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.

FOR HELP OR ADVICE 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

Ref:200116

SIP INDUSTRIAL

machinery specialists since 1968

P177
AC/DC TIG Inverter

05162

Please read and fully understand the instructions in this manual before operation. Keep this manual safe for future reference.

GUARANTEE

Guarantee:

This welder is covered by a 24 month parts and labour warranty covering failure due to manufacturers defects. This does not cover consumable items such as torches, electrode holder and earth clamps. Failures due to misuse or operating the machine outside the scope of this manual are also not covered.

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.

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 oxidization clean the connection with a mild abrasive or wire brush.
4.Check all the earth clamp and electrode in clean and in good condition of dirty clean and if in poor condition replace.
5.Check the TIG torch it lead and consumables are in good condition, replace if not.
6.If the machine is not to be used for a long time, store it in the original packing a dry place.

CONTENTS

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 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 sole 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 welding machine 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 torch without first switching off the machine.

ELECTRIC SHOCK
Either AC or' DC voltages associated with the welding 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 TIG

Note: The following are basic instructions on how to operate the welder, to produce the best welds, training, practice and further reading will be required.

DC TIG WELDING

1.Set the mode switch on front of welder to TIG.
2.Set the AC/DC switch to DC.
3.Set the current switch to continuous.
4.Assemble the TIG torch using the correct size of electrode (see table below).
5.Connect the machine to the electrical supply and switch on.
6.Adjust the current control until the correct current is shown on the current display.
7.Set the post gas to 2S.
8.Perform a test weld and readjust the peak current control until the required weld is achieved.
9.If the tungsten electrode becomes oxidized regrind the electrode and increase the post gas time a little.

AC TIG WELDING

1.Set the mode switch on front of welder to TIG.
2.Set the AC/DC switch to AC.
3.Set the current switch to continuous.
4.Assemble the TIG torch using the correct size of electrode (see table below).
5.Connect the machine to the electrical supply and switch on.
6.Adjust the current control until the correct current is shown on the current display.
7.Set the post gas to 2S.
8.Set the clean area width to 50%.
9.Perform a test weld and readjust the peak current control and clean area width until the required weld is achieved.
10.If the tungsten electrode becomes oxidized regrind the electrode and increase the post gas time a little.

Current settings for DC TIG welding

Welding thickness mm	Tungsten 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
6.00	3.2	200-300	200-300	200-300

Current settings for AC TIG welding Aluminium and its alloys

Welding thickness mm	Tungsten Electrode diameter mm	Welding current A
0.5	1.0	15-20
1.0	1.6	40-50
1.5	1.6	50-80
2.0	1.6	90-110
3.0	2.4	120-300
4.0	2.4	180-220
5.0	3.2	250-300

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 weld 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 process and current level.

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 GAS:

Compressed air is potentially dangerous.
Refer to the relevant safety standards for safety guidelines.

SAFETY….cont

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

FUMES:
Toxic gases may be given off when welding, especially if zinc or cadmium coated materials are involved. Welding 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 welding area.

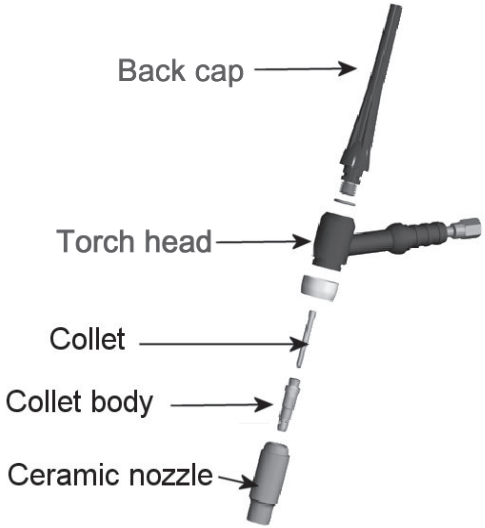
NB: IF IN DOUBT SEEK PROFESSIONAL ADVICE.

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 and chipping slag 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 ore 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.

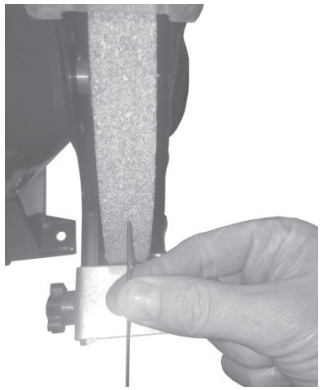
OPERATING INSTRUCTIONS TIG



Electrode preparation.

Chose the correct electrode type for the current type.
For DC you use Thoriated (red TIP), Ceriated (grey TIP) or Lathanated tungsten electrodes (black,gold,blue TIP).
For AC you use Pure tungsten (green tip), Zirconiated (white TIP) or Lathanated tungsten electrodes (black,gold,blue TIP).

The tungsten should then be sharpened facing the grinding wheel. The tip should be perfectly concentric in order to avoid arc deviations. It is best to regularly inspect the tungsten to maintain peak condition.



DC TIG -grind to a point of 15-20 degrees.

AC TIG -grind the end tip for electrodes smaller than 2mm and chamfer the tip to 45 degrees for larger electrodes

ALL TIG modes

You will need the following extra items

a.Regulator
b.Bottle of Argon Gas.
c.Tungsten welding electrode.
d.Filler rod.
At foot pedal control is available as an optional extra

1.Screw the TIG torch power/gas connection into the torch power socket on the front of the P177, ensure the plastic insulator cover is fitted over the nut.
2.Connect the torch trigger connection to the trigger socket
3.Fit the earth return lead into the positive power socket.
4.Ensure the electrode lead is not attached to the P177.
5.Connect the gas connection on the rear of the P177 to the regulator on the argon gas bottle, additional gas fittings and hose may be needed.

If you are using a foot pedal connect the 3 pin connector the remote control socket, if you wish to trigger the welder using the foot pedal also fit the 2 pin connector into the trigger socket instead of the torch trigger lead.

TIG torch assembly

1.Select the tungsten electrode to match current level polarity to be welded at.
2.Grind the end of the electrode to it's required shape.
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.

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 10 metres.
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 , 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. 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:
a.Appreciable combustibles (Including building construction) are within 10 metres.
b.Appreciable combustibles are further than 35 feet but can be ignited by sparks.
c.Openings (concealed or visible) in floors or walls within 10 metres 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, 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.
9.Hollow items must be vented before welding or they can explode.
10.Explosive atmosphere, never weld where the air may contain flammable dust, gas or liquid vapours (such as petrol).

SAFETY….cont

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 welding, turn off the equipment. DO NOT coil or loop the welding 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 may produce, prevent them with adequate ventilation. NEVER ventilate with oxygen.
2.Lead, cadmium, zinc, mercury and beryllium bearing and similar materials, when welded 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

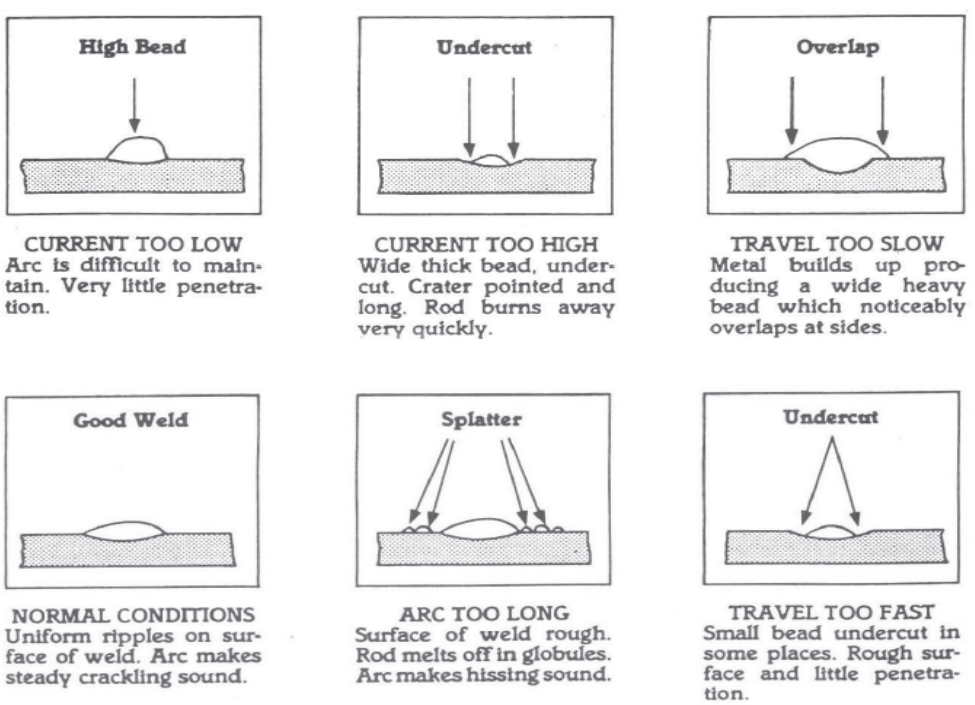
OPERATING INSTRUCTIONS ARC

Current setting for ARC welding

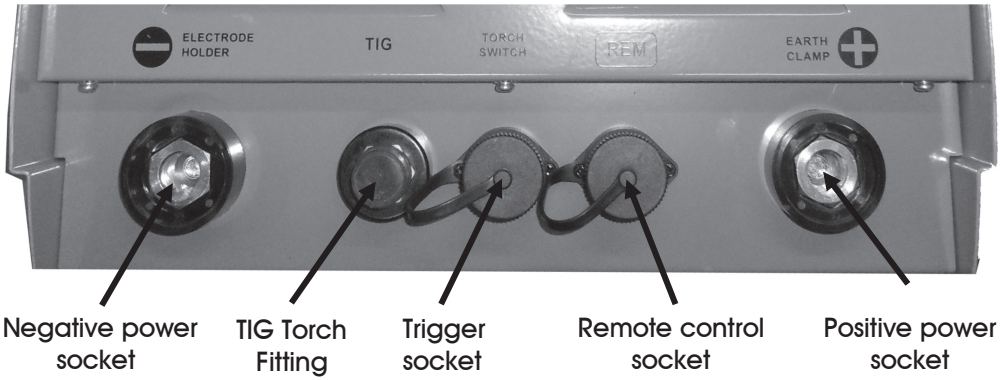
These settings are for E6013 electrodes, for other types of electrode consult the technical data sheets.

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



INSTALLATION….cont



OPERATING INSTRUCTIONS ARC

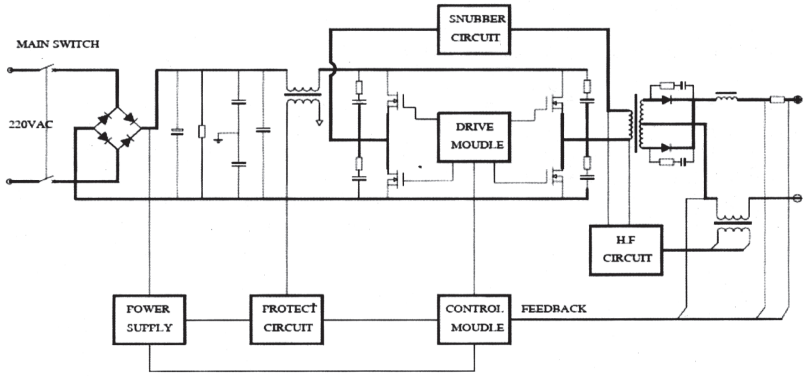
ARC (MMA welding) mode

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 power 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 the mode switch on front of the P177 to ARC.
5.Set the AC DC switch the match that specified by the rod, if the rod is suitable for both AC and DC use DC mode.
6.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.
7.Perform a short weld test and look at the appearance of the weld bead, adjustment of the current level may be need to get the required weld.

SAFETY….cont

wearing an air supplied respirator.
5.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.
6.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.
7.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 Perchlorethylene. vapours to form phosgene. DO NOT WELD where solvent vapours can be drawn into the welding atmosphere, or where the radiant energy can penetrate to atmospheres containing even minute amounts of Trichloroethylene or perchlorethylene.

The Weldmate P177 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.



Rotary controls

1. **Pre flow time, TIG mode** Sets a pre-weld gas flow time to purge the weld area.
2. **Peak current,** Sets the welding current in constant current and the peak current in
3. **Clean area width, AC TIG MODE** Sets the balance between the cleaning polarity and the weld polarity in AC mode, 50% = equal time clean and weld.
4. **Slope down, TIG MODE** Sets the slope down time which starts after the torch trigger is released, this is the time taken for the current to automatically reduced from the peak current to zero.
5. **Post flow TIG MODE,** Sets the post weld gas flow time after the torch trigger is released.

Control Switches

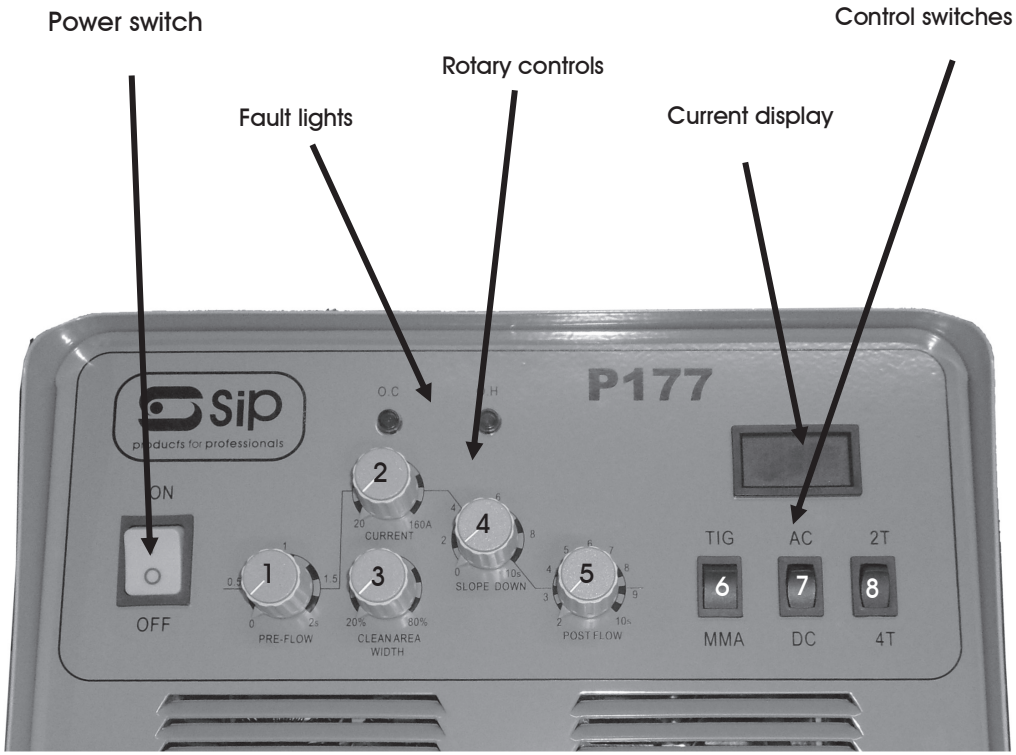
6. **TIG - MMA switch**, Selects the Welding Process.
7. **AC– DC switch ,** Selects the output current mode.
8. **2T-4T switch,** Used in TIG mode, in **2T** the welding starts when the torch trigger is pressed and stops when the trigger released, in **4T** welding starts when the trigger is pressed and is stopped by a second press and release of the torch trigger.

MMA mode - controls 2,6,7 are used
TIG DC mode - controls 1,2,4,5,6,7,and 8 are used
TIG AC mode - controls 1,2,3,4,5,6,7,and 8 are used

Contents

1 * Inverter based power unit
1 * TIG Torch
1 * Electrode holder lead
1 * Earth return lead

Front Panel



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 P177 is a Dual process machine capable of ARC and TIG welding mild steel, carbon steel, stainless steel, alloy steel, Aluminium and most other nonferrous metals, all torches and leads are supplied the user only needs to supply a gas regulator, welding 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.

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.

DC 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.

Pulse DC TIG this is the same process as DC TIG except the welding current is not at a constant level. The welding current rises to a peak and falls to the basic level, this enables the welding of thing materials with a reduced risk of melting holes.

AC TIG is used for the welding of aluminium and its alloys, these metals have a hard heat resistant oxide layer on the surface, the oxide layer needs to be removed in order to produce a strong weld.
During welding the polarity of the torch and work are reversed, when current flows from the work to the electrode the oxide layer if lifted off, then current flows from the electrode to the work this melts the metal and produce the weld, the repeated polarity changes clean and melt the area to produce a continues weld.

Model	05162		
Input Current	11 amps		
Input Voltage	AC230V 50Hz		
No Load Consumption	35 watts		
Efficiency	0.85		
Power Factor	0.93		
Insulation Class	F		
Protection	IP21s		
Weight	26 Kg		
Unit Dimensions	440x430x600		
	DC TIG	AC TIG	ARC
OCV	56V	56V	56V
Operating Voltage	16.4V	16.4V	26.4V
Max Current	160A	160A	160A
Output Current Range	10-600A	10-160A	10-160A
Output at 60% Duty cycle	160A	160A	160A
Gas Flow	2-5 l/min	2-5 l/min	
Arc starting	HF	HF	Manual