

# UNIMIG



# RAZOR

## CUT45 PFC

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## 1. Safety

Welding and cutting equipment can be dangerous to both the operator and people in or near the surrounding working area if the equipment is not correctly operated. Equipment must only be used under the strict and comprehensive observance of all relevant safety regulations.

**Read and understand this instruction manual carefully before the installation and operation of this equipment.**

### 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 workpiece.
- 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 workpiece 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, undersized, 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 while 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 while 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 degreasing, 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 galvanised, 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.



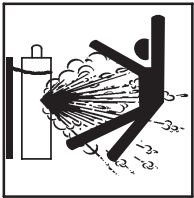
### Arc rays: harmful to people's eyes and skin

- 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 the correct shade of filter lens and suitable protective clothing, including welding gloves while 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 workpiece, and hot equipment can cause fires and burns. Accidental contact of the 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 correctly prepared according to the required Safety Standards to ensure 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 a fire on the hidden side.



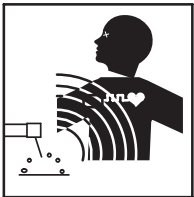
## Gas cylinders

- Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Because gas cylinders usually are 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.
- Ensure 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 cause 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.

**WARNING: USE COMPRESSED AIR ONLY WITH THIS MACHINE**

## Caution

### Working environment

- The environment in which this welding/cutting equipment is installed must be free of grinding dust, corrosive chemicals, flammable gas or materials etc., and at no more than a maximum of 80% humidity.
- When using the machine outdoors, protect the machine from direct sunlight, rainwater and snow, etc.; the temperature of the working environment should be maintained within -10°C to +40°C.
- Keep this equipment 30cm distant from the wall.
- Ensure the working environment is well ventilated.

### Safety tips

- **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/cutting 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.
- **Thermal Overload Protection:** Should the machine be used to an excessive level, or in a 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 a safe level.
- **Over-Voltage Supply:** Regarding the power supply voltage range of the machine, please refer to the “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.
- Do not come into contact with the output terminals while the machine is in operation. An electric shock may occur.

## Maintenance

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

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

## Troubleshooting

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

## 2. Machine Features

### RAZOR CUT 45 PFC



#### Latest IGBT Inverter Technology

Our state-of-the-art IGBT Inverter technology gives you get better performance, better efficiency, and better reliability, all with a significantly lighter power source than a transformer.

#### HD Backlit Interface

This next generation interface panel is bright and easy to read in any environment.

#### Power Factor Correction

PFC gives you maximum electrical efficiency. It automatically compensates for any voltage fluctuation, and PFC is also designed to be generator friendly.

#### Perforated Cut Mode

Now you can cut perforated metal without having to restart the arc between gaps. Simply switch into perforated cutting mode and slice through perforated metal with ease.

#### Pilot Arc Start

Pilot Arc Start lets you start the arc before contacting the workpiece. This gives you better control of the torch, especially on materials with uneven or curved surfaces.

#### 2T/4T Trigger Modes

Designed for user preference and comfort, adjustable trigger modes allow you to either hold the trigger down throughout the cut, or use the trigger as a on/off switch by pulling to start and pulling to stop.

#### Smart Fan

Smart Fan diminishes noise, saves power, helps reduce energy costs, and minimises the number of contaminants being pulled through the machine.

#### Lightweight & Portable

Weighing just 10kg, the RAZOR CUT 45 is ready to go anywhere you need it.

#### CNC Connectivity

With an easy-access CNC connection on the front panel, you can plug in a CNC torch and use it with a CNC table.

#### Air Test

The Air Test feature lets you to test the air pressure before proceeding with cutting, to easily check you've set the optimal parameters.

#### Optional Air Compressor Module

The new air compressor module is designed to perfectly fit the RAZOR CUT 45. This sleek and compact unit eliminates the need for a bulky external air compressor, perfect for workshops where space is a premium or as a CNC companion. Despite its small size, there is no compromise on performance, maintaining a clean cut of 16mm and a severance cut of 25mm.

## 3. Machine Specifications

### 3.1 Technical Data

Parameter	Values
SKU	U14006K
Primary Input Voltage	240V Single Phase
Supply Plug	15A
Rated Input Current (A)	23
No Load Voltage (V)	300
I <sub>eff</sub> (A)	15.0
Air Flow Draw Off (L/min)	189
Air Flow Pressure (Bar)	5.17 (75 psi) (0.5 MPa)
Current Range (A)	20-45
Machine Duty Cycle	25% @ 45A 60% @ 30A 100% @ 20A
Protection Class	IP23S
Insulation Class	H
Dinse Connector	10/25
Standard	AS/NZ60974-1
Warranty (Years)	5

### 3.2 Plasma Cut Thickness Rating

Parameter	Values
Mild Steel Clean Cut	16mm
Mild Steel Severance Cut	25mm
Aluminium Clean Cut	10mm
Aluminium Severance Cut	12mm
Stainless Clean Cut	12mm
Stainless Severance Cut	14mm

### 3.3 Size & Weight

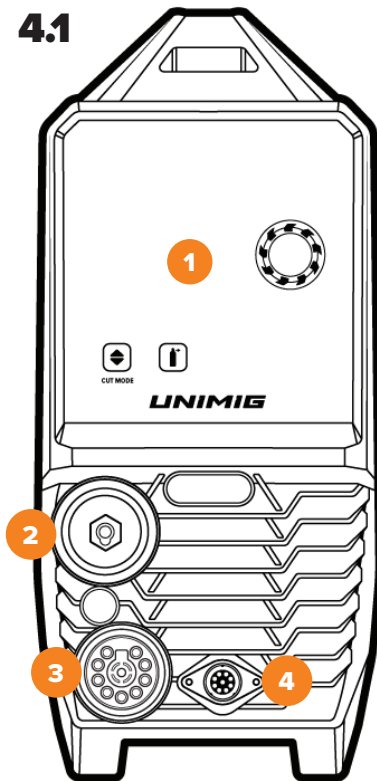
Parameter	Values
Dimensions	546×169×341mm
Weight	10kg

### 3.4 Machine Features

Parameter	Values
Plasma Arc Start	Pilot Arc
CNC Connection	Yes
Thermal Overload Protection	Over Temperature Warning

## 4. Machine Layout

### 4.1



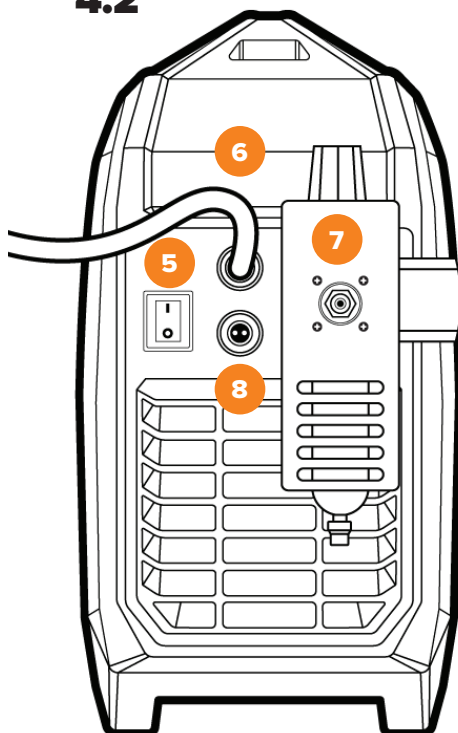
### 4.1 Front Panel Layout

1. Interface Panel
2. Earth Connector (10/25 Dinse)
3. Torch Connector (Euro Connection)
4. CNC Port

### 4.2 Rear Panel Layout

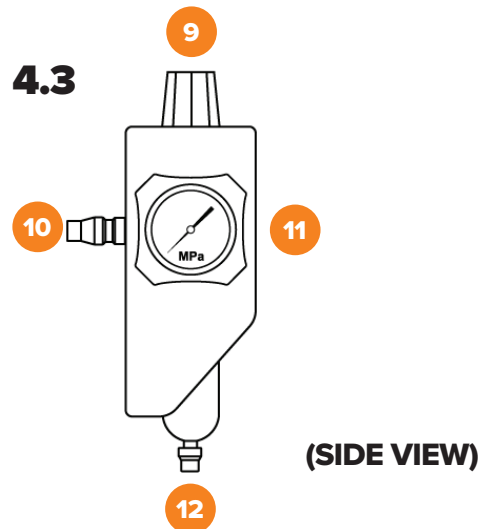
5. On/Off Switch
6. Input Power Cord
7. Air Regulator
8. AC Power Out for Air Compressor

### 4.2



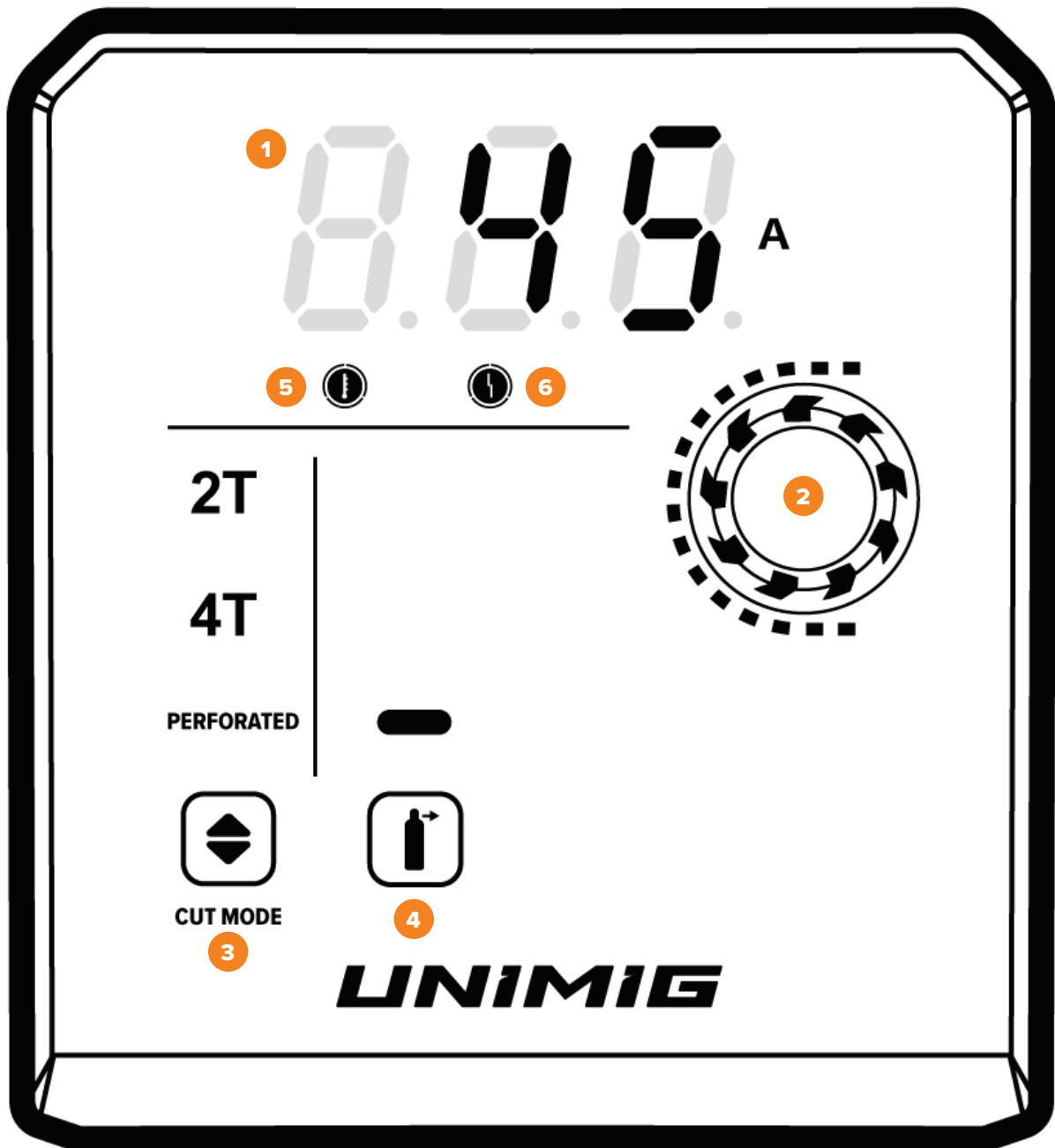
### 4.3 Air Regulator Layout

9. Air Pressure Adjustment Knob
10. Air Outlet (1/4" Nitto Fitting)
11. Air Pressure Gauge (MPa)
12. Moisture Trap Release





## 5. Control Panel Layout



- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| 1. Numerical Display              | 4. Air Test Button                    |
| 2. Multi Function Adjustment Knob | 5. Over Temperature Warning Indicator |
| 3. Cut Mode Selection Button      | 6. Over Current Protection Indicator  |

## 6. Control Panel Details

### CUT MODE SELECTION ---

# 2T

#### 6.1 2T Trigger mode

In this cutting mode you must hold down the trigger throughout the desired length of cut.

# 4T

#### 6.2 4T Trigger Mode

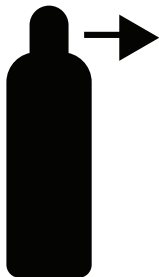
In this cutting mode you pull the trigger to initiate the arc, and the machine will continue cutting until the trigger is pulled again.

# PERFORATED


#### 6.3 Perforated Cut Mode

This mode is meant to be used on metal with gaps such as expanded steel, grating, or mesh. While in this mode the arc will not cut out while moving the torch over the areas that are not solid metal.

### GAS TEST ---



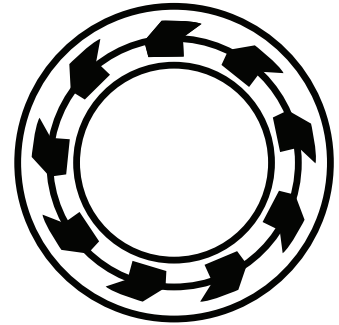
#### 6.4 Air Test Mode

To test your air connection press the Air Test button while not actively cutting. This mode will run for up to 20 seconds, and is indicated on the screen by this shape . You can either wait the 20 seconds or press the button again to turn the test off.

## 7. Advanced Settings Menu

**PRESS AND HOLD THE ADJUSTMENT KNOB FOR 5 SECONDS TO ENTER THE ADVANCED SETTINGS MENU**

While in this menu you can scroll through the available settings with the adjustment knob. Each of the different settings is indicated by a code.



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**F01**    **Standby Timer**    0 / 5 / 10 / 15    (minutes) 0 indicates standby mode is off.

---

**F02**    **Input Over-Voltage Protection**    0 OFF    1 ON

---

**F03**    **Post-Flow Air Timer**    10 - 60    (seconds)

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**F04**    **Torch Length Adjustment**    0 / 5 / 10 / 15 / 20    (meters) 0 indicates automatic mode.



**PRESS THE CUT MODE BUTTON TO SAVE & EXIT**

## 8. Factory Reset

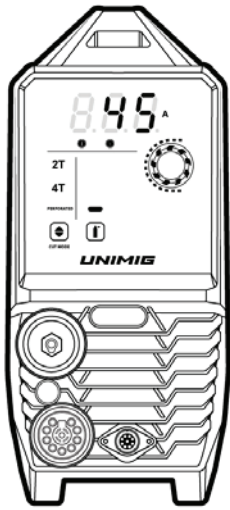


**PRESS & HOLD CUT MODE BUTTON FOR 5 SECONDS**

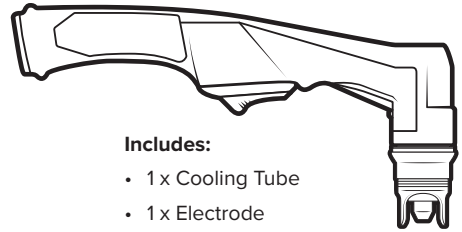
After pressing and holding for 2 seconds, the display window will count down from 3. When the countdown ends, the factory settings are restored. If the button is released before the countdown ends, the factory restore will not take place.

**\*WARNING THIS CANNOT BE UNDONE\***

## 9. Package Contents



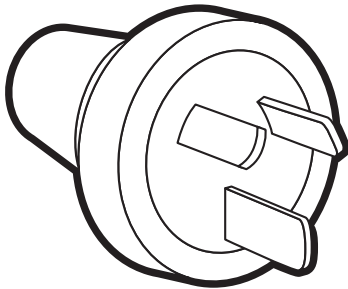
**RAZOR CUT 45 PFC**



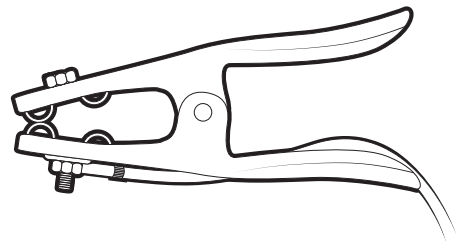
**Includes:**

- 1 x Cooling Tube
- 1 x Electrode
- 1 x O Ring
- 1 x Cutting Tip
- 1 x Retaining Cap
- 1 x Stand Off Guide

**4m SC80 Plasma Torch**



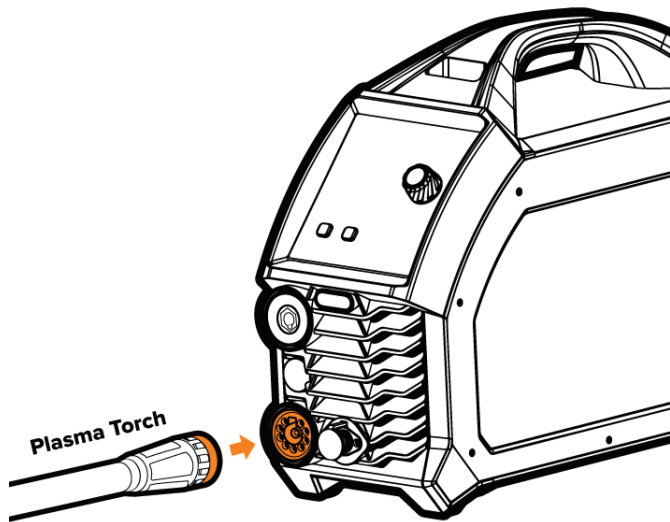
**15A Plug Fitted**



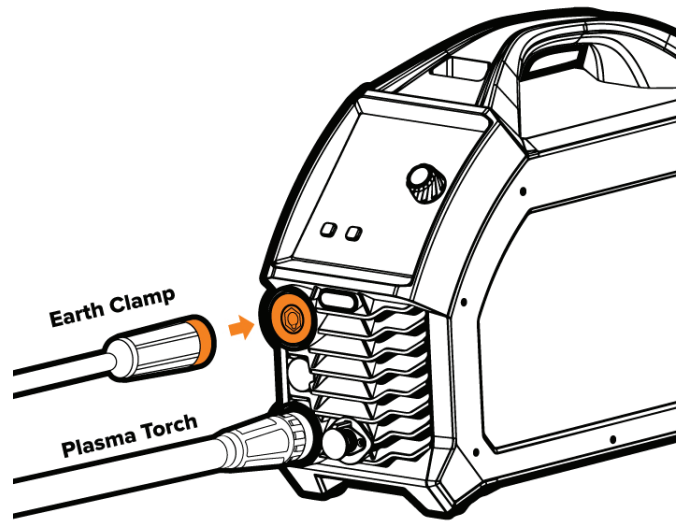
**4m 300 AMP Earth Clamp**

## 10. Machine Setup

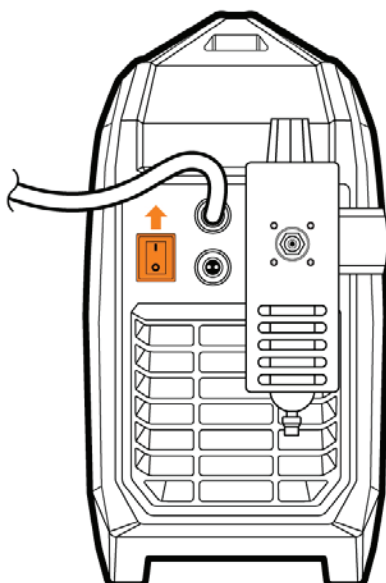
1. Connect the plasma torch to the plasma torch connection. Tighten the nut once connected to ensure a secure connection.



2. Connect the earth clamp to the dinse connection, located above the torch connector. Twist to lock in place.



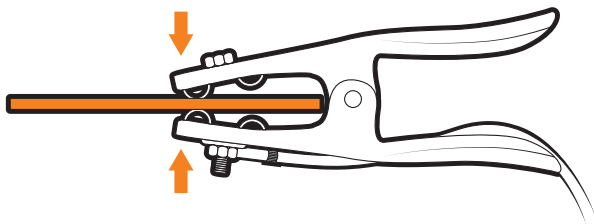
3. Connect the plug into a power point, then switch the machine ON.



4. Press the **CUT MODE** button to choose your desired cutting mode.



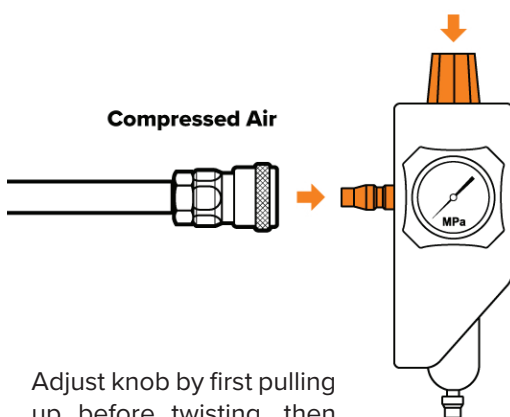
5. Connect the earth clamp to the workpiece.



6. Using the **ADJUSTMENT KNOB**, select your desired amperage.



7. Hook up the air hose from your air compressor to the back of the air regulator. After turning your compressor on and waiting for it to be up to pressure, check to make sure the pressure is correct. Adjust the top pressure knob if needed.

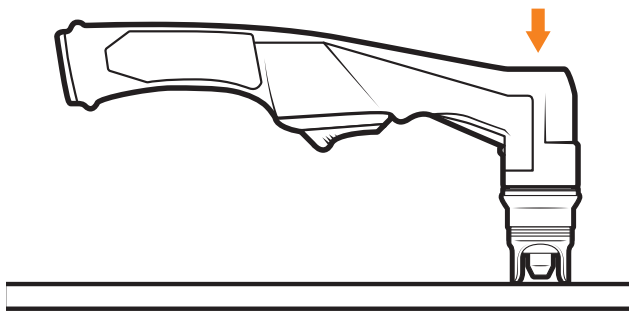


Adjust knob by first pulling up before twisting, then press down to lock the adjustment in place.

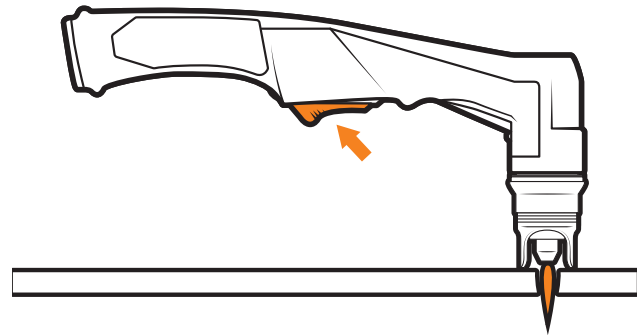
8. Press the **AIR TEST** button to do a quick check to ensure air is getting from the compressor to the end of the torch.



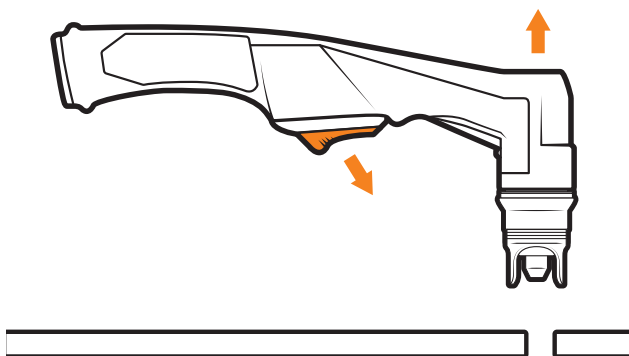
- 9.** Place and hold the torch vertical at the edge of the plate.



- 10.** Pull the trigger to initiate the arc. When the cutting arc has cut through the edge of the plate, start moving evenly in the direction you wish to cut.



- 11.** To finish the cutting, release the torch switch. The air flow will continue according to the set Post-Flow to cool the torch head. Do not disconnect air until this cooling period has been completed. Failure to do this will result in torch head damage.



# 11. Machine Operation Information

## Compressed Air Requirements

A reliable and consistent supply of clean, dry compressed air is essential for proper operation. Although the machine contains its own internal air supply filtration system, it is recommended the compressed air supply should have external filtration in the line feeding the machine, both a standard water trap (sintered bronze filter) and also a coalescing filter (for oil in the air). The air requirement is a minimum of 189 L/min (6.7cfm) Free Air Delivery (FAD) at 75psi pressure. This usually means the compressor must be a belt-drive model or if a direct drive, it must have a motor power of 2.5HP or higher.

The air must be dry and free of oil and moisture (usually a symptom of older, worn-out compressors). The air hose must also be of sufficient size (3/8"/10mm minimum) to supply the machine.

## Operation Environment

- Height above sea level  $\leq 1000$  M.
- Operation temperature range -10 to +40°C.
- Air relative humidity is below 90% (20°C).
- Preferably sit the machine above the floor level, and the maximum angle does not exceed 15°.
- Protect the machine against heavy rain AND against direct sunshine.
- The content of dust, acid, corrosive gas in the surrounding air or substance cannot exceed the normal standard.
- Take care that there is sufficient ventilation during plasma cutting. There must be at least 30cm free distance between the machine and wall.

## Operation Environment

- Read this manual carefully before starting to use this equipment.
- Connect the earth clamp with the machine directly.
- Ensure that the input is single-phase: 50/60Hz, 240V  $\pm 10\%$ .
- Before operation, clear all unnecessary personnel from the work area.
- Do not watch the arc with unprotected eyes.
- Ensure proper ventilation of the machine to improve the duty cycle.
- Turn off the machine when the operation is finished for energy consumption efficiency.
- When the power switch shuts off protectively because of failure, don't restart it until the problem is resolved. Otherwise, the range of the problem will be extended.
- In case of problems, contact your local dealer if no authorised maintenance staff is available.



## Electrode Condition

A fixed gap is established between the electrode and the inside of the cutting tip — electrons arc across the gap, ionising and superheating the air creating the plasma stream. The electrode contains an insert at the end made of a highly conductive material called hafnium. This insert erodes with use, developing a pit at the end of the electrode. When the pit becomes too much, poor-quality cuts will result and necessitate replacement of the electrode.

## Air Pressure and Volume

Air pressure, flow rate and air quality are critical to quality plasma cutting and consumable life span. The required air pressure and volume can vary from model to model, and the manufacturer will provide the specs.

The RAZOR CUT 45 air pressure must be adjusted and set to 0.5MPA (75psi) and requires a flow rate of 189 L/min. The volume capacity of your compressor is important. If you have a small compressor with precisely 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 than 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, dry air 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 the airlines producing water, more so in humid environments. Moisture that forms in airlines tends 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 regular chemical content of the air in the torch. These elements will then dramatically change the plasma arc, which causes the torch consumable parts to wear very quickly and 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 onboard 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 onboard 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 submicronic 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 as close as possible to the air intake of the plasma cutter.

## General 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.



### Plasma Cutter Air Filter

SKU: 50500

*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 submicronic particulate filter that is designed to trap water through absorption.*

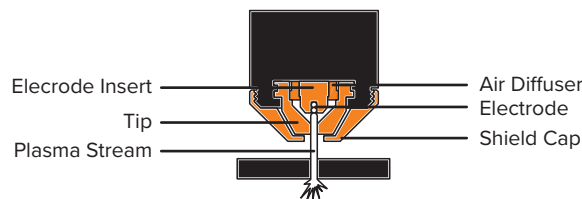
## How a Plasma Cutter Works

Plasma cutters work by passing an electric arc through air that is passing through a constricted opening. The electric arc elevates the temperature of the air 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 (tip) the air passes through causes it to squeeze by at high speed, like air passing through a venturi in a carburettor. This high-speed air cuts through the molten metal. Plasma cutting was invented as a 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.

Basic plasma cutters use electricity to superheat air into plasma, 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 tip.
2. Next, compressed air flows through the torch head, through the air diffuser that spirals the airflow around the electrode and through the hole of the cutting tip.
3. A fixed gap is established between the electrode and the tip. (The power supply increases voltage in order to maintain a constant current through the joint.) Electrons arc across the gap, ionising and superheating the air, creating a plasma stream.
4. Finally, the regulated DC current is switched so that it no longer flows to the tip but instead flows from the electrode to the workpiece. Current and airflow continue until cutting is stopped.



The nozzle and electrode require periodic replacement. The electrode has an insert of a tough, highly conductive material such as hafnium and cerium. This insert erodes with use as does the tip of the orifice. Quality of the air used is paramount to longer life of electrodes and tips, in short, clean, dry air gives more extended parts life, the cleaner and dryer the better. We recommend the 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 .31mm through 70mm can be cut, depending on the power of the plasma cutter used.

### How does plasma cutting compare to oxy-acetylene cutting?

Plasma cutting can be performed on any conductive metal - mild steel, aluminium and stainless are some examples. With mild steel, operators will experience faster, thicker cuts than with alloys.

Oxy-acetylene cuts by burning, or oxidising the metal it is cutting. It is therefore limited to steel and other ferrous metals which support the oxidising process. Metals like aluminium and stainless steel form an oxide that inhibits further oxidation, making conventional oxy-acetylene cutting impossible. Plasma cutting, however, does not rely on oxidation to work and thus it can cut aluminium, stainless and any other conductive material.

Plasma cutting is typically more accessible for the novice to master, and on thinner materials, plasma cutting is much faster than oxy-acetylene cutting. However, for heavy sections of steel (25mm and greater), oxy-acetylene is still preferred since oxy-acetylene is typically faster.

## Amperage

The 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

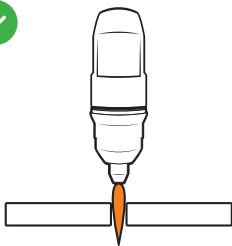
Amperage and speed are critical to producing a good quality cut. The faster you move (especially on aluminium), the cleaner your cut will be. To determine if you're going too fast or too slow, visually follow the arc that is coming from the bottom of the cut. The arc should exit the material at a slight 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 build-up 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

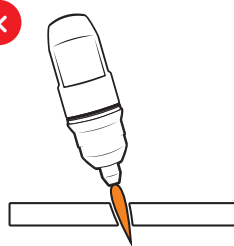
It is easier to pull the torch towards you than push it. The plasma stream swirls as it exits the tip, biting one side and finishing off on the other, leaving a bevelled edge and a straight edge. The bevel cut effect is more noticeable on thicker material and needs to be taken into consideration before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

## Torch Tip Height & Position

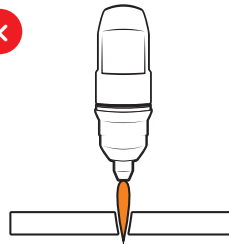
The distance and position of the plasma torch cutting tip affects the quality of the cut and the extent of the bevel of the cut. The easiest way to reduce bevel is by cutting at the proper amperage and height for the material that is being cut.



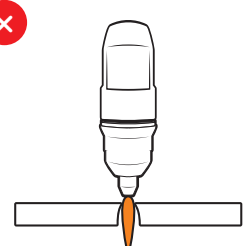
Correct torch height and square to the material.  
Minimum bevel & equal bevel  
Longest consumable life.



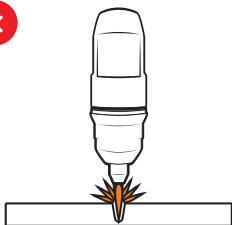
Torch angled to the material.  
Unequal bevel, one side may be excessively bevelled.



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



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



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

## Tip Size and Condition

The tip orifice focus the plasma stream to the workpiece. It is essential to use the correct size tip for the amperage being used. For example, a tip with a 1.0mm orifice is suitable 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 a 60 amp setting will blow out and distort the tip orifice and require replacement. Conversely, using an 80 amp tip on the lower settings will not allow you to focus the plasma stream as well and creates a wide kerf. The condition of the tip orifice is critical to the quality of the cut result. A worn or damaged tip orifice will produce a distorted plasma stream resulting in poor cut quality.

## 12. Troubleshooting

**WARNING: There are extremely dangerous voltage and power levels present inside this unit. Do not attempt to diagnose or repair unit by removing external cover unless you are an authorised repair agent for UNIMIG.**

### Over temp error display lamp on

- Airflow blocked, check for blocked airflow around the unit and correct condition.
- Fan blocked, check and correct condition.
- Unit is overheated, let the unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond duty cycle limit.
- Faulty components in the unit, return for repair or have qualified technician repair per Service Manual.

### Torch fails to ignite the arc when the torch switch is activated

- Faulty torch parts, inspect torch parts and replace if necessary.
- Air pressure too high or too low, adjust to the proper pressure.
- Faulty components in the unit, return for repair or have qualified technician repair per Service Manual.

### No cutting output; torch activated, power source on; air flows from torch; fan operates

- Torch not correctly connected to the machine, check that torch leads are correctly connected to the machine.
- Earth clamp not connected to the workpiece, or connection is weak. Ensure earth clamp has a proper connection to a clean, dry area of the workpiece.
- Faulty components in the unit, return for repair or have qualified technician repair per Service Manual.
- Faulty torch, return for repair or have qualified technician repair per Service Manual.

### Low cutting output

- Incorrect setting of current (A) control, check and adjust to the proper setting.
- Faulty components in the unit, return for repair or have qualified technician repair per Service Manual.
- Air not connected or pressure too low, check air connections. Adjust air pressure to the correct setting.

### Difficult starting

- Worn torch parts, shut off input power. Remove and inspect torch shield cup, tip and electrode. Replace electrode or tip if worn; replace shield cup if excessive spatter adheres to it.

### Arc shuts off during operation; arc will not restart when the torch switch is activated

- Power supply is overheated, let the unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond duty cycle limit. Refer to Section 3.1 for duty cycle specifications.
- Air pressure too low, check the source for at least 5-6bar/75psi, adjust as needed.
- Torch consumables worn, check torch shield cup, tip, and electrode, replace as needed.
- Faulty components in the unit, return for repair or have qualified technician repair per Service Manual.

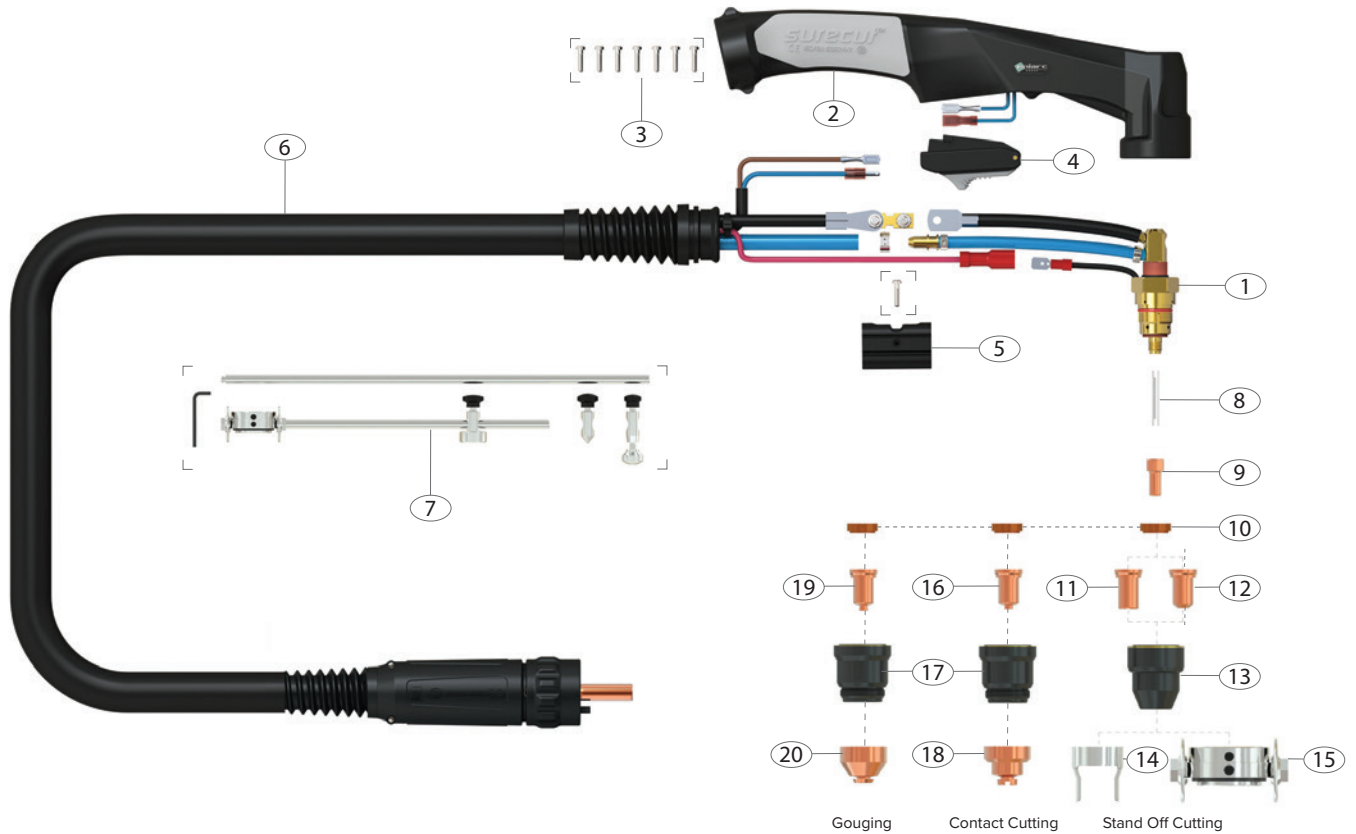
### No air flow at torch; the power lamp on; fan operates

- Air not connected or pressure too low, check air connections. Adjust air pressure to the proper setting.

### Torch cuts but low quality

- Current (A) control set too low, increase the current setting.
- The torch is being moved too fast across the workpiece, reduce cutting speed.
- Excessive oil or moisture in torch, hold torch 3mm (1/8 inch) from a clean surface while purging and observe oil or moisture build-up (do not activate torch). If there are contaminants in the compressed air, additional filtering may be needed.
- Air not connected or pressure too low, check air connections. Adjust air pressure to the proper setting.

## 13. SC80 Torch Breakdown



### TORCH SPECIFICATIONS

SC80 6m Torch	Part Number: WG-SC80-60-CC1
Length	6 Meters
Amp Rating	80A
Gas Type	AIR/N2v
Duty Cycle	60% @ 80A

### TORCH SPARE PARTS

	Part Number	Description
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

### FRONT END CONSUMABLES

	Part Number	Description
8	SC8002	Cooling Tube
9	SC8004	Electrode
10	SC8006	Swirl Ring
11	SC8020-09	Cutting Tip 0.9mm
12	SC8020-10	Cutting Tip 1.0mm
13	SC8030	Retaining Cup
14	SC8040	Stand Off Guide
15	SC8051	Cutting Buggy
16	SC8026-10	Cutting Tip Contact 1.0mm
16	SC8026-11	Cutting Tip Contact 1.1mm
16	SC8026-12	Cutting Tip Contact 1.2mm
16	SC8026-13	Cutting Tip Contact 1.3mm
17	SC8031	Shield Cap Body
18	SC8041	Shield Cap
19	SC8028-16	Gouging Tip 1.6mm
20	SC8043	Shield Cap Gouging

## 14. Indicator Lights



### THERMAL OVERLOAD

Typically caused by duty cycle limits. **DO NOT POWER OFF MACHINE.** Wait for the machine to cool down and for indicator to turn off before cutting again.



### OVERCURRENT LIMIT

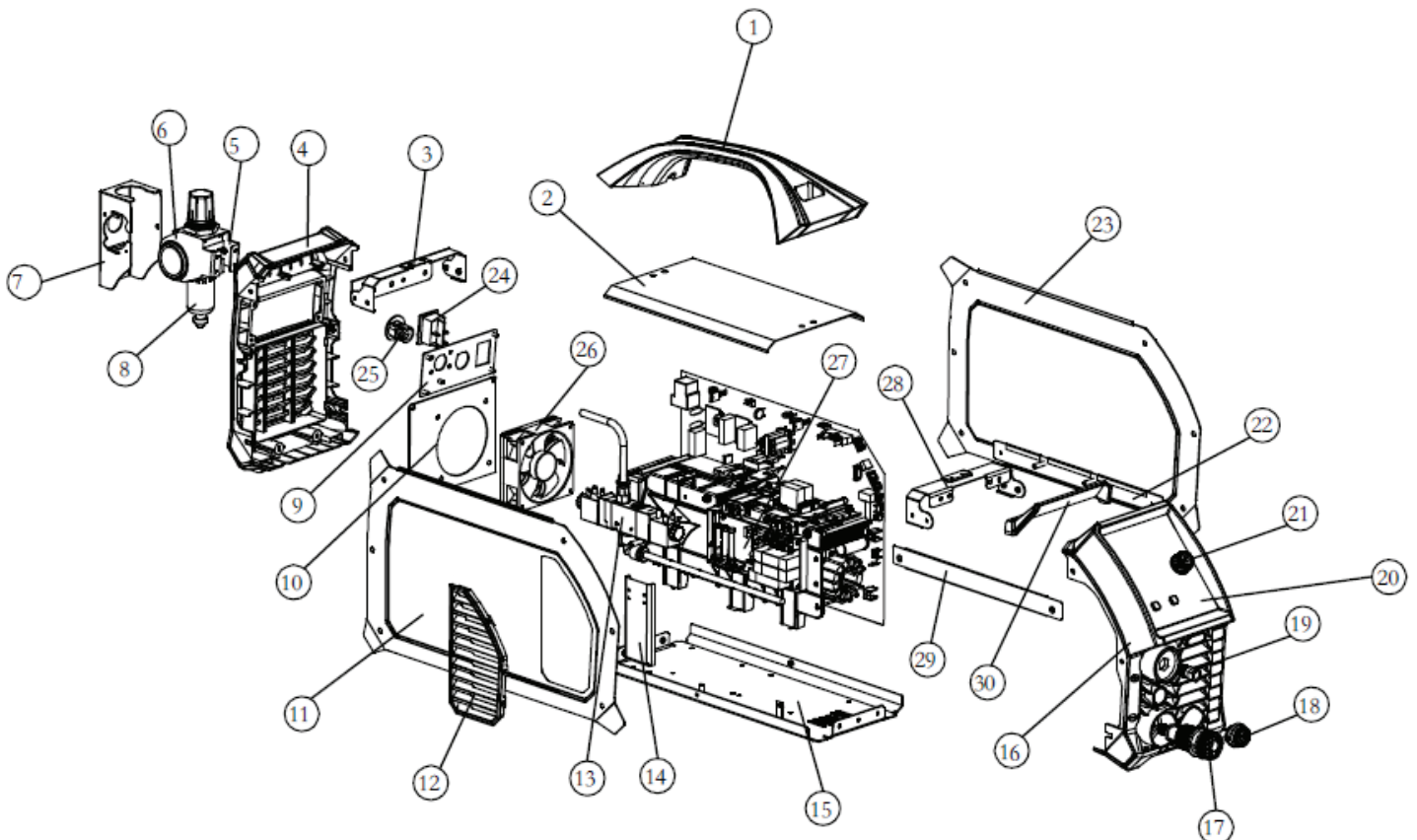
Typically caused by internal fault of machine. Restart machine and attempt to weld again. If problem persists contact UNIMIG Service Support.

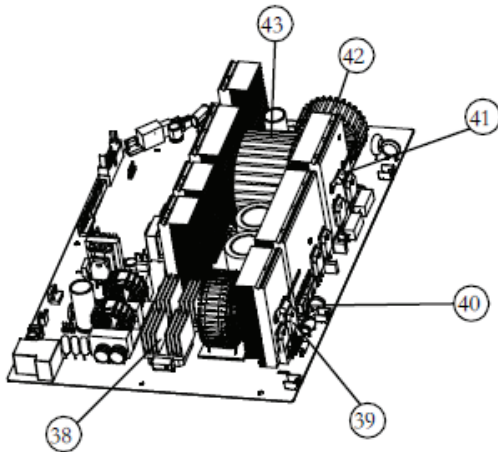
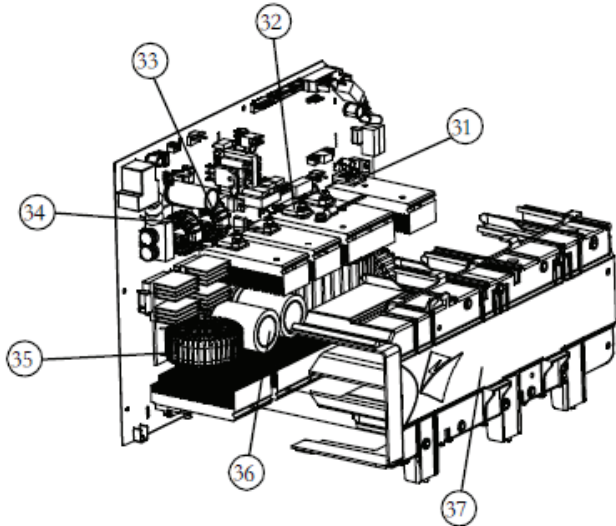
## 15. Error Codes

Error Code	Issue	Details
E10	Overcurrent Protection	The machine is outputting more current than it is rated for. This is likely due to internal fault. <i>Possible Solution: Power down and restart machine.</i>
E32	Over Voltage Protection	Voltage source for machine is too high. <i>Possible Solution: Remove any extension cables and check power socket and machine power wire. Attempt weld on a different power circuit.</i>
E60	IGBT Overheat	Internal temperature is too high, likely caused by duty cycle limit. <i>DO NOT TURN OFF MACHINE! Wait for machine to cool down and for indicator warning to turn off.</i>
E61	Rectifier Overheat	Internal temperature is too high, likely caused by duty cycle limit. <i>DO NOT TURN OFF MACHINE! Wait for machine to cool down and for indicator warning to turn off.</i>

**After attempting the possible solutions listed in the chart above please contact UNIMIG Support Services if you are still experiencing issues with your machine.**

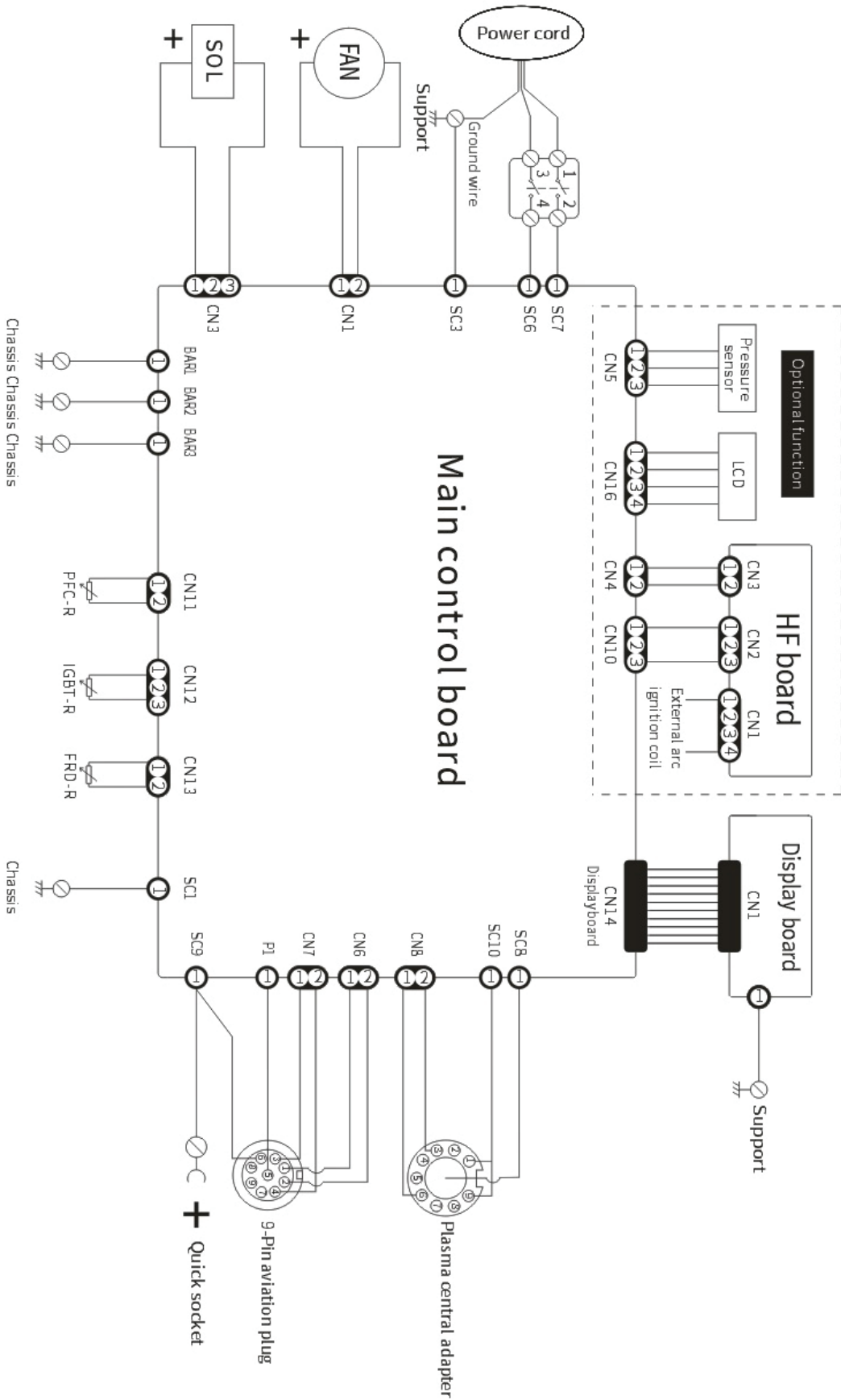
## 16. Parts Breakdown





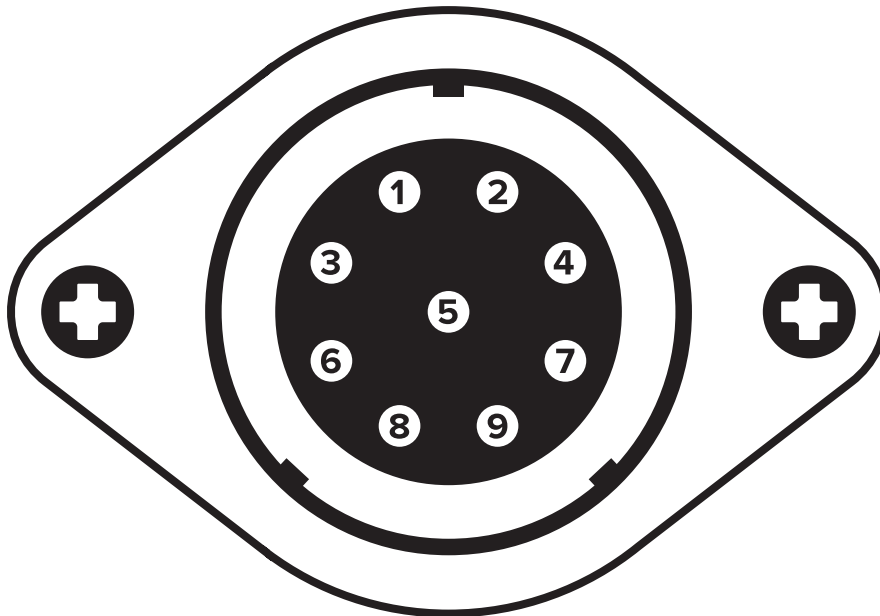
Number	Code	Name
1	10084166	Handle
2	10084064	Top cover
3	10084057	Rear bracket
4	10084109	Rear panel
5	10084071	Air regulator bracket
6	10084110	Gas meter protection cover
7	10084069	Air regulator protection cover
8	10080422	Air regulator
9	10084052	Rear fixed plate
10	10084055	Fan bracket
11	10084068	Left side cover
12	10084105	Louver
13	51000510	Air valve
14	10084063	Air valve support
15	10084056	Chassis
16	10084103	Front panel
17	51000513	Plasma central adapter
18	10041400	9-Pin aviation plug
19	10004635	Quick socket
20	51000779	Display board iron plate
21	10083484	Encoder knob
22	10084067	Right bracket
23	10084070	Right side cover
24	51000471	Rocker switch
25	10083802	Ring
26	51000336	Fan
27	51000501	HF board
28	10084066	Front bracket
29	10084062	Left bracket
30	-	Front panel cover
31	51000601	Pilot arc IGBT
32	51000072	FRD
33	10006545	EMC inductor
34	51000602	Inverter IGBT
35	51000455	PFC inductor
36	10078333	Electrolytic capacitor
37	10084111	Wind shield
38	10037345+51000332	Bridge rectifier + heat sink
39	51000601	PFC IGBT
40	10064645	PFC diode
41	51000705	Thermistor
42	10077123	Arc ignition coil
43	10084177	Main transformer

## 17. Wiring Diagrams





## 18. CNC Port Pin Diagram



FRONT PANEL VIEW

**PIN 1-2** ————— **Arc Success Signal**

**PIN 3-4** ————— **Trigger ON/OFF Signal**

**PIN 5 (-) 6 (+)** ————— **Torch Height adjustment  
Arc Feedback**

Default Ratio 1:1

Available Ratio - 20:1, 30:1, and 50:1  
For information on how to change ratio please  
contact UNIMIG support.

For questions please contact UNIMIG Service Support.

## 19. Recommended Accessories



### Optional Air Compressor Module

The new air compressor module is designed to perfectly fit the RAZOR CUT 45. This sleek and compact unit eliminates the need for a bulky external air compressor, perfect for workshops where space is a premium or as a CNC companion. Despite its small size, you won't compromise on performance, maintaining a clean cut of 16mm and a severance cut of 25mm.

SKU: U14007



### SCM80R CNC Plasma Torch

Finalise your CNC setup with a dedicated CNC Plasma Torch. This torch is designed to maximise your CNC table's cutting potential while using the same long lasting consumables as the standard SC80 Plasma Torch. The SCM80R is available in 3 lengths:

**4m** (WG-SCM80R-40)

**6m** (WG-SCM80R-60)

**10m** (WG-SCM80R-100-CC3-BX)



## SC80 Plasma Torch Starter Kit

Packaged in a sturdy carry case, the SC80 Plasma Torch Consumable Starter kit is the perfect companion to be bundled alongside machines, with the kit containing all the essential consumables.

- 1 x Swirl Ring (SC8006)
- 1 x Retaining Cap (SC8030)
- 5 x Electrodes (PSC8004)
- 5 x 0.9mm Cutting Tips (PSC8020-09)
- 5 x 1.0mm Cutting Tips (PSC8020-10)
- 1 x Stand Off Guide (SC8040)
- 1 x Cutting Buggy (SC8051)

SKU: UMSK45



## SC80 Plasma Torch Circle Cutting Kit

The UNIMIG SC80 Plasma Torch Circle Cutting Attachment guide allows you to cut circles up to 75cm in diameter accurately and with ease. The complete kit is designed for quick and easy setup.

SKU: SC8050



## Air Filter

The UNIMIG Plasma Cutter Air Filter eliminates contaminants such as sputter caused by moisture and oil from compressed air lines. With new and improved technology, the plasma air filter is able to entrap particles as small as .01 microns. This is crucial as moisture can cause a short circuit within your torch.

SKU: 50500

# UNIMIG

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