ARCSONIC
Technology For Better Cutting

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OPERATION MANUAL

ARCSONIC TECHNOLOGY

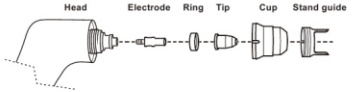
PlasmaPro 45X 55X

IGBT DIGITAL INVERTER PLASMA CUTTER - NHP

Rev.04

ACCESSORIES

MODEL HC55NPS Torch Parts



Tip		
Part #	Description	QTY
AHCPD-055-01	Tip	5/Pack

Electrodes		
Part #	Description	QTY
AHCPD-055-02	Electrodes	5/Pack

Shield Cup		
Part #	Description	QTY
AHCPD-055-03	Shield Cup	1

Swirl Ring		
Part #	Description	QTY
AHCPD-055-04	Swirl Ring	1

Stand off		
Part #	Description	QTY
AHCPD-055-05	Stand off	1

These quality parts are manufactured in China and are offered as replacement parts suitable for the TRAFIMET S60 Plasma torch.Our Plasma cutting nozzles and Plasma cutting electrodes are sold in packs of 5, Stand off springs in packs of 2, all other products are sold as individual items. All plasma cutting items are available in attractive clam shell packaging if required.

CONTENTS

EC DECLARATION OF CONFORMITY

We hereby declare that our machines for industrial and professional use as stated below.
Type: CUT55 Dual voltage.
Conforms with EMC Directives:
73/23/EEC and 89/336/EEC
European Standard: EN/IEC60974

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

The contents of this manual may be revised without prior notice and without obligation.

This instruction manual is issued on 1st Dec 2017. Rev 01

SAFETY

WARNING

Welding and cutting is dangerous to the operator, people in or near the working and surrounding areas, if the equipment is not operated correctly. Therefore the performance of welding/cutting must only be under the strict and comprehensive observance of all relevant safety regulations.

Symbol	Description
	**Electric Shock: Maybe fetal** Avoid all contact with live components of the welding circuit, Electrodes and Wires with bare bands. Wear dry gloves before start welding task. Wires with bare bands Keep operator insurance from welding metal and welding pieces.
	**Smoke and gas generated while welding or cutting Harmful to health of people** Keep head distance away from gas. Avoid breathing the smoke and gas of welding or cutting. Keep the working area in good ventilation.
	**Fire Hazard** Welding sparks, Power cable leakage both can cause the fire. Please do not welding in inflammable, it's can cause explode. Sparks may cause fire, Remove flammable material from the work place. Keep fire extinguisher nearby and have a trained fire person ready to use it.
	**ARC light-emission: Harmful to the eyes & skin of people** Wear a welding helmet, Anti-radiation glass and work clothes while the welding Operation is performed. Keep working area in ventilation.
	**CYLINDER may explode if damaged.** Always keep cylinders in an upright position securely chained to an Undercarriage or fixed support. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder. Keep your face and head away from the cylinder valve outlet when it to be opening.
	**Engine fan can hurt the hands** Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle Control rods while the engine is running.
	**ELECTRIC SHOCK can kill.** Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical. Ground the work or metal to be welded to a good electrical ground. Never dip the electrode in water for cooling. Turn off input power using the disconnect switch at the fuse box before working on the equipment. Install equipment in accordance with electric standard code.

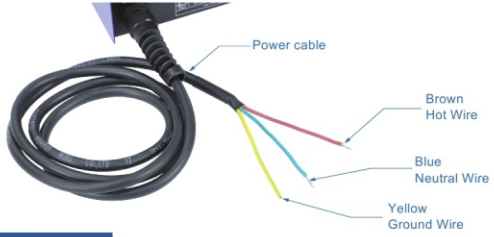
OPERATION

Safety Trigger Operation

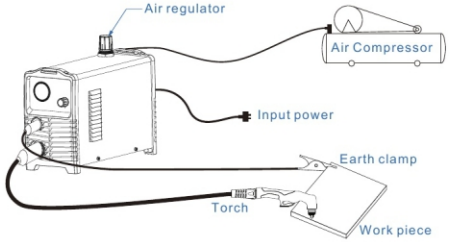
The PT60 torch supplied with the 45X 55X machine has a new design of safety trigger.Just pull back on the trigger whilst increasing your grip and you will feel the trigger move to the on position.When you release the pressure it will return to the off position.

OFF ON OFF

Power cable connection



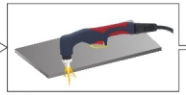
Connection



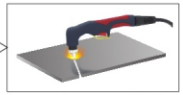
OPERATION

Starting a cut

Hold the torch vertical at the edge Of he work piece



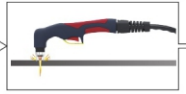
Pull the trigger to start the pilot arc ,The cutting arc will initiate when the Torch tip is close enough to the work Piece. Start cutting on the edge until the Arc has cut completely through.



Then, Proceed with the cut.

Hand torch cutting technique

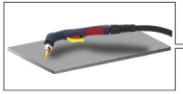
When cutting make sure that sparks are exiting from the bottom of the work piece.



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

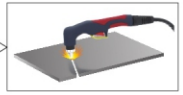
Hold the torch vertical and watch thearc as it cuts along the line.

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

CAUTION

1. Working Environment.

1.1 The environment in which this welding 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 -14°F to +104°F.

1.3 Keep this equipment 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 betweenthis equipment and any other objects in or near the working area should be 1ft. 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.

SAFETY

Maintenance

Exposure to extremely dusty, damp, or corrosive air is damaging to the welding machine. 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 guarantee; the guarantee of this welding 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.

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 'Low Voltage 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.

Aip 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 afford ability for producing a variety of flat metal shapes. They can cut much finer, and faster than oxy-acetylene torches.

OPERATION

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 19832°f) 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.

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.

OPERATION

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 piece 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 3/64" orifice is good for 0-40 amps whereas a 1/16" 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 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 condi tion 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.

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.

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 RazorCut45 air pressure is pre-set at 4.5 psi and requires a flow rate of 6.0 CF/M. 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.

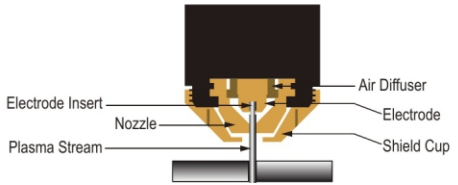
SAFETY

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.

SAFETY

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 13/16" 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 (1" 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 (>63/64 inch) of steel more quickly than plasma.

Accessories come with machine

OPERATION

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 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 postion 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.

OPERATION

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 arc importand 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 20 seconds to cool the torch head.

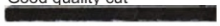
Cut Quality

A clean cut depend on several factors:

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

Poor quality cut

Good quality cut



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

PARAMETER

230v 45 Amps - 1'' Cut on Steel
120v 35 Amps - 5/8'' Cut on Steel
Inverter with Industrial Rated, Lightweight and Portable.

Features

- Latest IGBT Inverter Technology
- Safe Euro torch connection
- High quality PT60 Non HF Plasma torch
- Industrial application
- Tolerant to variable power supply
- Built-in Air Regulator with preset air pressure
- Suitable to cut all electrically conductive materials
- Light weight and compact
- Strong metal housing

Technical data

Power Supply / Phases (V-Ph)	240V +/- 15%	120V +/- 15%
Duty Cycle @ 78°F(25.5°C)	60% @ 45Amps	60% @ 35Amps
Rated Power (KVA)	5.5	4.25
Output Current Range (A)	20-45	20-35
Rated Output Voltage (V)	98	96
Efficiency (%)	85	
Insulation Class	H	
Protection Class	IP21S	
Plasma Arc Starting	Pilot Arc (Non HF)	
Air Flow Pressure (MPA)	0.5 (75 psi)	0.38 (50 psi)
Air Flow Rate (CFM)	6.70	
Cutting speed (mm)	120mm/min	
Cutting Thickness Clean (inch)	4/5'' (20mm)	2/5'' (10mm)
Cutting Thickness Severance (inch)	1'' (25mm)	5/9'' (14mm)
Dimensions (inch)	17.5" x 7.1" x 12"	
Weight (Pounds)	20 Lbs (9 kgs)	

Product code: AHC55NHPLT

- The Standard Package include: 40X 55X Machine
- IPT60 Plasma Cutting Torch • Earth Clamp with cable

LAYOUT

Front & rear panel layout

Front Panel Layout

Rear Panel Layout

1		TorchTorch protection indicator, It illuminates when the consumable parts of the machine are not well installed or the torch head is shorted. Meanwhile the Machine stops working.
2		Work indicator, It illuminates when the machine is working while user using machine.
3		Overheating indicator, It illuminates when the working temperature of the IGBT is overly high. Meanwhile, The machine stop working.
4		Air-check indicator, it illuminates when the machine is under air check status. At this moment, the machine can not cut.
		Normal cutting mode, the machine can cut when this indicator illuminates.

OPERATION

Operating procedure using the Standoff Guide mounted to PT60 torch.

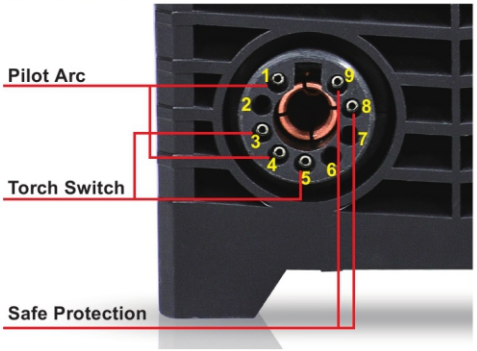
1

2

3

1. The feet of the standoff guide are placed on the cutting surface. This maintains an optimal 5/64" 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.
2. Wear your safety gear. Generally you ,Want the same type of protective gear when Welding and cutting, 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 eyes protection a #5 shade is the minimum eyes protection with other shade required depending on amperage a face shield is also recommended.
3. connect the earth clamp securely to the work piece or the work bench.

CONNECTION



OPERATION

1. connect the IPT60 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 insde 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.

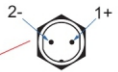
6. Set the amperage dial.

LAYOUT

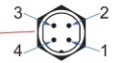
5		2T indicator torch switch when the machine is under 2T status.
		4T indicator torch switch when the machine is under 4T status.
6	LED Current Display.	
7	Amperage Control Knob.	
8	Air Pressure Gauge.	
9	Output connector (DC+) connect to the work piece.	
10	Plasma torch connection (DC-). Photo in page 13.	
11	Air Regulator.	
12	ON/OFF Power Switch.	
13	Air supply connector.	
14	Power input cable.	

CNC connecting

CNC port is an optional function, It is not come with standard machine.



ARC VOLTAGE OUTPUT:
Pin 1+, Pin 2-, Ratio 1:1

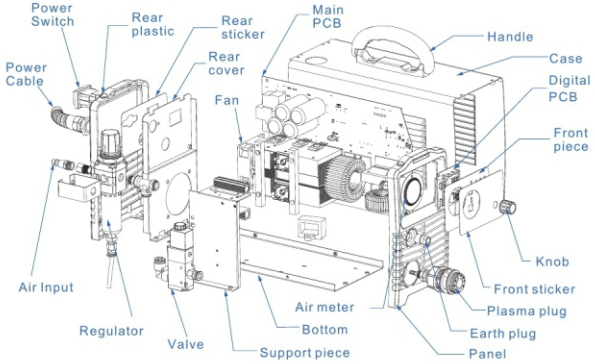


SIGNAL CONTROL:
1 / 2 Start control signal input.
3 / 4 Arc starting signal output.

LAYOUT

Signal	Type	Notes	Connector Sockets
Start(start plasma) Switch signal control	Input	Normally open. 18VDC open circuit voltage at START terminals, Requires dry contact closure to active.	1,2
Transfer (start machine motion) Signal of arc starting Successful	Output	Normally open, Dry contact closure when the arc transfers. There is an reed switch inside of machine monitoring current signal to decide if the arc starting successful.	3,4
Arc voltage signal	Output	Divide arc signal of 1:1 Pin 1+, Pin 2-, Ratio 1:1	1(+), 2(-)

Explosive view of machine



OPERATION

Set up procedure for plasma cutting machine

1 Connect the PT60 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 PT60 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.

How to begin use this machine

Before use this machine, you need to read the blow information carefully, Put the accessories ready before operate this unit.

1. Connect the earth lead to the output terminal Of the machine and tighte

2. Connect the IPT60 Plasma cutting torch to the machine nsert the torch connection into the torch connection Receptacle at the front of the machine and Screw up hand tight.