

RAZOR CUT80



XA-CUT80RZ | Operating Manual



XA XCEL-ARC
RAZORCUT

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

© Xcel-Arc 2023



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

- 3 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.

CONTENTS	PAGE
Warranty	2
Safety - Cautions	4-6
Air Plasma Cutting Technology	7
Technical Data, Product Information	8
Machine Layout & Descriptions	9
Set Up and Operating Procedure	10-11
Plasma Cutting Procedure & Techniques	12-14
SC120 Plasma Torch Parts Breakdown	15
Machine Warranty	16-18
Notes	19



**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.

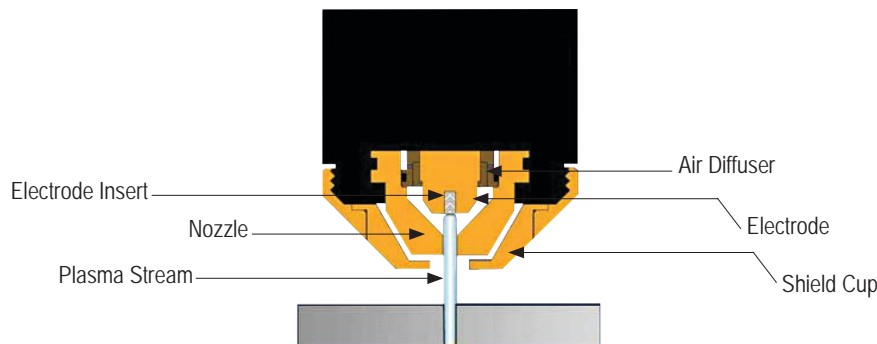
Plasma cutting was invented as the result of trying to develop a better welding process. Many improvements then led to making this technology what it is today. Plasma cutters provide the best combination of accuracy, speed, and affordability for producing a variety of flat metal shapes. They can cut 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 CUT80 PLASMA

80 Amp Inverter Plasma Cutter

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

RazorCut



RAZOR CUT80

80Amp 415V Inverter Plasma Cutter
Industrial Rated with CNC Compatibility
30mm Cut on Mild Steel

Features

- Latest IGBT Inverter Technology
- Heavy Industrial application
- CNC-Ready
- Outstanding performance from three-phase
- HF Arc Ignition (non-contact)
- Stand-off cutting with drag cut capability
- Maximum sever cutting thickness (steel) 35mm
- High quality Surecut SC80 Plasma Torch 6mtr
- Euro Style torch connection, low-cost consumables
- Auto protection for over Voltage & over current
- Auto protection for low air & thermal overload
- Integral pre-set air regulator, self-drain type
- Suitable to cut all electrically conductive materials
- Lightweight & compact design
- Strong metal housing with plastic front & rear panels
- Tolerant to variable power supply

XA-CUT80RZ
Standard Package



Optional machine accessories available - refer www.xcelarc.nz

Overview

The RAZOR CUT80 is a high quality industrial-rated three phase inverter Plasma Cutting machine produced using the latest in IGBT inverter technology and incorporating advanced MCU intelligent software technology. The machine automatically monitors and controls all critical functions and compensates for possible inconsistencies caused by wear in torch components, environmental temperature or humidity. The resulting cutting performance is greatly improved compared to traditional plasma cutting machines. The RAZOR CUT80 is reliable, robust and stacked with features that you can expect from a high quality plasma cutter including full CNC connection. The RAZOR CUT80 is equipped with a high quality Suregrip SC120 Plasma Torch with Euro Style connection and 6mtr cable. The SC120 Plasma Torch provides effortless starting of the cut with powerful, fast and accurate stand-off cutting with drag cutting capability. The SC120 Plasma Torch uses low-cost wear consumables with the additional benefit of longer life cycle of both Electrodes and Cutting Tips. The RAZOR CUT80 is an exceptional machine that is well suited to a wide range of applications including industrial and general engineering, forestry and agriculture, site work, heavy transport and marine repair, general demolition and maintenance work. The RAZOR CUT80 provides great portability, with stacks of cutting power to get the job done with outstanding speed and a great finish. Built to our specification and manufactured in compliance to AS/NZ60974-1

Product Code: XA-CUT80RZ-K

Standard Package includes: RAZOR CUT80 Machine, SC120 Plasma Torch 6m, Earth Lead & Spares Kit



Technical Data

Power Supply / Phases (V-Ph)	415V - 3 +/- 10%
Rated Input Power	15.0 kVA
I _{eff} as per AS/NZ60974-1	12.6 Amps
I _{Max}	20.0 Amps
Plasma Cut Current Range	20-80Amps
Duty Cycle @ 40°C as per AS/NZ60974-1	40% @ 80Amps
Duty Cycle @ 25°C (approximate)	80% @ 80Amps
No Load Voltage	310V
Plasma Arc Start	Pilot Arc
Air Flow Draw Off	6.7 cfm
Air Pressure	75 psi
Steel Cut Thickness	30mm
Steel Sever Thickness	35mm
Aluminium Cut Thickness	16mm
Aluminium Sever Thickness	20mm
Stainless Cut Thickness	16mm
Stainless Sever Thickness	20mm
Insulation Class	F
Protection Class	IP21S
Dimensions (LxWxH)	560x220x415mm
Weight Power Source	16.0kg
Certification Approval	AS/NZ60974-1

Front & Rear Panel Layout

Front Panel Layout



Rear Panel Layout



1		Power indicator. It illuminates when the machine is powered on, and it glitters after arc is successfully ignited.
2		Overheating indicator. It illuminates when the working temperature of the machine is overly high. Meanwhile, the machine stops working.
3		Digital Amperage metre
4		2T indicator. It illuminates when the machine is under 2T status.
		4T indicator: It illuminates when the machine is under 4T status.
5		Gas-check indicator. It illuminates when the machine is under gas-check status. At this moment, the machine cannot cut.
		Normal cutting mode, the machine can cut when this indicator illuminates.
6		Air Pressure Gauge
7		Amperage Control Dial.
8		Output connector (DC+) connect to the work piece.
9		Torch connection (DC-).
10		Primary power input cable.
11		On/Off switch.
12		Air supply connector

Set Up Procedure for PLASMA Cutting

- (1) Connect the SC80 Plasma Torch to the machine. Insert the torch connection into the torch connection receptacle at the front of the machine and screw up hand tight.
Caution: Be careful not to bend the pins located inside the torch connector.
- (2) Connect the earth lead to the output terminal of the machine and tighten.
- (3) Connect the air supply to the air connection located at the rear of the machine.
Turn on the air supply
- (4) Connect the machine to the correct power supply and switch on the machine using the on/off switch located at the rear of the machine.
- (5) Select 2T / 4T operation
Operating procedure using the 2T / 4T Function with SC80 torch.
Set torch operation 2T / 4T.
 - When 2T operation is selected press trigger Arc starts, release trigger Arc stops.
 - When 4T operation is selected press and release trigger Arc starts, press and release trigger Arc stops.
- (6) Set amperage dial.

(1) Connect the SC80 Plasma Torch to the machine. Insert the torch connection into the torch connection receptacle at the front of the machine and screw up hand tight.
Caution: Do not to bend the pins located inside the torch connector.

2. Connect the earth lead to the output terminal of the machine and tighten.



(3) Connect the air supply to the air connection located at the rear of the machine. Turn on the air supply.



(4) Connect the machine to the correct power supply and switch on the machine using the on/off switch located at the rear of the machine.



(5) select 2T or 4T torch control



(6) Set the amperage dial

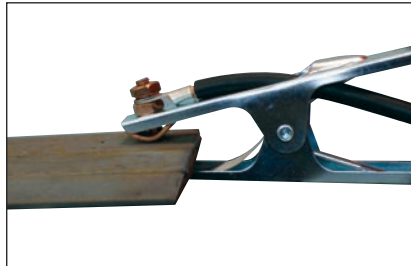
Operating Procedure for PLASMA Cutting

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.



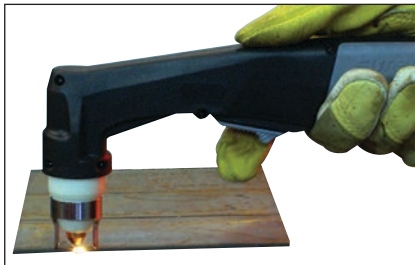
1) Wear your safety gear. Generally you want the same type of protective gear as when welding. Plasma has high arc voltage if the job or bench is wet and you place your hand or arm on it you can become part of the circuit and receive a shock, be sure you are wearing leather gloves, Full length pants 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,



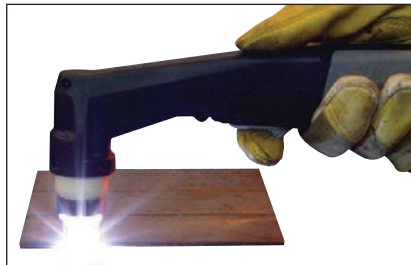
2) Connect the Earth Clamp securely to the work piece or the work bench.



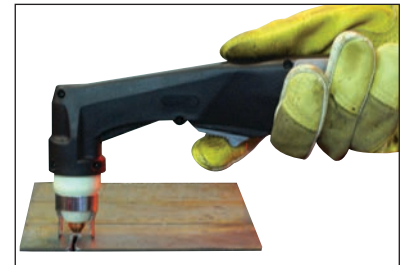
3) Place and hold the torch vertical at the edge of the plate



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 for PLASMA Cutting

• 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.



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

Torch angled to the material.
Unequal bevel, one side may be excessively beveled.

Torch height too high.
Excessive bevel, plasma stream may not cut all the way through the material

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

• Tip size and condition

The tip orifices focus the plasma stream to the work piece. It is important to use the correct size tip for the amperage being used, for example a tip with a 1.0mm 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 for PLASMA Cutting

• 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.

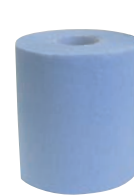
Sub Micronic Filter

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.

Operating Procedure & Techniques for PLASMA Cutting

• 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 SC80 torch supplied with the RazorCut 45 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

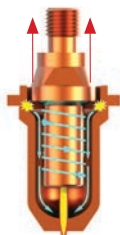


Fig 2

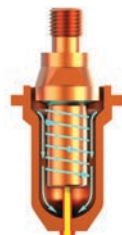


Fig 3

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.

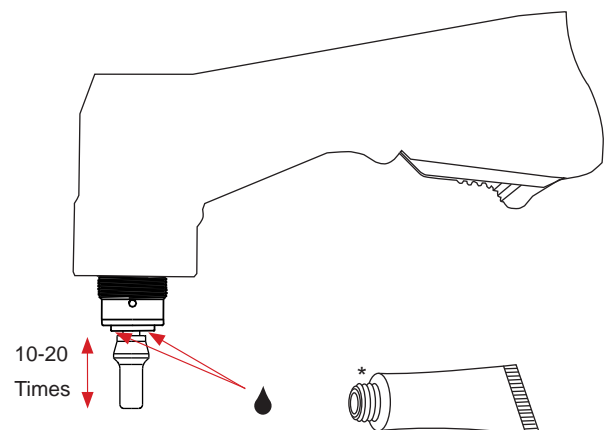
Lubrication instruction

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:

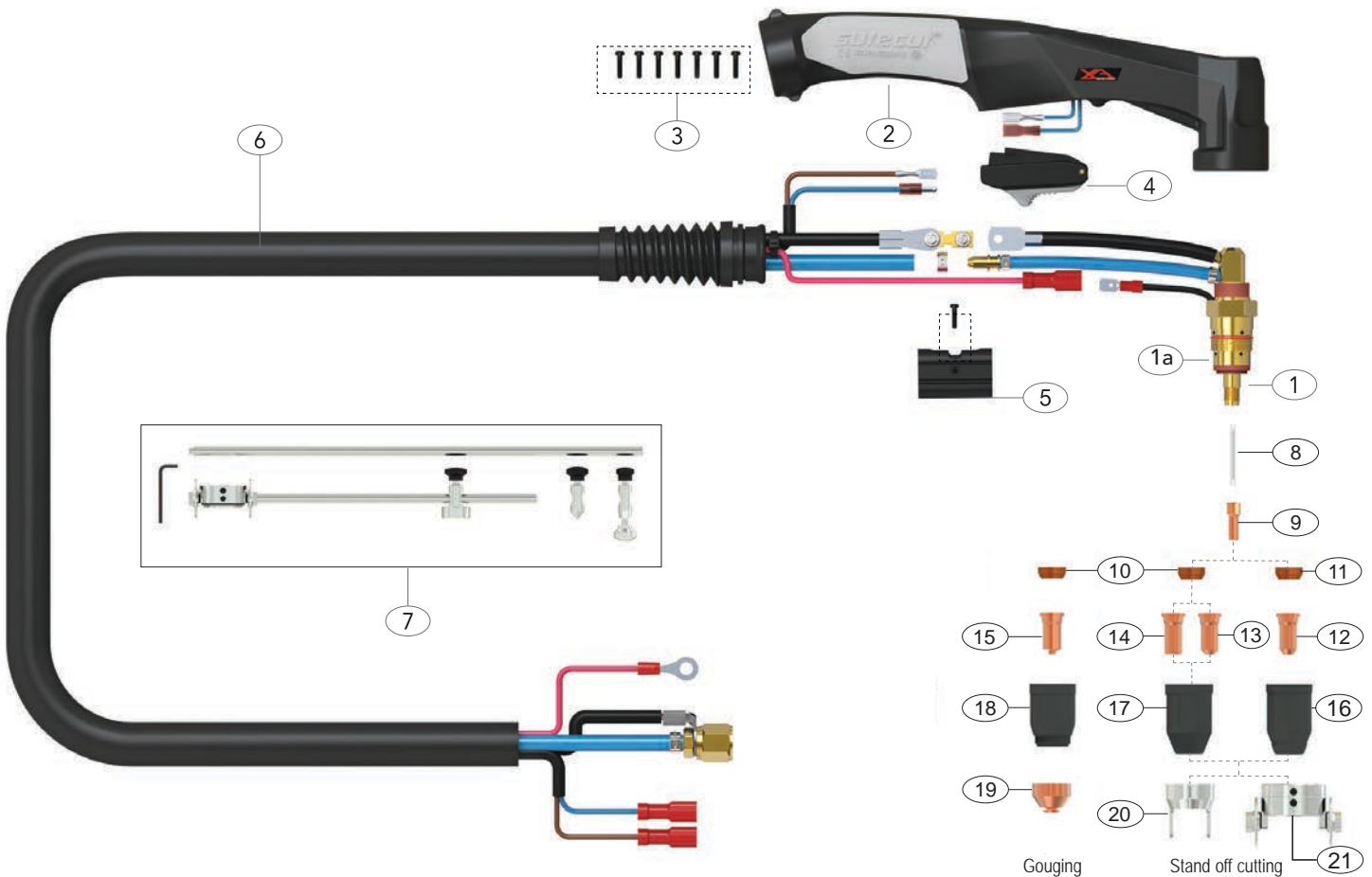
- Apply in case of sticking or start/stop is delayed.
- Apply after a period of prolonged inactivity.



Surecut SC120

Rating: 120A Air/N₂ Gas, @ 60% duty cycle.

For optional use on RAZOR CUT80



Technical Data

Max Current	120A	Gas Pressure	4.5-5.0 Bar (65-75psi)
Duty Cycle	60%	Gas Flow	200 l/min
Gas	Air/N ₂		with Pilot Arc

Spare Parts

#	Part Number	Description
	SC120-60-CC1	Surecut 120 Plasma Torch x 6m
1	SC1201	SC120 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	SC1250	Circle Cutting Attachment Kit
8	SC1202	Cooling Tube
9	SC1204	Electrode
10	SC1207	Swirl Ring 4 Holes
11	SC1206	Swirl Ring 6 Holes Heavy Duty

Spare Parts

#	Part Number	Description
12	SC1220-10	Cutting Tip 1.0mm 40-50A
	SC1220-11	Cutting Tip 1.1mm 50-60A
	SC1220-12	Cutting Tip 1.2mm 60-70A
13	SC1221-14	Cutting Tip 1.4mm 80-90A
	SC1221-15	Cutting Tip 1.5mm 100-110A
	SC1221-16	Cutting Tip 1.6mm 110-120A
14	SC1222-09	Contact Cutting Tip 0.9mm 30-40A
15	SC1228-22	Gouging Tip 2.0mm 120A
16	SC1230	Retaining Cap, 30-70A
17	SC1231	Retaining Cap, 80-120A
18	SC1232	Shield Cap Body
19	SC8043	Shield Cap Gouging
20	SC1240	Double Pointed Spacer
21	SC1251	Cutting Buggy

ESSETI New Zealand Limited ('us', 'we') warrants that the products bearing the brand names ESSETI, XCEL-ARC, RAZORWELD, RAZORCUT, JASIC, VIPER, T&R, XCEL-GAS, Otos, Servore, TECNA & HIT-8SS supplied by us and purchased by you from an Authorised ESSETI (NZ) Ltd. Distributor are free of Material and Faulty Workmanship Defects except for those products listed under 'Warranty Exclusions' and whilst any claim is made subject to the following terms and conditions.

Your rights under the New Zealand Consumer Law may not be limited by a defined time. However, New Zealand Consumer Law does recognise that the relevant time period can vary from product to product, depending on factors such as the nature of the product and the price. Esseti NZ Ltd. adopts the same approach. As you can appreciate, the type of remedy we can offer you may also vary depending on how long it takes you to return the product to us.

WARRANTY PERIOD

We offer the following 'Warranty Periods' from 'date of purchase':

An Extended Warranty Period of 6 months total shall apply only to Machinery where offered and warranty is registered online.

We offer the following 'Warranty Periods' effective from the 'date of purchase':

XCEL-ARC, Inverter MIG/SWF/MTS, MMA/TIG, TIG ACDC, Plasma (Power Source Only*)	2 Years
RAZORWELD, Inverter MIG/SWF/MTS, MMA/TIG, TIG ACDC (Power Source Only*)	3 Years
RAZORCUT, Inverter Plasma (Power Source Only*)	3 Years
VIPER MIG185, Viper TIG180ACDC (Power Source Only*)	2 Years
VIPER ARC140, VIPER ARC160, VIPER CUT30, (Power Source Only*)	1 Year
VIPER TIG200P, VIPER SYNERGIC MIG 120 (Power Source Only*)	1 Year
JASIC, Inverter MIG/SWF/MTS, MMA/TIG, TIG ACDC, Plasma (Power Source Only*)	2 Years
XCEL-ARC & RAZORWELD, Water Coolers, PAPR Air Blower Unit	1 Year
XCEL-GAS, Gas Cutting and Welding Torches	3 Months
XCEL-GAS, Straight Line & Gas Cutting Machines (Machine Only*)	1 Year
XCEL-GAS, Regulators Argon/ Acetylene / Oxygen / LPG / Bobbin Flowmeter	1 Year
XCEL-ARC, Automatic Welding Helmet	2 Years
RAZORSHIELD Digital Welding Mask & Goggle Kit , Automatic Welding Helmets	2 Year
TECNA, Spot Welding Machines (Power Source Only*)	1 Year
ALL WELDING TORCHES – GMAW / GTAW / MMAW / PLASMA	3 Months
ALL EARTH LEADS, INTERCONNECTING CABLES, GAS HOSES	3 Months

(*) This only covers manufacturing faults on any torches, cables and other accessories, either included with a machine kitset or sold separately, for the first three months after date of purchase.

WARRANTY / RETURNS / EXCHANGES

Our Warranty Returns Policy recognises all and any rights you have under New Zealand Consumer Law and other relevant laws.

You shall inspect the goods on delivery and shall within seven (7) days of delivery (time being of the essence) notify the Esseti NZ Ltd. Authorised Distributor from whom you purchased the goods of any alleged defect, shortage in quantity, damage or failure to comply with the description or quote.

You shall also afford Esseti NZ Ltd. the opportunity to inspect the goods within a reasonable time following delivery if you believe the goods are defective in any way.

If you shall fail to comply with these provisions the goods shall be presumed to be free from any defect or damage. For defective goods and where permissible by law, Esseti NZ Ltd. reserves the right to repair or otherwise remedy the defect prior to issuing replacement goods or refunding the purchase price.

If the goods are being purchased for a business purpose then the purchaser acknowledges that the Consumer Guarantees Act will not apply.

The New Zealand Sales of Goods Act applies when goods are not covered by the Consumer Guarantees Act. You may be able to get a full refund or compensation if the trader doesn't have the right to sell the goods, or the goods are:

- not of 'merchantable quality' (so defective that most people wouldn't want them)
- not fit for their normal purpose
- poorer quality than a sample you were shown
- not suitable for what you told the trader you wanted the goods for
- not matching their description

If there has been a misrepresentation you may have rights under the Fair Trading Act or the Contractual Remedies Act and therefore also entitled to, at the consumer's discretion, either a refund of the purchase price of the goods, or repair of the goods, or replacement of the goods.

Returns will only be accepted provided that:

(a) You have complied with the provisions outlined above, and

(b) where the goods are unable to be repaired, the goods are returned at your cost within thirty (30) days of the delivery date, and

(c) Esseti NZ Ltd. will not be liable for goods which have not been stored or used in a proper manner, and

(d) the goods are returned in the condition in which they were delivered and with all packaging material, brochures and instructional material in as new condition as is reasonably possible in the circumstances.

Esseti NZ Ltd Accepts no responsibility for any products lost, damaged or mislaid whilst in transit. Esseti NZ Ltd. may (at their sole discretion) accept the return of goods for credit but this may incur a handling fee of up to fifteen percent (15%) of the value of the returned Goods plus any freight costs.

MAKING A CLAIM

If you wish to make a claim under this Warranty, you should:

- Return the product to the point of purchase either in person or via prepaid courier; or
- Contact us by Telephone – Esseti NZ Ltd – 06 355 1103

When returned, the product must be accompanied with the original Receipt or Tax Invoice clearly showing the purchase date and disclosing the purchase price. All costs of installation, cartage, freight, travelling expenses, hiring tools and insurance are paid by the Customer. To the extent permitted by law, our total liability for loss or damage of every kind related to the goods in any way whatsoever is limited to the amount paid to the retailer by you for the goods or the value of the goods. No responsibility will be taken for any products lost, damaged or mislaid whilst in transit.

WARRANTY EXCLUSIONS

This Warranty covers Material and Faulty Workmanship defects only.

This Warranty does not cover damage caused by:

- Normal wear and tear due to usage
- Misuse or abusive use of the machine and/or failure to correctly follow set up or operating instructions supplied with these products
- Failure to clean or improper cleaning of the product
- Failure to maintain the equipment such as regular services, etc.
- Incorrect voltage or non-authorised electrical connections
- Improper installation
- Use of non-authorised/non-standard parts
- Abnormal product performance caused by any ancillary equipment interference or other external factors
- Failure or any breakage caused by overload, dropping or abusive treatment or use by the customer
- Repair, modifications or other work carried out on the product other than by an Esseti-Authorised Service Agent

Unless it is a manufacturing fault, this Warranty does not cover the following parts:

- **All Batteries, including Button Type and Cell Type Batteries**
- **MIG Welding Torch Consumables, such as:**

Gas Nozzles, Gas Diffusers, Contact Tip Holders, Contact Tips, Swan Necks, Triggers, Handles, Liners, Euro Block, Shroud Springs, Knobs, All XCEL-ARC / Magmaweld Mig Welding Wires & Electrodes, Arc Leads, Welding Cable, Electrode Holder, Earth Clamps

- **MMA & TIG Welding Torch Consumables, such as:**

Tungsten Electrodes, Collet, Collet Body, Alumina Nozzle, Torch Head, Torch Head water Cooled, Torch Head Flexible, Back Caps, Gas Lens, Torch Handle, Cup Gasket, Torch Body Gas Valve, O-ring, All XCEL-ARC TIG Welding Rods, All XCEL-ARC / Magmaweld Electrodes, Arc Leads, Welding Cable, Electrode Holder, Earth Clamps

- **PLASMA Cutting Torches Consumables, such as:**

All Cutting Tips, All Diffuser/Swirl Ring, All Electrodes, Retaining Caps, Nozzle Springs, All Spacers, All Shield Caps, All Air and Power Cables, All Switches, All O-rings, All Springs, All Circle Guides and Cutting Kits, Torch Bodies, Air Filter Regulator, Welding Cable, Earth Clamps

- **Gas Welding & Cutting Torch and Straight Line Cutting Machine Consumables and Fittings, such as:**

All Cutting, Welding & Brazing Tips, Adaptors, Hoses, Fittings, Tracks and associated parts

- **Automatic Welding & Cutting Carriage Machine Parts, such as:**

Input Cord, Inter-connecting Power Cord, Triggering Cable

This Warranty does not cover products purchased:

- Without the provision of a suitable Receipt or Tax Invoice that clearly provides proof of purchase as outlined above
- At an auction or from a private seller
- Unless it is a manufacturing fault, this Warranty does not apply to any products sold to Hire Companies.

These conditions may only be varied with the written approval of the Directors of Esseti NZ Limited.

REMEMBER TO RETAIN YOUR ORIGINAL INVOICE FOR PROOF OF PURCHASE.



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