)	240V - 1 +/- 10%
Rated Input Power	5.30 kVA
I <sub>eff</sub> as per AS/NZ60974-1	15.0 Amps
I <sub>Max</sub>	29.2 Amps
Plasma Cut Current Range	20-45 Amps
Duty Cycle @ 40°C as per AS/NZ60974-1	25% @ 45Amps
Duty Cycle @ 25°C (approximate)	55% @ 45Amps
No Load Voltage	98V
Plasma Arc Start	Pilot Arc
Air Flow Draw Off	6.7 cfm
Air Pressure	75 psi
Steel Cut Thickness	16mm
Steel Sever Thickness	25mm
Aluminium Cut Thickness	8mm
Aluminium Sever Thickness	10mm
Stainless Cut Thickness	8mm
Stainless Sever Thickness	10mm
Insulation Class	H
Protection Class	IP23S
Dimensions (LxWxH)	546x166x341mm
Weight Power Source	10kg
Certification Approval	AS/NZ60974-1



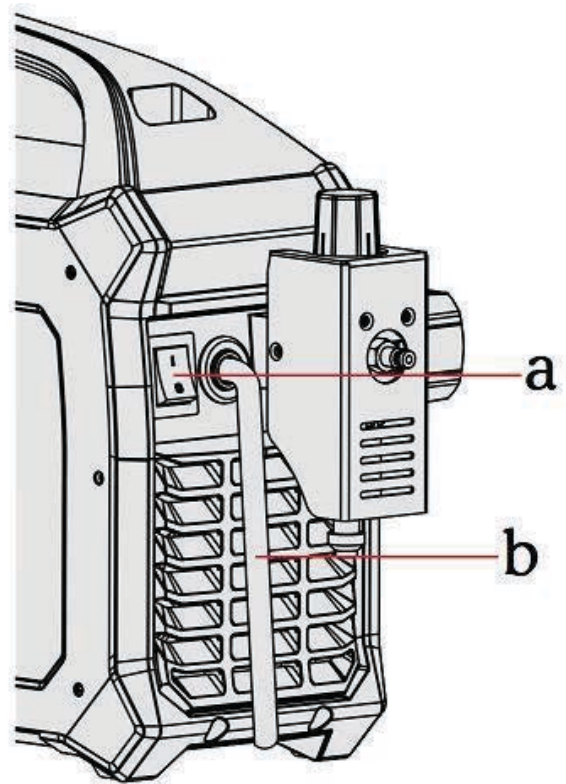
## Front & Rear Panel Layout



**Warning!** All connections shall be made with the power supply is turned off.  
**Warning!** Electric shock may cause death; after power failure, there is still a high voltage on the equipment, do not touch the live parts on the equipment.  
**Warning!** Incorrect input voltage may damage the equipment.  
**Warning!** This product meets the requirements of Class A equipment in EMC requirements and is not to be connected to a residential low-voltage power supply grid.



*(Front panel view)*



*(Rear panel view)*

- a. Power switch
- b. Input power line
- c. Quick socket (positive output)
- d. Central plasma adaptor

## Power Installation

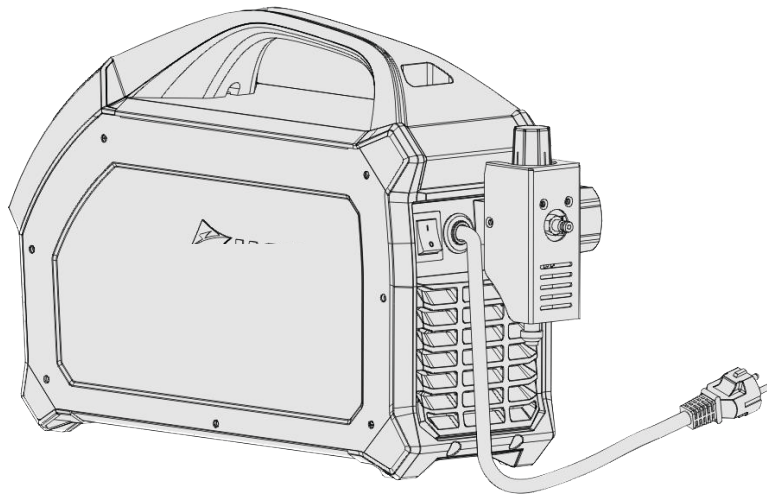


**Warning! The electrical connection of equipment shall be carried out by suitably qualified personnel.**

**Warning! All connections shall be made after the power supply is off.**

**Warning! Incorrect voltage may damage the equipment.**

- 1) Ensure the input voltage value is within the specified input voltage range.
- 2) Ensure that the power switch of the cutter is turned off.
- 3) Connect the input power cord to the input terminal or plug the power cord into the corresponding socket (if any) and ensure a good contact.
- 4) Ground the power supply well. (As shown in the diagram, the European plug has a grounding terminal, so no additional grounding is required.)



(Wiring diagram)

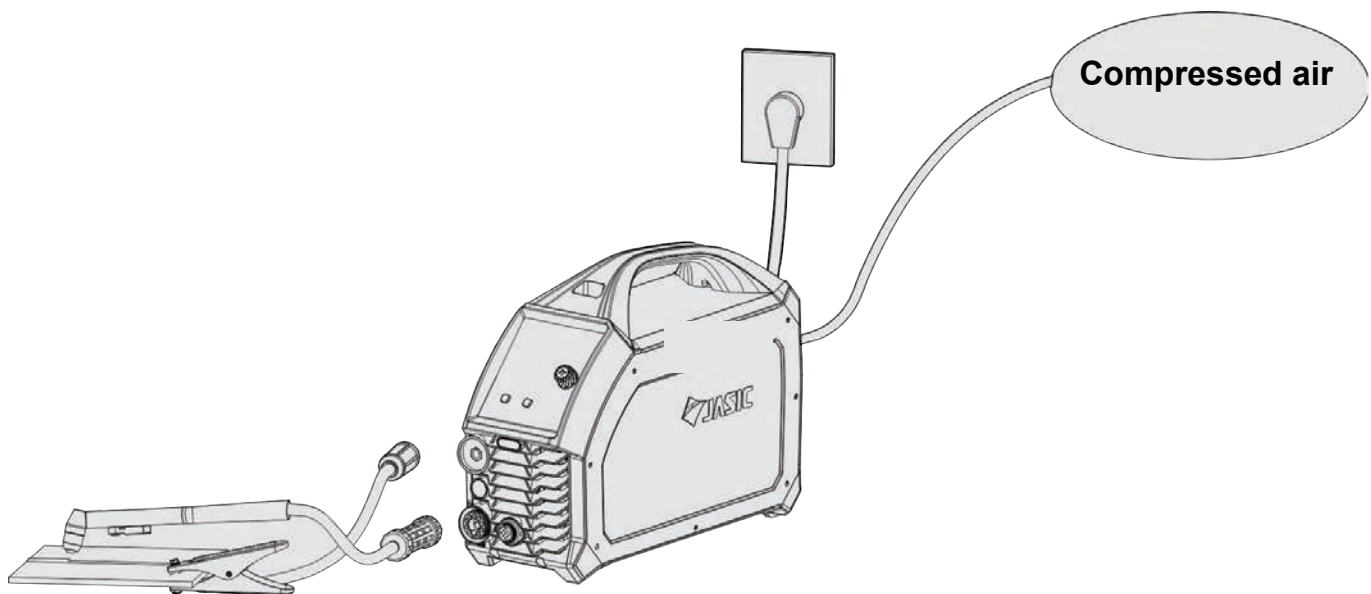
### NOTE!

If the input cable needs to be extended, please use a cable with larger cross-sectional area to reduce the voltage drop, 3x2.5mm<sup>2</sup> or more is recommended.

## Set Up Procedure for PLASMA Cutting

### Connection of cutting torch, earth cable and gas pipe

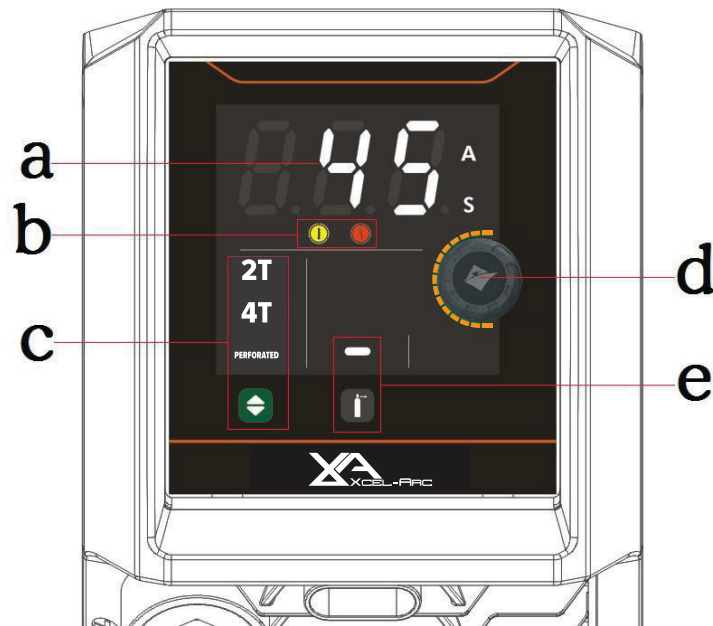
- 1) Ensure that the power switch of the cutting machine is turned off.
- 2) Insert the cable plug with earth clamp into the corresponding positive quick socket on the front panel of the machine and tighten it clockwise.
- 3) Insert the central plasma plug of the cutting torch into the negative central plasma socket on the front panel, and tighten it clockwise.
- 4) Connect the input end of the air regulator on the rear panel to the output port of the compressed air source, and fix it firmly with the clamp.



(Wiring diagram)

**NOTE!** If you want to use long secondary cables (plasma torch cable and earth cable), you must ensure that the cross-sectional area of the cable is increased appropriately in order to reduce the voltage drop due to the cable length.

## Control panel



- a. Parameter and error code display
- b. Protection indicator
- c. Cutting mode selector
- d. Parameter adjustment knob
- e. Gas check buttons and indicators

## Display of parameters and error codes



- 1) Electric current configuration
- 2) When the factory settings are restored the countdown is displayed.
- 3) In user mode, the parameter settings are displayed during back-end adjustment.
- 4) When the barcode queried, the machine barcode is displayed.
- 5) In abnormal state, an error code will be displayed.

## Parameter adjustment knob



- 1) Rotate the adjusting knob to adjust the parameters.
- 2) Rotating the adjusting knob clockwise increases the parameter value, and rotating the adjusting knob counterclockwise decreases the parameter value.
- 3) When the adjusting knob is rotated the adjusted parameters are displayed in the parameter display area.

## Parameter adjustment knob





- 2T**

**4T**

PERFORATED


- 1) Press the cutting mode selection button  while not cutting to switch between the three cutting modes as needed: 2T, 4T and mesh cutting.
  - 2) If the indicator **2T** is on, it indicates that the machine is currently in 2T cutting mode.
  - 3) If the indicator **4T** is on, it indicates that the machine is currently in 4T cutting mode.
  - 4) If the indicator PERFORATED is on, it indicates that the machine is currently in mesh cutting mode.


## Gas check function


- 

- 1) Press the gas check button  while not in cutting state.
  - 2) When the  indicator is lit, the machine is in gas check mode.
  - 3) Press the gas check button again or wait 20s. After the indicator light goes out, the machine has exited gas check mode.

## Electrical current settings for cutting

In cutting mode, the display window displays the current cutting current, which can be set by turning the adjustment knob.



## Protective indicators

The overheat indicator light  indicates that the machine has entered overheat protection and has stopped output.


The over-current indicator light  indicates that the machine has entered over-current protection and has stopped output.





## Engineer mode

- 1) Press and hold the parameter adjustment knob  for 5s while not in cutting mode to enter engineer mode.
- 2) After pressing for 1 second, the display window will count down from 3, then the machine will enter engineer mode. Release the button during that time to exit the countdown without entering engineer mode.
- 3) Engineer mode: F01: Standby time selection; 0, 5, 10, or 15, unit is min, 0 means that the standby function is not enabled.  
F02: Input over-voltage protection enabled; 0 means the function is off, 1 means the function is on.  
F03: Post-flow time adjustment; 0-60s, precision is 1s.  
F04: Torch length selection; 0, 5, 10, 15, or 20, unit is m, 0 means self-adjusted.
- 4) After adjusting the parameters, press the cutting mode selection button  to save and exit.

## Restoring factory settings

- 1) Press and hold the cutting mode selection button  for 5s while not cutting to restore factory mode.
- 2) After 1s, the display window will count down from 3. After completion, factory settings are restored. Release the button halfway to exit the countdown without restoring factory settings.
- 3) Factory settings: Cutting mode: 2T continuous cutting; cutting current: rated maximum; post-flow time: 15s.

## Barcode display

- 1) Press and hold the cutting mode selection button  and parameter adjustment knob  for 5s at the same time while not cutting to enter barcode display mode.
- 2) The barcode of the machine is displayed in the display window. Press any key to exit.

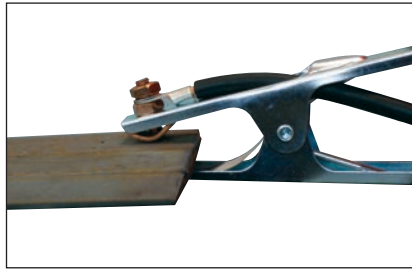
## Operating Procedure & Techniques for PLASMA Cutting

### Operating procedure using the Stand Off Guide mounted to SC80 torch.

The feet of the standoff guide are placed on the cutting surface. This maintains an optimal 2mm standoff distance between the plasma cutting tip and the work, this is especially suitable if your hands are unsteady, or if you wish to use a straight edge guide or pattern guide. It also helps extend tip life.



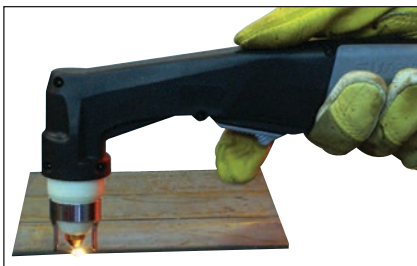
**1)** Wear your safety gear. Generally you want the same type of protective gear as when welding. Plasma has high arc voltage if the job or bench is wet and you place your hand or arm on it you can become part of the circuit and receive a shock, be sure you are wearing leather gloves, Full length pants and covered shoes, Wear eye protection a #5 shade is the minimum eye protection with other shades required depending on amperage. A face shield is also recommended,



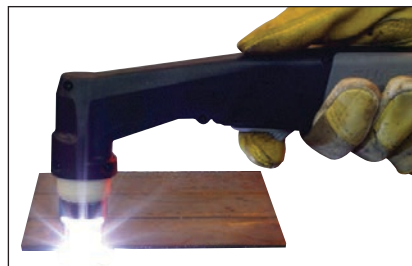
**2)** Connect the Earth Clamp securely to the work piece or the work bench.



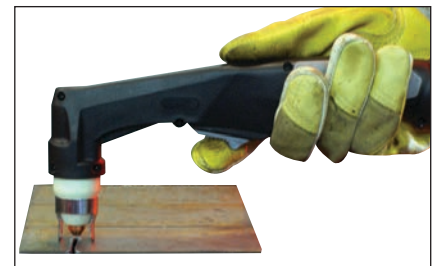
**3)** Place and hold the torch vertical at the edge of the plate



**4)** Pull the trigger to energise the pilot arc. The cutting arc will start when the nozzle is moved closer to the edge of the work piece. When the cutting arc has cut through the edge of the plate start moving evenly in the direction you wish to cut,



**5)** Correct amperage and travel speed are important and relevant to material thickness and are correct when sparks are exiting from the work piece. If sparks are spraying up from the work piece there is insufficient amps selected or the travel speed is too fast.



**6)** To finish the cutting release the torch switch. The air flow will continue for 30 seconds to cool the torch head.

### Cut Quality

A clean cut depends on several factors:

- amperage
- travel speed
- tip height & position
- tip and electrode quality
- air pressure and quality
- technique

The best quality cut will be produced when all these variables are set correctly for the material thickness and type of material being cut.

### Poor quality cut



### Good quality cut



## Operating Procedure & Techniques

### • 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.

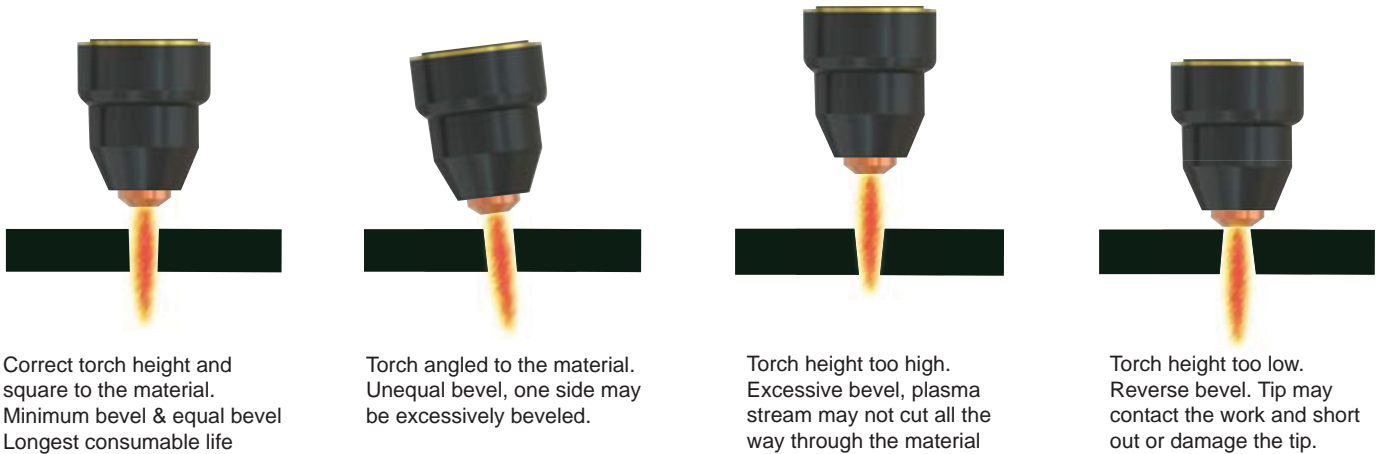
The arc should exit the material at a slight angle away from the direction of travel. If it's going straight down, that means you're going too slow, and you'll have an unnecessary buildup of dross or slag. If you go too fast, it will start spraying back onto the surface of the material without cutting 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 affect 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.



### • 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 0.9mm orifice is good for 0-40 amps whereas a 1.3mm 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 80 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.

#### New Tip



#### Worn Tip



### • 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.

#### New Electrode



#### Worn electrode



## Operating Procedure & Techniques

### • 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 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.

### • 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 11,000°C) 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.

**Sub-Micronic Filter**

AT1000



**Filter Element**

AT50505



### • 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 buggy 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.

### • Starting a cut



Hold the torch vertical at the edge of the work piece and place the stand off guide on the workpiece.



Pull the trigger to start the arc. Start cutting on the edge until the arc has cut completely through.

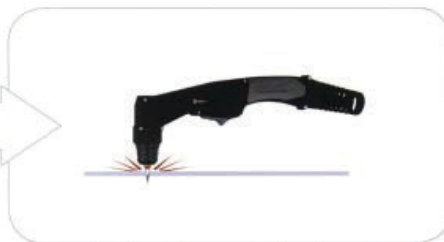


Then, proceed with the cut.

### • 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 set.



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

## Operating Procedure & Techniques

### • 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.

### • Safety Trigger Operation

The Suregrip SC40 torch supplied with the Viper Cut 30 machine has a new design of safety trigger. Just pull back on the trigger whilst increasing your grip and you will feel the trigger move to the on position. When you release the pressure it will return to the off position.



off



on



off

## Surecut™ Patented Arc Ignition System



Fig 1

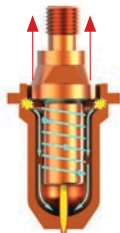


Fig 2

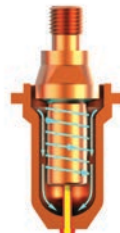


Fig 3

**Fig 1:** Shows the electrode and tip position when not in use.

**Fig 2:** At the point the safety trigger is actuated, current flow is sent through the torch. This is followed by a pressurized gas flow which causes a piston action to take place in the torch head. The tip and electrode are separated causing a "strike" and the pilot arc is initiated.

**Fig 3:** When the torch head is placed in proximity to the work piece the plasma cutting jet is ignited.

\*Your plasma torch is supplied with a tube of Silicon Grease, this grease is used to lubricate the piston shaft of the torch head.

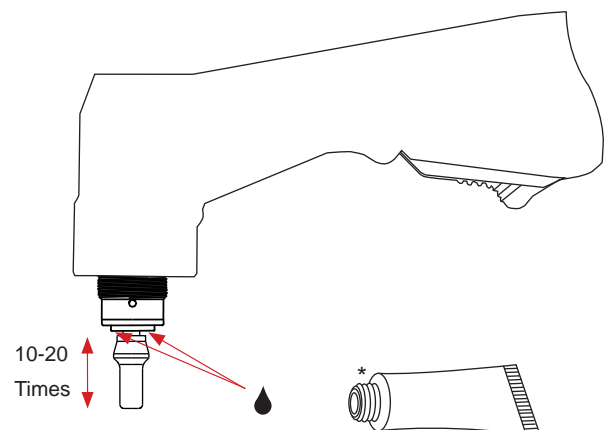
## Lubrication instruction

### Lubrication Procedure:

- Remove the retaining cap, cutting tip, and swirl ring, keep the electrode on the torch head.
- Apply grease as shown in the drawing, and then push the electrode up and down for 10-20 times.
- Remove the excess grease before assembling the torch.

### Torch Head Electrode Holder Lubrication:

- Apply in case of sticking or start/stop is delayed.
- Apply after a period of prolonged inactivity.

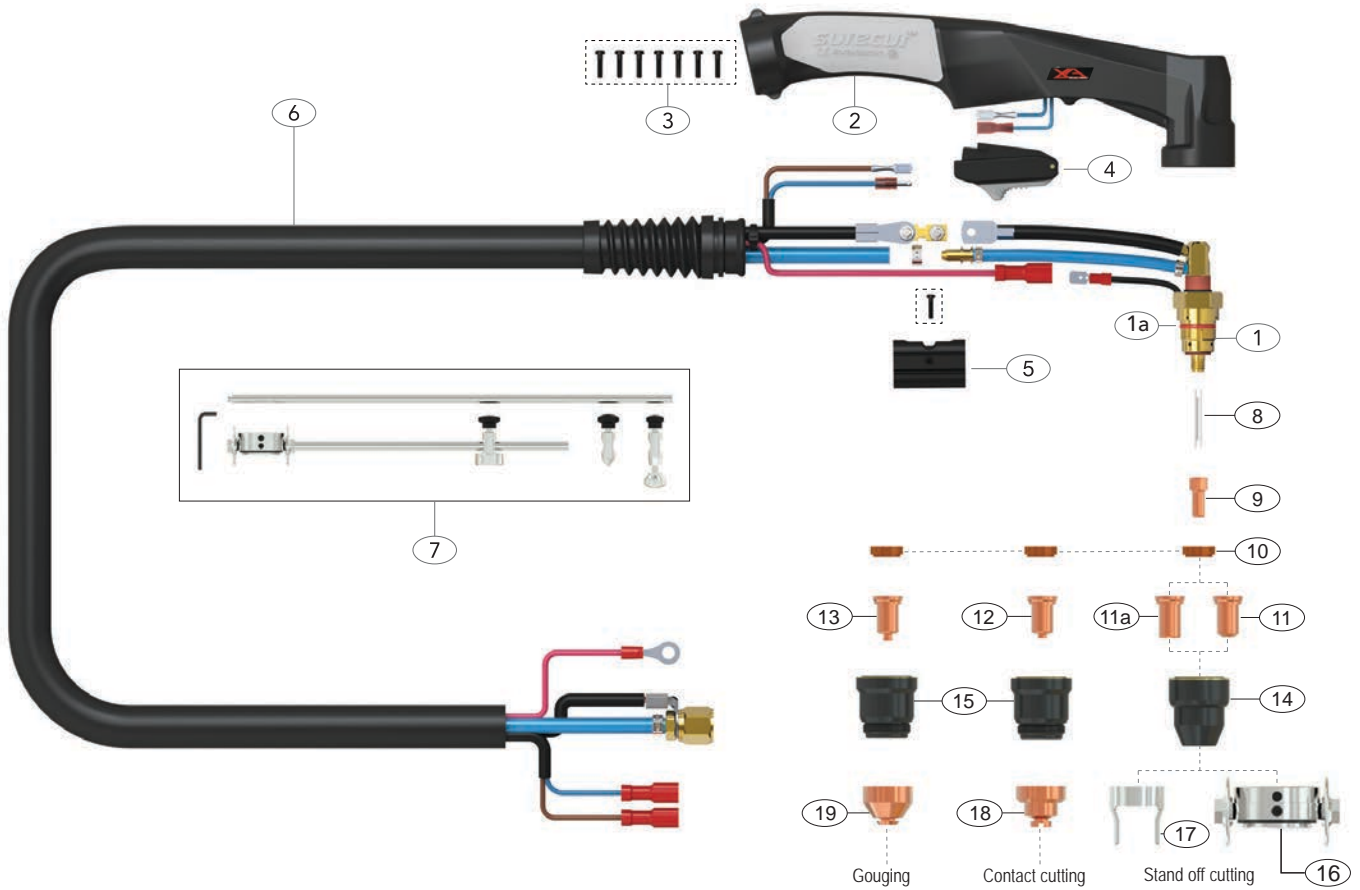




# Surecut SC80

Rating: 80A Air/N<sub>2</sub> Gas, @ 60% duty cycle.

For use on **RAZOR CUT 40Air, CUT45 & CUT80**



## Technical Data

<b>Max Current</b>	<b>80A</b>	<b>Gas Pressure</b>	<b>4.5-5.0 Bar (65-75psi)</b>
<b>Duty Cycle</b>	<b>60%</b>	<b>Gas Flow</b>	<b>110 l/min</b>
<b>Gas</b>	<b>Air/N</b>	<b>with Pilot Arc</b>	

## Spare Parts

#	Part Number	Description
	SC80-60-CC1	Surecut 80 Plasma Torch x 6m
	SCM80R-60-CC1	Surecut 80 Machine Torch x 6m
1	SC8001	SC80 70 Torch Head Kit
2	SC8014	Plasma Handle Kit
3	SCSP1	Screw Pack
4	SC2516	Plasma Safety Trigger
5	SC8015	Location Block
6	SC8019-60-CF4	Cable Assembly Complete x 6mt
7	SC8050	Circle Cutting Attachment Kit
8	SC8002	Cooling Tube
9	SC8004	Electrode
10	SC8006	Swirl Ring
11	SC8020-10	Cutting Tip 1.0mm

## Spare Parts

#	Part Number	Description
	SC8020-13	Cutting Tip 1.3mm
11a	SC8022-09	Cutting Tip 0.9mm Cross Groove
12	SC8026-10	Contact Cutting Tip 1.0 mm, 40-50A
	SC8026-11	Contact Cutting Tip 1.1 mm, 50-60A
	SC8026-12	Contact Cutting Tip 1.2 mm, 60-70A
	SC8026-13	Contact Cutting Tip 1.3 mm, 70-80A
13	SC8028-16	SC80 Gouging Tip 1.6mm
14	SC8030	Retaining Cap
15	SC8031	Shield Cap Body
16	SC8051	SC80 Cutting Buggy
17	SC8040	SC80 Stand Off Guide
18	SC8041	Contact Cutting Shield Cap
19	SC8043	Gouging Shield Cap

## Troubleshooting



**Warning! Before machines are dispatched from the factory, they have already been checked thoroughly. The machine should not be tampered with or altered. Maintenance must be carried out carefully. If any wire becomes loose or is misplaced, it may be potentially dangerous to user! Only professional maintenance personnel should repair the machine!**

**Ensure the power is disconnected before working on the machine. Always wait 5 minutes after power switch off before removing the panels.**

## Common malfunction analysis and solution



**The symptoms listed here may be related to the accessories, gas, environmental factors, and power supply you use. Please try to improve the environment and avoid such situations.**

Symptom	Reasons	Troubleshooting
No pilot arc after pressing the torch trigger	<ul style="list-style-type: none"> <li>·The machine is in gas check mode</li> <li>·The torch trigger circuit is blocked</li> <li>·Compressed air is not connected</li> <li>·The pilot arc circuit is damaged</li> </ul>	<ul style="list-style-type: none"> <li>·Turn off the gas check function or wait 20s to exit automatically</li> <li>·Check the torch trigger circuit</li> <li>·Reconnect the compressed air</li> <li>·Replace or repair the mainboard</li> </ul>
The pilot arc is discontinuous or extinguishes	<ul style="list-style-type: none"> <li>·The consumables are seriously worn</li> <li>·Input compressed air pressure is too high</li> <li>·Too much moisture or impurities in the compressed air</li> <li>·Pilot arc time exceeds 2s</li> </ul>	<ul style="list-style-type: none"> <li>·Replace with new consumables</li> <li>·Adjust the pressure of compressed air to 0.35-0.55MPa through the gas regulator on the rear panel</li> <li>·Manually drain the water in the filter cup of the gas regulator on the rear panel or replace the valve</li> <li>·Don't press the torch to keep pilot arc for a long time without cutting.</li> </ul>
The pilot arc cannot be transferred to the workpiece	<ul style="list-style-type: none"> <li>·The cutting circuit is blocked</li> <li>·Too much distance between the tip of cutting torch and the workpiece</li> </ul>	<ul style="list-style-type: none"> <li>·Check whether the earth clamp is damaged and clean the part which contacts the workpiece, and ensure good metal-to-metal contact</li> <li>·Ensure that the distance between the tip of the cutting torch and the workpiece remains within 3-5mm</li> </ul>

<p>Poor cutting quality</p>	<ul style="list-style-type: none"> <li>·The cutting current and speed do not match the thickness of the workpiece</li> <li>·The cutting air pressure is too low or high</li> <li>·The consumables are seriously worn</li> </ul>	<ul style="list-style-type: none"> <li>·Choose the correct cutting standard operation - refer to section 7.1.3 "Cutting Procedure Checklist"</li> <li>·Ensure that the working air pressure range is 0.35-0.55MPa</li> <li>·Replace with new consumables</li> </ul>
-----------------------------	---	---

## Alarm and solutions

Error code	Category	Possible cause	Countermeasure
E10	Overcurrent protection	Continuously output the maximum capacity current of machine	Restart the machine. If overcurrent protection alarm is still active, contact the after-sales department.
E32	Overvoltage protection	Input grid voltage is too high	Turn it off and on again. If the alarm cannot be eliminated and the grid voltage remains too high, check the power grid voltage and wait for the grid to be normal before welding. If the grid voltage is normal and the alarm persists, contact professional maintenance personnel.
E60	Overheating	Inverter IGBT temperature is too high	Do not turn off the machine. Wait for a while, and then continue welding after the indicator goes out.
E61	Overheating	Output rectifier diode temperature is too high	Do not turn off the machine. Wait for a while, and then continue welding after the indicator goes out.

**NOTE! After applying the above countermeasures, the alarm still persists or reappears after lifting. Please contact professional maintenance personnel.**

## Maintenance



### Warning!

The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing the machine covers.

**Please note: The following should only be carried out by an authorised electrical technician.**

## Power supply maintenance

In order to guarantee that the machine works efficiently and in safety, it must be maintained regularly. Operators should understand the maintenance methods and means of the machine operation. This guide should enable customers to carry out simple examination and safeguarding by oneself, try to reduce the fault rate and repair times of the machine, so as to lengthen service life of the machines.

<u>Period</u>	<u>Maintenance item</u>
Daily examination	Check the condition of the machine, mains cables, welding or cutting cables and connections. Check for any warnings LEDs and machine operation.
Monthly examination	Disconnect from the mains supply and wait for at least 5 minutes before removing the cover. Check internal connections and tighten if required. Clean the inside of the machine with a soft brush and vacuum cleaner. Take care not to remove any cables or cause damage to components. Ensure that ventilation grills are clear. Carefully replace the covers and test the unit. <b>This work should be carried out by a suitably qualified competent person.</b>
Yearly examination	Carry out an annual service to include a safety check in accordance with the manufacturers standard (EN 60974-1). <b>This work should be carried out by a suitably qualified competent person.</b>

**Notes**

Blank lined area for notes, consisting of 18 horizontal grey bars.





**Esseti New Zealand Limited**  
PO Box 4189, Palmerston North - 4442  
**Phone:** 06 355 1103  
**Fax:** (06) 354 2437  
**Email:** [sales@esseti.co.nz](mailto:sales@esseti.co.nz)  
[www.esseti.co.nz](http://www.esseti.co.nz)