



Please dispose of packaging for the product in a responsible manner. It is suitable for recycling. Help to protect the environment, take the packaging to the local amenity tip and place into the appropriate recycling bin.



Never dispose of electrical equipment or batteries in with your domestic waste. If your supplier offers a disposal facility please use it or alternatively use a recognised re-cycling agent. This will allow the recycling of raw materials and help protect the environment.



Multi P185

TIG/ARC/Plasma Inverter



05279

FOR HELP OR ADVISE ON THIS PRODUCT PLEASE CONTACT YOUR DISTRIBUTOR,
OR SIP DIRECTLY ON:
TEL: 01509500400
EMAIL: sales@sip-group.com or technical@sip-group.com
www.sip-group.com

Please read and fully understand the instructions in this manual before operation. Keep this manual

Guarantee:

This plasma cutter is covered by a 24 month parts and labour warranty covering failure due to manufacturers defects. This does not cover consumable items or failure due to misuse or operating the machine outside the scope of this manual.

In the unlikely event of warranty claims, contact your distributor as soon as possible. Proof of purchase will be required before any warranty can be honoured.



Note: Proof of purchase will be required before any warranty can be honoured.

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SAFETY

INTRODUCTION:

WE LEARN BY EXPERIENCE Learning safety through personal experience, like a child touching a hot stove is harmful, wasteful, and unwise. Let the experience of others teach you.

SAFE PRACTICES DEVELOPED FROM EXPERIENCE

In the use of welding and cutting are described in this manual. Research, development, and field experience have evolved reliable equipment and safe installation, operation, and servicing practices. Accidents occur when equipment is improperly used or maintained. The reason for these safe practices may not always be given. Some are based on common sense, others may require technical volumes to explain, it is wiser to follow the rules.

READ AND UNDERSTAND THESE SAFE PRACTICES

Before attempting to install, operate or service the equipment. Comply with these procedures as applicable to the particular equipment used and their instruction manuals, for personal safety and for the safety of others.

FAILURE TO OBSERVE THESE SAFE PRACTICES

May cause serious injury or death. When safety becomes a habit, the equipment can be used with confidence.

GENERAL:

The plasma cutting machine is simple and safe to operate under normal circumstances. If the unit is to be used under unusual circumstances, e.g. in wet or damp conditions, on boats or oil rigs, or in an elevated position. Then extra thought must be given to any possible hazard introduced by the situation.

ELECTRICAL:

- A. DO NOT operate the machine with any of the panels removed.
- B. DO NOT attempt any repairs unless you are a competent electrician.
- C. Ensure that the machine is connected to the correct supply voltage through the recommended fuse.

NB: This unit must be earthed.

- D. DO NOT dismantle the protection nozzle from the torch without first switching off the machine.

ELECTRIC SHOCK

Either AC or DC voltages associated with the cutting environment can cause severe burns to the body or fatal shock. Severity of electrical shock is determined by the path and amount of current through the body.

OPERATING INSTRUCTIONS PLASMA

Under no circumstances must the plasma nozzle be removed or any other work be carried out on the torch with the machine switched on. Ignoring this precaution could lead to serious burns or contact with high DC voltages.

If the machine has just been used for cutting, allow the cooling air to stop before switching the machine off for torch servicing.

The torch should be kept free of slag at all times to ensure the free passage of air.

To assemble / dismantle the torch:

1. Invert the torch so the tip points upwards.
2. Unscrew and remove the ceramic shield, this item is brittle do not drop.
3. Unscrew and remove the cutting tip.
4. Unscrew and remove the electrode.
5. Screw electrode onto torch.
6. Screw the cutting tip onto the torch, ensure it is a 1.1 mm tip large sizes are available but the P185 will not operate correctly with a larger tip.
7. Check the metal ring is clean on the ceramic shield, clean or replace the shield.
8. Screw ceramic shield onto the torch.

The Tip and electrode need replacing when worn.

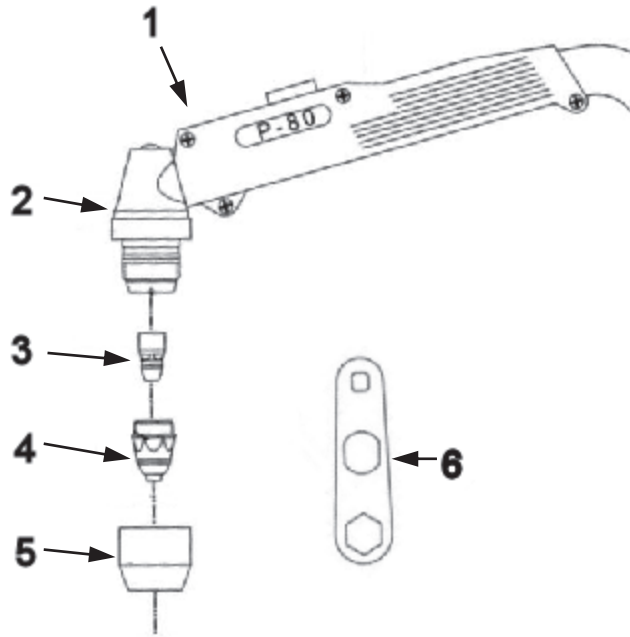
Indication of wear are a loss of cutting capacity or that the cut is no longer 90 degrees.

When inspecting the Tip look for erosion of the hole in the centre of the tip or a build up of metal residue.

When inspecting the electrode look for erosion in centre of the electrode

MAINTENANCE

1. Clear dust from machine at regular intervals use clean dry compressed air, if use in a dirty environment the machine should be cleaned once a month, **failure to clear the dust may lead to machine failure and will invalidate the warranty.**
2. Check all connections are clean and tight, if there is any oxidation clean the connection with a mild abrasive or wire brush.
3. If the machine is not to be used for a long time, store it in the original packing a dry place.



REF	DESCRIPTION	SIP CODE
1	TORCH COMPLETE	05130
2	TORCH HEAD	05144
3	ELECTRODE	05000
4	1.1mm CUTTING TIP	05001
5	CERAMIC SHIELD	05007
6	SPANNER	64366

TO PROTECT AGAINST SHOCK

1. Keep body and clothing dry. Never work in a damp area without adequate insulation against electrical shock. Stay on a dry duck board, or rubber mat when dampness or sweat can not be avoided. Sweat, sea water, or moisture between body and an electrically HOT part, or grounded metal reduces the body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.
2. Never allow live metal parts to touch bare skin or any wet clothing, be sure gloves are dry.
3. Before welding, check for continuity. Be sure the ground cable is connected to the work piece as close to the welding areas as possible. Grounds connected to building frame work or other remote locations from the welding area reduce efficiency and increase the potential electric shock hazard. Avoid the possibility of the welding current passing through lifting chains, crane cables or various electric paths.
4. Frequently inspect cables for wear, cracks, and damage. IMMEDIATELY REPLACE those with worn or damaged insulation to avoid a possibly lethal shock from bare cables.

FIRE:

All inflammable materials must be removed from the area.

DO NOT cut containers which have held inflammable materials or gases.

Have a suitable fire extinguisher available close by.

GLARE AND BURNS:

The electric **welding** arc must not be observed with the naked eye. Always use a welding mask or hand shield, ensure the mask/shield is fitted with correct shade of filter for the welding current level.

The electric **plasma** arc must not be observed with the naked eye. Always wear goggles of the type used for oxyacetylene welding.

Gloves should be worn to protect the hands from burns. Non-synthetic overalls with buttons at neck and wrist, or similar clothing, should be worn. Greasy overalls should not be worn. Wear suitable protective footwear.

COMPRESSED AIR:

Compressed air is potentially dangerous.

Refer to the relevant safety standards for safety guidelines.

VENTILATION:

Ventilation must be adequate to remove the smoke and fumes during cutting. See the relevant safety standard for acceptable levels.

FUMES:

Toxic gases may be given off when cutting, especially if zinc or cadmium coated materials are involved. Cutting should be carried out in a well ventilated area, and the operator should always be alert to fume build-up.

In small or confined places use a fume extractor.

VAPOURS:

Vapours of chlorinated solvents can form the toxic gas phosgene when exposed to U.V radiation from an electric arc. **All** solvents, degreasers and potential sources of these vapours must be removed from the arc area.

NB: IF IN DOUBT SEEK PROFESSIONAL ADVICE.

GENERAL PRECAUTIONS:

BURN PREVENTION

1. Wear Protective Clothing leather gauntlet gloves, hat, and high safety toe shoes. Button shirt collar and pocket flaps, and wear cuff less trousers to avoid entry of sparks and slag.
2. Wear Helmet with Safety Goggles or glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a MUST for welding or cutting (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken. pitted, or spattered.
3. Avoid oily or greasy clothing. A spark may ignite them.
4. Hot metal such as electrode stubs and work pieces should never be handled without gloves.
5. Medical first aid and eye treatment. First aid facilities and a qualified first aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns to the eyes and skin.

Flammable hair preparations should not be used by persons intending to weld or cut.

Plasma mode

You will need the following extra item

- a. An air compressor
- b. Air hose and fittings.

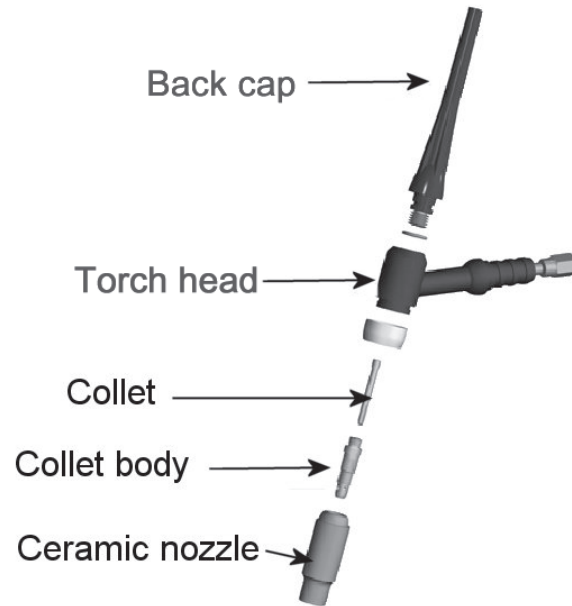
1. Screw the plasma torch central connection onto the torch socket on the front of the P185.
2. Fit the earth return lead into the +ve socket.
3. Connect the P185 regulator to the compressor additional gas fittings/hose may be needed.
4. Select the mode switch on front of the welder to plasma.
5. Assemble the Plasma torch using the correct size electrode.
6. Ensure the electrode lead is not attached to the P185.
7. Connect the machine to the electrical supply and switch on.
8. Adjust the current control until the correct current is shown on the current display.
9. Set the post gas to 2S.
10. If starting at the edge of a panel or in a hole, hold the torch vertical with the centre of the cutting tip off the work, press the trigger and allow the arc to start, once the arc starts move the torch in the direction of the cut ensure that the cutting stays in contact with the work and vertical.
11. If piercing, the torch head should be angled back so as to allow the molten material to escape to one side. The normal angle of cut can be resumed once the metal has been pierced, piercing will reduce the life of the torch consumables.
12. Perform a test cut and re-adjust the current control if needed.
13. If performance degrades check the cutting tip and electrode .

Thickness	Mild Steel	Aluminium	Stainless steel
4mm	20A	20A	20A
6mm	25A	30A	30A
8mm	30A	40A	40A
10mm	40A	-	-

OPERATING INSTRUCTIONS TIG

TIG torch assembly

1. Select the tungsten electrode to match current level to be welded at.
2. Grind the end of the electrode to a point of 15-20 degrees use a fine grinding wheel and grind along the axis of the electrode.
3. Select a collet body and collet that match the electrode size.
4. Select a ceramic nozzle for low power use a low number and high current a higher number.
5. Select a back cap based on access to the weld area to fit shorter caps the electrode may need to be shortened.
6. Screw the collet body into the torch head.
7. Screw the ceramic nozzle on the collet body.
8. Insert the collet through the torch head into the collet body.
9. Push the electrode through into the collet until the point of the electrode is 10mm past the end of the ceramic nozzle.
10. Screw the back cap onto the torch head but do not tighten.
11. Adjust the pointed end of the electrode so the distance from the point of the electrode to the end of the ceramic nozzle is approximately 3 times the diameter of the electrode.
12. Tighten the back cap.



SAFETY....cont

FIRE AND EXPLOSION PREVENTION

1. Causes of fire, and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag or heated material, misuse of compressed gases and cylinders, and short circuits. BE AWARE THAT: flying sparks or falling slag can pass through cracks along pipes, through windows or doors, and through wall or floor openings and out of sight of the operator. Sparks and slag can fly up-to 35 feet.
2. Keep equipment clean and operable, free of oil, grease and (in electrical parts) of metallic particles that can cause short circuits.
3. If combustibles are in the area. DO NOT weld or cut, move the work if practical to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work can not be moved, move combustibles at least 35 feet away out of reach of sparks and heat, or protect against ignition with suitable and snug fitting, fire-resistant covers or shields.
4. Walls touching combustibles on opposite sides should not be welded on (or cut). Walls, ceilings and floor near the work area should be protected by heat resistant covers or shields.
5. A fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:
 - a. Appreciable combustibles (Including building construction) are within 35 feet.
 - b. Appreciable combustibles are further than 35 feet but can be ignited by sparks.
 - c. Openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks.
 - d. Combustibles adjacent to walls, ceilings, roofs or metal partitions can be ignited by radiant or conducted heat.
6. After work is done, check that area is free of sparks, glowing embers, and flames.
7. An empty container that held combustibles, or that can produce flammable or toxic vapours when heated, must never be welded on or cut, unless container has first been cleaned as described in AWS Standard A6.0 listed 3 in Standards Index. This includes a thorough steam or caustic cleaning (or a solvent or water washing, depending on the combustible's solubility) followed by purging and inserting with nitrogen or carbon dioxide, and using protective equipment as recommended in A6.0 Water filling just below working level may substitute for inerting.
8. A container with unknown contents should be cleaned (see paragraph above), DO NOT depend on sense of smell or sight to determine if it is safe to weld or cut.
9. Hollow items must be vented before welding or cutting they can explode.
10. Explosive atmosphere, never weld or cut where the air may contain flammable dust, gas or liquid vapours (such as gasoline).

HOSE

1. Use ferrules or clamps designed for the hose (not ordinary wire or other substitute) as binding to connect hoses to fittings.
2. No copper tubing splices, use only standard brass fittings to splice hose.
3. Avoid long runs to prevent kinks and abuse, suspend the hose off the ground to keep it from being ran over, stepped on, or otherwise damaged.
4. Coil excess hose to prevent kinks and tangles.
5. Protect hose from damage by sharp edges, sparks, slag and open flames.
6. Examine hose regularly for leaks, wear and loose connections. Immerse pressured hose in water bubbles indicate leaks.
7. Repair leaking or work hose by cutting area out and splicing. DO NOT use tape.
8. Never leave equipment unattended. When not cutting, turn off the equipment. DO NOT coil or loop the cutting torch or earth cable around parts of the body, turn the unit off when left unattended.

Flash goggles with side shields **MUST** be worn under the helmet to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Prevent looking at the arc momentarily with unprotected eyes (particularly at high intensity) as the arc can cause a retinal burn that may leave a permanent dark area in the field of vision.

PROTECTION OF NEARBY PERSONNEL

1. Warn bystanders not to watch the arc and not to expose themselves to the welding-arc rays or to hot metal.
2. Keep children away while welding, they are not aware that looking at an arc ray can cause serious eye damage.
3. Protect other nearby personnel from arc rays and hot sparks with a suitable non-flammable partition.
4. Bystanders should also wear safety glasses or goggles.

TOXIC PREVENTION

1. Adequate ventilation, severe discomfort, illness or death can result from fumes, vapours, heat, or oxygen enrichment or depletion that welding (or cutting) may produce, prevent them with adequate ventilation. NEVER ventilate with oxygen.
2. Lead, cadmium, zinc, mercury and beryllium bearing and similar materials, when welded (or cut) may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used., or each person in the area as well as the operator should wear an air-supplied respirator, for beryllium, both must be used.
3. Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface. The area should be well ventilated, or the operator should wear an air supplied respirator.
4. Work in a confined space only while it is being ventilated and if necessary, while

TIG mode

You will need the following extra items

- a. Regulator
- b. Bottle of Argon Gas.
- c. Tungsten welding electrode.
- d. Filler rod.

1. Screw the TIG torch central connection into the torch socket on the front of the P185.
2. Fit the earth return lead into the positive socket.
3. Connect the gas connection on the rear of the P185 regulator to the regulator on the argon gas bottle additional gas fittings/hose may be needed.
4. Set the mode switch on front of welder to TIG.
5. Assemble the TIG torch using the correct size of electrode (see table below).
6. Ensure the electrode lead is not attached to the P185.
7. Connect the machine to the electrical supply and switch on.
8. Adjust the current control until the correct current is shown on the current display.
9. Set the post gas to 2S.
10. Perform a test weld and readjust the current control until the required weld is achieved.
11. If the tungsten electrode becomes oxidized regrind the electrode and increase the post gas time a little.

Current settings for TIG welding

Welding thickness mm	Electrode diameter mm	Welding current Steel A	Welding current stainless steel A	Welding current Copper and Copper alloys A
0.5	1.0	30-60	15-30	30-40
1.0	1.6	50-70	50-70	70-60
1.5	1.6	90-110	60-90	100-130
2.0	1.6	100-130	80-100	130-150
3.0	2.4	120-140	100-130	130-180
4.0	2.4	150-190	130-170	170-250

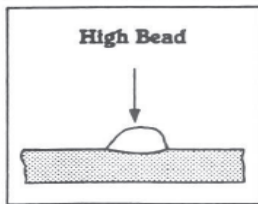
OPERATING INSTRUCTIONS ARC

Current setting for ARC welding

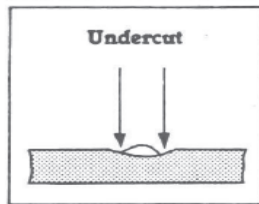
These settings are for E6013 electrodes, for other types of electrode consult the technical data sheets.

Electrode size mm	Material thickness mm	Welding current A
1.6	1-1.6	25-40
2.0	1.6-2.6	40-70
2.5	2.6-4.0	60-100
3.25	3.0-5.0	80-130
4.0	5.0-7.0	130-170

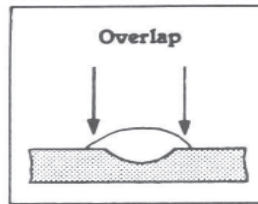
ARC welding beads



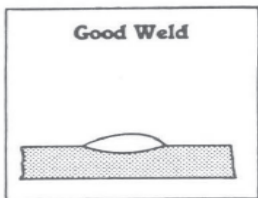
High Bead
CURRENT TOO LOW
Arc is difficult to maintain. Very little penetration.



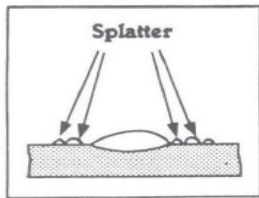
Undercut
CURRENT TOO HIGH
Wide thick bead, undercut. Crater pointed and long. Rod burns away very quickly.



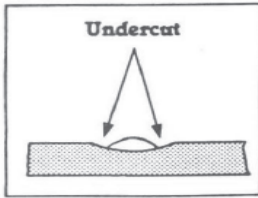
Overlap
TRAVEL TOO SLOW
Metal builds up producing a wide heavy bead which noticeably overlaps at sides.



Good Weld
NORMAL CONDITIONS
Uniform ripples on surface of weld. Arc makes steady crackling sound.



Splatter
ARC TOO LONG
Surface of weld rough. Rod melts off in globules. Arc makes hissing sound.



Undercut
TRAVEL TOO FAST
Small bead undercut in some places. Rough surface and little penetration.

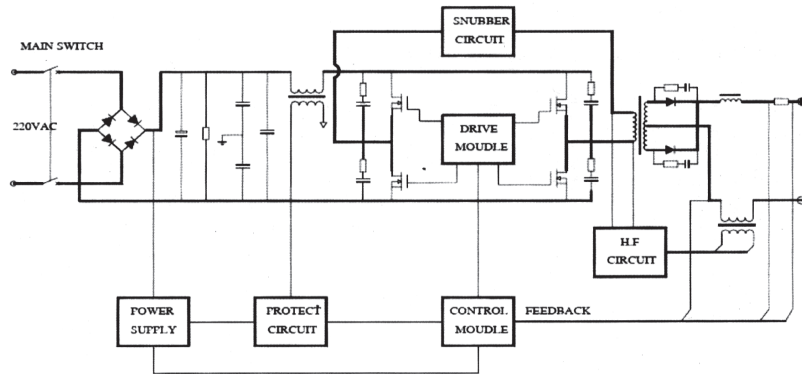
SAFETY....cont

wearing an air supplied respirator.

- Gas leaks in a confined space, should be avoided. Leaking gas in large quantities can change oxygen concentration dangerously. DO NOT bring gas cylinders into a confined space.
- Leaving confined space, shut OFF gas supply at source to prevent possible accumulation of gases in the space if down stream valves are left open, check to be sure that the space is safe before re entering it.
- Vapours from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye-irritating products. The ultra violet (radiant) energy of the arc can also decompose Trichloroethylene and Perchloroethylene. vapours to form phosgene. DO NOT WELD or cut where solvent vapours can be drawn into the welding or cutting atmosphere, or where the radiant energy can penetrate to atmospheres containing even minute amounts of Trichloroethylene or perchloroethylene.

INTRODUCTION

The Weldmate Multi P185 is made with advanced inverter technology. The inverter works by converting the mains supply at 50Hz to a high frequency voltage at 100kHz, this voltage is then controlled by a PWM system before passing to the transformer and then the rectifier.



INSTALLATION...cont

Assembly

1. Remove all parts from box.
2. Screw the pressure gauge into the 1/8" bsp hole on the regulator.
3. Screw the brass fitting into the port marked "out" and fit your required fitting into the port marked "in".
4. Fit the regulator bracket onto rear of P185.
5. Remove locking ring from top of regulator and fit the regulator onto the fixing bracket hole, re-fit the locking ring.
6. Connect the regulator port marked out to fitting on the rear of the plasma, use the supplied pipe you can cut it to the required length, clamp the hose into position with the hose clips supplied.
7. Always keep the fan inlet clear, locate the machine in areas away from water, metallic dust and other airborne contamination.
8. In order to connect the P185 to the electrical supply a suitably rated plug, must be used, consult with a competent electrician.

NOTE: you will need to use PTFE tape to seal the threads

OPERATING INSTRUCTIONS ARC

ARC (MMA welding) mode

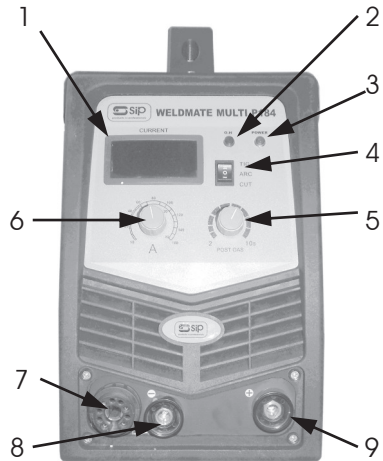
1. Fit electrode holder lead into the power socket specified for the welding electrode that is to be used, if not specified connect to the positive socket.
2. Fit earth return lead into the remaining power socket.
3. Connect the welder to the electrical supply using a suitably rated plug.
4. Set mode switch on front of the P185 to ARC.
5. Switch the welder on and adjust the current control until the required current is shown on the current display, the current value will depend upon the type of metal, the rod diameter and the thickness of the material to be welded.
6. Perform a short weld test and look at the appearance of the weld bead, adjustment of the current level may be needed to get the required weld.

INSTALLATION

Contents

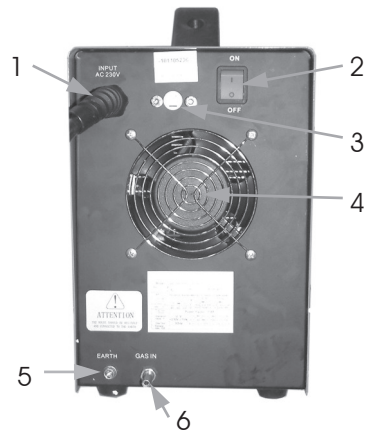
- 1 * Inverter based power unit
- 1 * Cutting torch
- 1 * TIG Torch
- 1 * Regulator
- 1 * Earth return lead
- 2 * Brass pipe fitting
- 1 * Length braided air hose
- 2 * Hose clip
- 1 * Electrode holder lead
- 1 * Pressure gauge
- 1 * Regulator Bracket
- 1 * Torch socket cover

Front Panel



- 1 Current display
- 2 Overload light
- 3 Power LED
- 4 Mode Switch
- 5 Post gas time
- 6 Current control
- 7 Plasma and TIG torch socket
- 8 Negative socket
- 9 Positive socket

Rear Panel



- 1 Mains Lead
- 2 Power switch
- 3 Regulator Mounting screws
- 4 Fan
- 5 Earth bonding point
- 6 Gas Inlet

INTRODUCTION...cont

By using inverter technology the weight and volume of product can be reduced, while the efficiency is raised to 85%, this give a machine that is compact, very portable, controllable and energy efficient.

The Mutli P185 is a multi function machine capable of Plasma cutting and welding mild steel, carbon steel, stainless steel, alloy steel, copper and some other nonferrous metals, all torches and leads are supplied the user only needs to supply the consumables and the item to weld.

Items the user needs to supply.

MMA mode, welding electrodes that match the work being under taken.

TIG mode, argon gas bottle with regulator, welding electrodes that match the work being under taken.

Plasma mode, dry compressed air at 4.5 bar and a delivery of 150l/min.

The Processes

Arc welding more accurately described as Manual Metal Arc welding (MMA) pieces of metal to be fused together by means of an electric ARC, the arc is generated by electric current flowing across the gap between the metal being welded and an arc welding electrode.

The electric arc causes a portion of the metal work piece to melt forming a pool of molten metal. The arc welding electrode, which is coated with flux to prevent the molten material from reacting with the surrounding atmosphere and to facilitate the stability of the arc. During welding the flux is simultaneously melted/vapourized, this flows to the molten pool of material shielding it from the air and forms a coating over the cooling weld bead, the coating on the weld bead is called `slag` and is removed after cooling.

INTRODUCTION....cont

TIG Welding is similar in principle to MMA. An arc is created between the electrode which is made from a very durable material called Tungsten and the work piece, causing a portion of the metal work piece to melt forming a molten pool of metal, the area is shielded by argon gas. A non-fluxed filler rod, compatible with the work material, is added to the molten metal pool to form the weld.

The arc is started by pressing holding the electrode close to the surface and pressing the torch trigger, a high voltage at high frequency is applied to the electrode, as soon the air is ionised in the gap between the electrode and work piece the welding power can flow.

The Tungsten is then drawn away sufficiently to avoid contact whilst still maintaining the arc. The distance between the work piece and the Tungsten is governed by the amount of welding current in use and the Tungsten diameter, as for MMA welding.

Plasma cutting relies on the fact that, if a gas or mixture of gases, such as air, is subjected to a very high temperature it becomes ionized, i.e. negative electrons are separated from the atom which is then positively charged.

This ionized state of the gas is called plasma and, in this state, the gas is electrically conductive. The high temperature necessary to create the 'plasma' is achieved, in the case of Plasma cutting, by a standing electric arc. This is constricted by forcing the 'plasma' through a small nozzle which increases the temperature of the arc to over 15,000°C, and concentrates it into a very small area.

When this 'plasma' is directed at a conductive material the arc is transferred through the 'plasma' (transferred arc operation) to the material. The high energy of the arc melts the material which, so long as it is within the cutting range of the equipment, will be displaced by the gas flow.

In order to initiate the standing arc it is necessary to produce an ionized path in the gas.

This is achieved by applying a very high voltage, at a high frequency, between the electrode and the nozzle. As soon as the air is ionized, the cutting arc will ignite.

TECHNICAL SPECIFICATIONS

Model	05279		
Input Current	16 amps		
Input Voltage	AC230V 50Hz		
No Load Consumption	35 watts		
Efficiency	0.85		
Power Factor	0.93		
Insulation Class	F		
Protection	IP23		
Weight	8 Kg		
Unit Dimensions	380x178x295		
	TIG	ARC	PLASMA
OCV	62V	62V	250V
Operating Voltage	16.5V	26V	120V
Max Current	160A	150A	40A
Output Current Range	15-160A	15-150A	20-40A
Output at 60% Duty cycle	160A	150A	33A
Compressed Air Pressure	-	-	4.5 bar
Compressed Air Flow	-	-	150 l/min
Gas Flow	2-5 l/min	-	-
Arc starting	HF	Manual	HF Contact