OPERATOR'S MANUAL

ARCOTIG™ HF 200P

IMPORTANT: Read this Owner's Manual Completely before attempting to use this equipment. Save this manual and keep it handy for a quick reference. Pay particular attention to the safety instruictions we have provided for your protection. Contact your distributor if you do not fully understand this manual.

CONGRATULATIONS!

THANK YOU FOR YOUR PURCHASE OF THIS

QUALITY ARCOWELD PRODUCT!

WELCOME TO THE ARCOWELD TEAM!

We look forward to supporting you with dependable service and our extensive range of first-class products.
Our range can be viewed at - https://arcoweld.com.au/

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CONTENTS

1 SAFETY

1.1 Signal Explanation

• The above signals mean warning! Notice! Running parts and electric shocks can injure or kill.

It is a safe operation after taking several necessary protection measures.

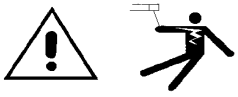
1.2 Arc Welding Damage

• The following signals and word explanations relay dangers present during the welding operation. Please be aware and cautious.

• Only persons who are trained professionally can install, debug, operate, maintain and repair the equipment.

• During the operation, only required persons shall be present within the welding area. Nil children should be present.

• After shutting off the machine power, please maintain and examine the equipment according to section 5 because of the DC voltage existing in the electrolytic capacitors.



ELECTRIC SHOCK CAN KILL.

• Never touch electrical parts.

• Wear dry, hole-free gloves and clothes to insulate yourself.

• Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

• Take care when using the equipment in confined spaces, at heights and in wet environments.

• Always shut down the machine power before installation and adjustment.

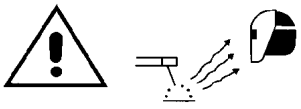
• Ensure to install the equipment correctly and ground the work or metal to be welded to a good electrical (earth) ground according to the operation manual.

•The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding torch are also electrically “hot”.
- Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- Never dip the electrode in water for cooling.
- Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.


FUMES AND GASES CAN BE DANGEROUS.

- Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding with electrodes which require special ventilation such as stainless or hard facing or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values using local exhaust or mechanical ventilation. In confined spaces or in some circumstances outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.
- Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to ensure breathing air is safe.
- Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the material safety data sheet and follow your employer’s safety practices.



ARC RAYS CAN BURN.

- Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding.
- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- Protect other nearby personnel with suitable, non-flammable screening and /or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

Recommended Protective Filters for Electric Welding		
Description of Process	**Approximate Range of Welding Current in Amps**	**Minimum Shade Number of Filter(s)**
Manual Metal Arc Welding - covered electrodes (MMAW)	Less than or equal to 100	8
	100 to 200	10
	200 to 300	11
	300 to 400	12
	Greater than 400	13
Gas Metal Arc Welding (GWAW) (MIG) other than Aluminium and Stainless Steel	Less than or equal to 150	10
	150 to 250	11
	250 to 300	12
	300 to 400	13
	Greater than 400	14
Gas Metal Arc Welding (GMAW) (MIG) Aluminium and Stainless Steel	Less than or equal to 250	12
	250 to 350	13
Gas Tungsten Arc Welding (GTAW) (TIG)	Less than or equal to 100	10
	100 to 200	11
	200 to 250	12
	250 to 350	13
	Greater than 350	14
Flux-cored Arc Welding (FCAW) -with or without shielding gas.	Less than or equal to 300	11
	300 to 400	12
	400 to 500	13
	Greater than 500	14
Air - Arc Gouging	Less than or equal to 400	12
Plasma - Arc Cutting	50 to 100	10
	100 to 400	12
	400 to 800	14
Plasma - Arc Spraying	—	15
Plasma - Arc Welding	Less than or equal to 20	8
	20 to 100	10
	100 to 400	12
	400 to 800	14
Submerged - Arc Welding	—	2(5)
Resistance Welding	—	Safety Spectacles or eye shield

SELF-PROTECTION

• Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

• 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.

DO NOT add fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling the tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

WELDING SPARKS can cause fire or explosion.

• Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

• Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situation.

• When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

• Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to ensure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”.

• Vent hollow castings or containers before heating, cutting or welding. They may explode.

• Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff less trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

• Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

Rotating parts may be dangerous.

• Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

• Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

• Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

• Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.

• Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

• Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

1.3 The knowledge of Electric and Magnetic Fields

Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). The discuss on the effect of EMF is ongoing all the world. Up to now, no material evidences show that EMF may have effects on health. However, the research on damage of EMF is still ongoing. Before any conclusion, we should minimize exposure to EMF as few as possible.

In order to minimize EMF, we should use the following procedures:

• Route the electrode and work cables together – Secure them with tape when possible.

- All cables should be put away and far from the operator.
- Never coil the power cable around your body.
- Make sure welding machine and power cable are as far away from the operator as possible according to the actual circumstance.
- Connect the work cable to the workpiece as close as possible to the area being welded.
- Persons with heart-pacemakers should be away from the welding area.

2 SUMMARY

2.1 Brief Introduction

ArcoTig HF200P welding machine adopts the latest pulse width modulation (PWM) technology and insulated gate bipolar transistor (IGBT) power module, which can replace large transformer type welders. Inverters are portable, small, lightweight, with low power low consumption.

The parameters of the ArcoTig HF200P on the front panel can be adjusted continuously and steplessly, such as start current, crater arc current, welding current, base current, duty ratio, upslope time, downslope time, pre-gas, post-gas, pulse frequency, hot start and arc force etc. When welding, it uses high frequency and high voltage for arc ignition consistency.

ArcoTig HF200P Characteristics：

★ The ZVS soft switch technology reduces the IGBT switching loss.

★ DC Pulsed TIG and MMA, adopt IGBT and advanced PWM technology

★ High performance MCU, Digital control, Digital display

★ Preset all parameters with the hold process

★ HF/Lift TIG, current down slope and up slope, gas post-flow, Pulse Frequency

★Intelligent protection: over-voltage, under-voltage, over-current, over-heat

★Reduced weight of the machine, improved mobility of the welder.

1. For MMA, polarity connection can be chosen according to different electrodes, please refer to 3.5；

2. For DC TIG, DCEN is used normally (workpiece connected to positive polarity, while torch is connected to positive polarity). This connection has many characters, such as stable welding arc, low tungsten pole loss, more welding current, narrow and a deep weld;

3. DC Pulsed TIG has the following characters: 1) Pulse heating. Metal in Molten pool has a short time on high temperature status and freezes quickly, which can reduce the chances of hot cracking of the materials with thermal sensitivity. 2) The workpiece receives lower heat. Arc energy is focused. Is suitable for thin sheet and super thin sheet welding. 3) Exactly controls heat input and the size of the

molten pool. The depth of penetration is even. Is suitable for welding all positions for pipe. 4) High frequency arc can eliminate blowholes and improve the mechanical performance of the joint. 5) High frequency arc is suitable for high welding speed to improve productivity.

ArcoTig HF200P is suitable for all positions welding for various plates made of stainless steel, carbon steel, alloyed steel, titanium, magnesium, cuprum, etc, which is also applied to pipe installment, mould mend, petrochemical, architecture decoration, car repair, bicycle, handicraft and common manufacture.

MMA——Manual Metal Arc welding

PWM——Pulse-Width Modulation

IGBT——Insulation Gate Bipolar Transistor

TIG——Tungsten Insert Gas welding

2.2 Module Explanation

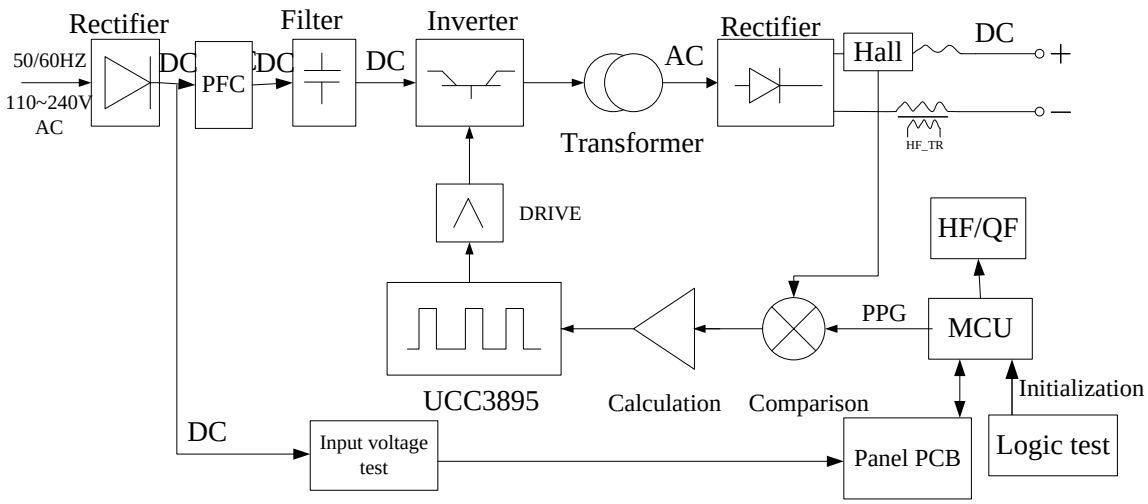
HF= High Frequency

200- Amperage

P- Pulse modulation

2.3 Working Principle

The working principle of ArcoTig HF200P is shown as the following figure. Single phase work frequency AC 110V/220V (50 Hz) is rectified into DC (about 380V), then is converted to medium frequency AC (about 40KHz) by inverter device (IGBT), after reducing voltage by medium transformer (the main transformer) and rectifying by medium frequency rectifier (fast recovery diode) and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stably. Meanwhile, the welding current parameter can be adjusted continuously and steplessly to meet with the requirements of welding craft.

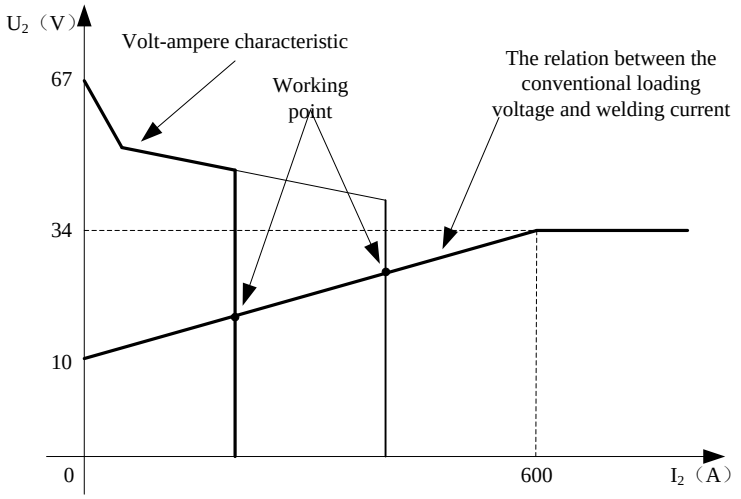


ArcoTig HF200P

2.4 Volt-Amperage Characteristic

ArcoTig HF200P welding machine has an excellent volt-ampere characteristic, whose graph is shown as the following figure. The relation between the conventional rated loading voltage U_2 and the conventional welding current I_2 is as follows:

When $I_2 \leq 600A$， $U_2=10+0.04I_2(V)$; When $I_2 > 600A$,$U_2=34(V)$.



3 Installation and Adjustment

3.1 Parameters

Model	ArcoTig HF200P			
Power supply voltage(V)	1~110±10％		1~220±10％	
Frequency (Hz)	50/60			
	MMA	TIG	MMA	TIG
Rated Input Power (KW)	3.95	3,43	6.8	4.6
Rated Input Current(A)	36	30.2	31.7	21
Duty Cycle (40℃ 10min)	30% 125A 60% 95A 100% 80A	30% 160A 60% 120A 100% 100A	25％ 200A 60％ 130A 100％ 100A	30％ 200A 60％ 130A 100％ 100A
No Load Voltage(V)	25V(controlled)			
Welding Current Range(A)	5~125	5~160	5~200	
Pulse Frequency (Hz)	0.5~100			
Pulse Width Range (%)	5~100			
Up Slope Time(S)	0~5			
Down Slope Time(S)	0~5			
Pre-Flow(S)	0~1			
Post Flow(S)	0.1~10			
Efficiency (％)	81%		87%	
Power factor	0.98			
Net Weight (Kg)	8.2			
Dimensions(mm)	465*120*240			
Protection Class	IP23			
Insulation Class	F			
Cooling	AF			

Note: The above parameters are subject to change with the improvement of machines.

3.2 Duty cycle & Over heat

Duty cycle, which is defined as the proportion of the time that a machine can work continuously within a certain time (10 minutes). The rated duty cycle means the proportion of the time that a machine can work continuously within 10 minutes when it outputs the rated welding current.

If the welder is over-heat, the IGBT over-heat protection unit inside it will output an instruction to cut output welding current and brighten the over-heat pilot lamp on the front panel. At this time, the machine should be relaxed for 15 minutes to cool the fan. When operating the machine again, the welding output current or the duty cycle should be reduced.

3.3 Movement and placement

Please take care when moving the welder when moving it, and do not sit it on uneven ground.

It also can be moved by the handle on the top of the welder. Place the welder carefully when moving it to the right position. When the machine gets to the destination, it needs to be secured to prevent movement.

Movement may result in the potential danger or substantive hazard, so please make sure that the machine is in a safe position before using it.

3.4 Power supply input connection

ArcoTig HF200P welding machines' power supply connects to110V/220V.

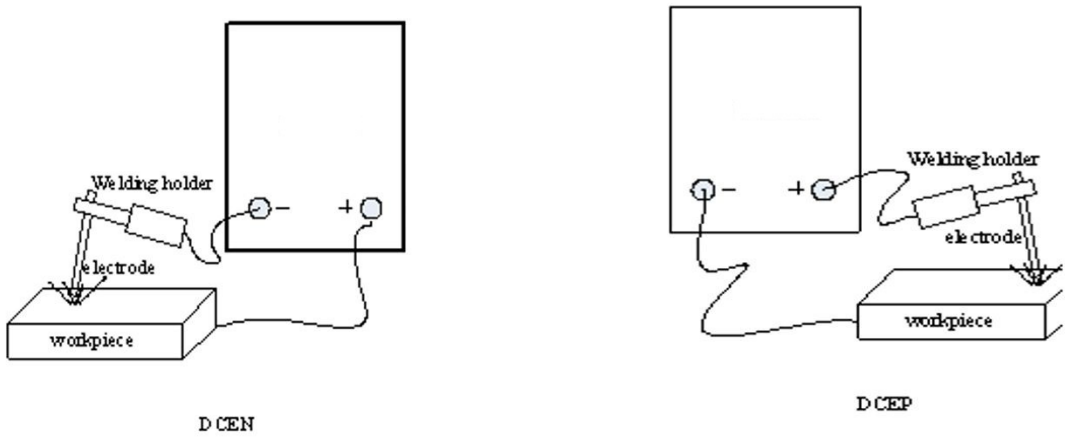
When the power supply voltage is over the safe work voltage, there are over voltage and under voltage protections inside the welder, the alarm will light up and at the same time the current output will be cut off.

If the power supply voltage continually goes beyond the safe work voltage range, it will shorten the welders life-span. The below measures can be used:

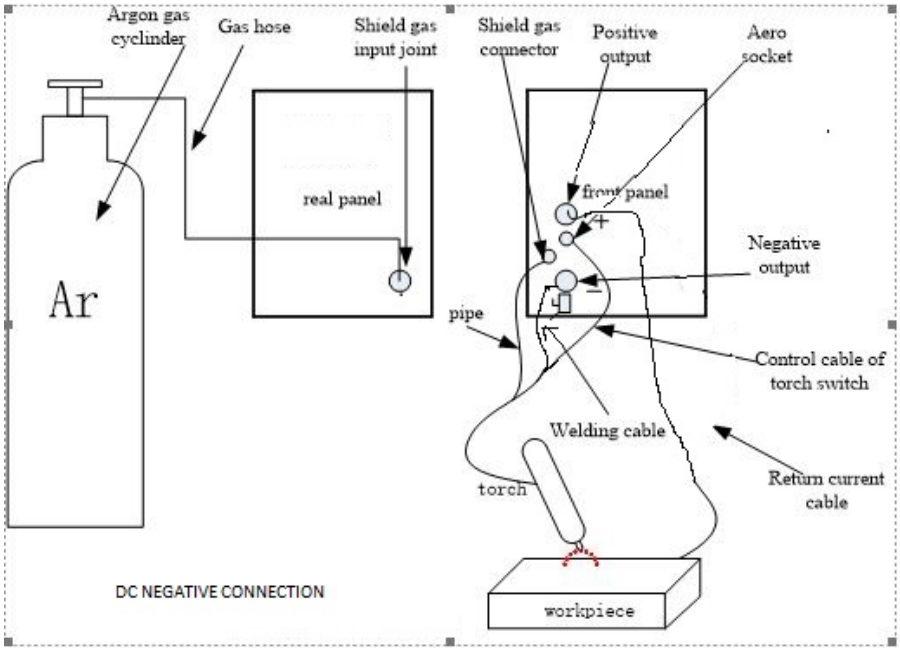
- Change the power supply input net. Such as connect the welder with the stable power supply voltage of distributor;
- Reduce the machines work load and ensure input supply is regular.
- Set the voltage stabilization device in the front of power cable input.

3.5 Polarity Connection（MMA）

MMA (DC): Choosing the connection of DCEN or DCEP according to the different electrodes. Please refer to the electrode manual.



3.6 Assembling the equipment (TIG) ArcoTig HF200P



- Workpiece is connected to the positive electrode of welding machine, and welding torch is connected to the negative electrode, which is called DC NEGATIVE CONNECTION; Generally, it is usually operated in DC NEGATIVE CONNECTION in TIG welding mode.

- The control cable of torch switch consists of 2 wires, UP-DOWN control of 3 wires and the aero socket has 8 leads.
- Consumable parts for TIG torch, such as tungsten electrode、tip、gas nozzle、electrode shield(short/long) , please contcat Arcoweld or your distributor according to the accessory codes.
- When ArcoTig HF200P welding machines are operated in HF ignition method, the ignition spark can cause interferences in equipment near the welding machine. Be sure to take specially safety precautions or shielding measures.

HF 200P OPERATION

The layout of the Front Panel

1. Over Current Light

2. Digital Display

3. Amperage Adjustment

4. Gas Outlet

5. Negative Polarity Output

6. High Temperature Light

7. Mode Setting

8. Positive Polarity Output

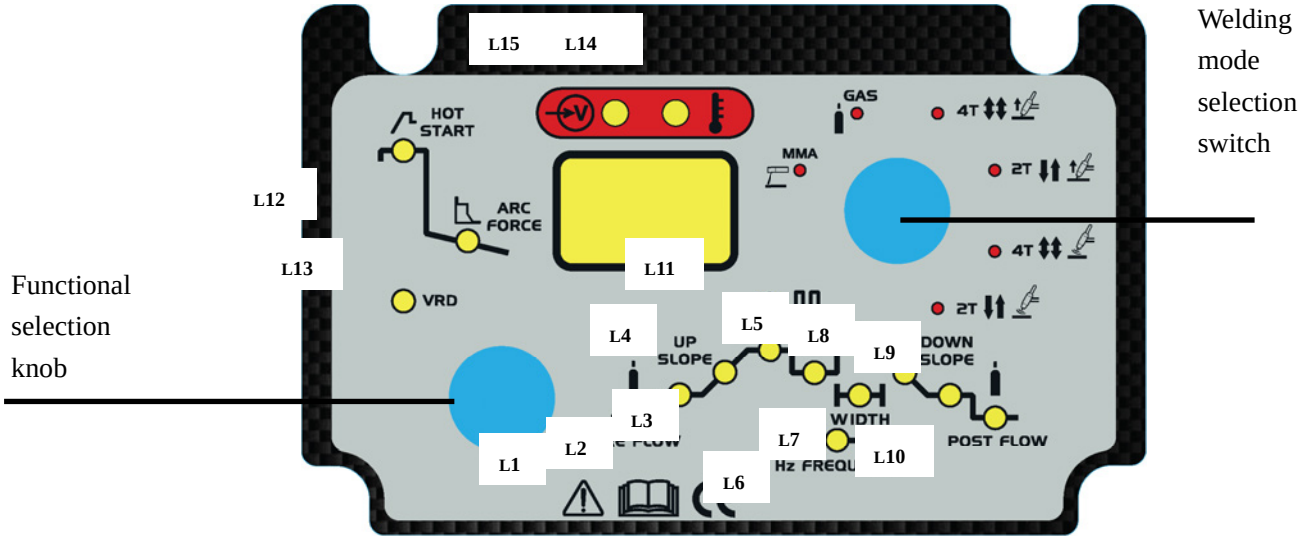
HF 200P OPERATION

The layout of the Back Panel

9. Primary Power Lead

10. Machine On/Off Switch

4.2 Control panel



Ⅰ、Introduction the pilot light of ArcoTig HF200P operation panel:

1.——Pre Flow Time (L1)
2.——Start Current (L2)
3.——Up Slope Time (L3)
4.——Welding Current (Peak Current) (L4)
5.——Base Current (L5)
6.——Pulse Frequency (L6)
7.——Pulse Width (L7)
8.——Down Slope Time (L8)
9.——Crater Current (L9)
10.——Post Flow Time (L10)
11.——Pulse Selection light (L11)
12.——Hot Start (L12)
13.——Arc Force (L13)
14.——Alarm Pilot Light (L14)
15.——Power Pilot Light (L15)

Ⅱ、The function of 'welding mode selection switch':

1. GAS——Gas test function; In GAS shelf, the gas is given all the time untill the welding is stopped.
2. 4T_LIFT——TIG Lifting arc, long welding function.
3. 2T_LIFT——TIG Lifting arc, short welding function.
4. 4T_HF——TIG HF striking arc, long welding function.
5. 2T_HF——TIG HF striking arc, short welding function.
6. MMA——MMA function.

Ⅲ、Operations:

1. MMA parameters adjustment

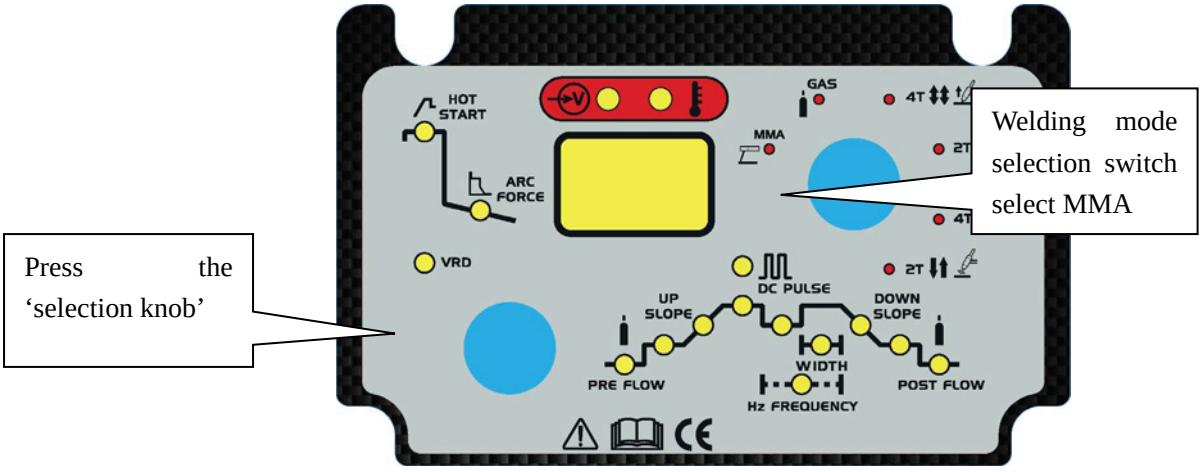
Adjust the 'welding mode selection switch' to MMA function. In MMA mode, only three parameters (welding current, hot start, arc force) can be adjusted.

MMA parameters adjustment: Turn on the welder, the welding current can be adjusted directly; If adjusting the selection knob, the welding current LED (L4) is flashing; It means the welding current can be adjusted. If the

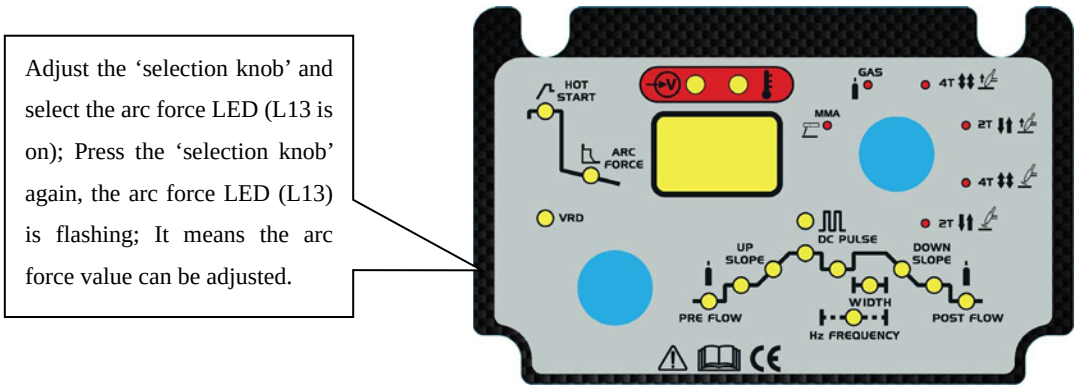
adjustment is completed, confirm the parameter by pressing the 'selection knob' or the system will confirm the parameter automatically after 3 seconds.

Other parameters such as arc force adjustment: press the 'selection knob'; Adjust the 'selection knob'and select the arc force LED (L13 is on); Press the 'selection knob'again, the arc force LED(L13) is flashing It means the arc force can be adjusted. If the adjustment is completed, press the 'selection knob'and confirm the parameter; Or the system will confirm the parameter automatically after 3 seconds. Operation flow as follows:

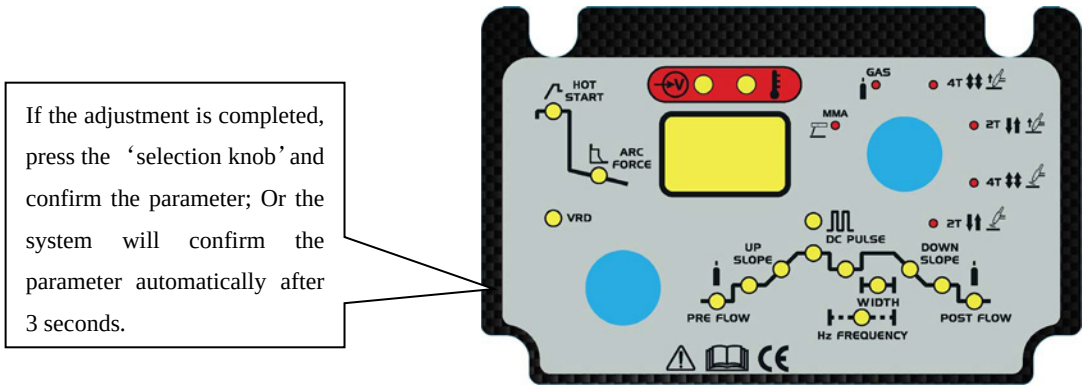
Step one: 'Welding mode selection switch' selects MMA mode, press the 'selection knob';



Step two: Adjust the 'selection knob'and select the arc force LED (L13 is on); Press the 'selection knob'again, the arc force LED(L13) is flashing.; It means the arc force can be adjusted.



Step three: If the adjustment is completed, press the 'selection knob'and confirm the parameter; Or the system will confirm the parameter automatically after 3 seconds.



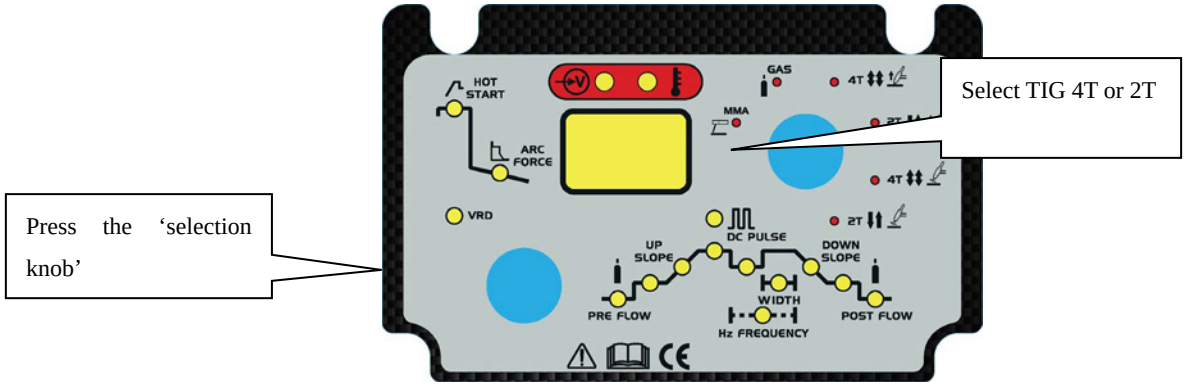
2. TIG parameters adjustment

Adjust ‘welding mode selection switch’ to TIG mode. If in TIG 4T mode and the output pulse function is turned on, all parameters (L1~L11) of TIG can be adjusted. If in TIG 2T mode and the output pulse function is turned on, the start current and crater current is 5A; If the pulse function is closed, the parameter of base current(L5), pulse frequency(L6) and pulse width(L7) cannot be adjusted.

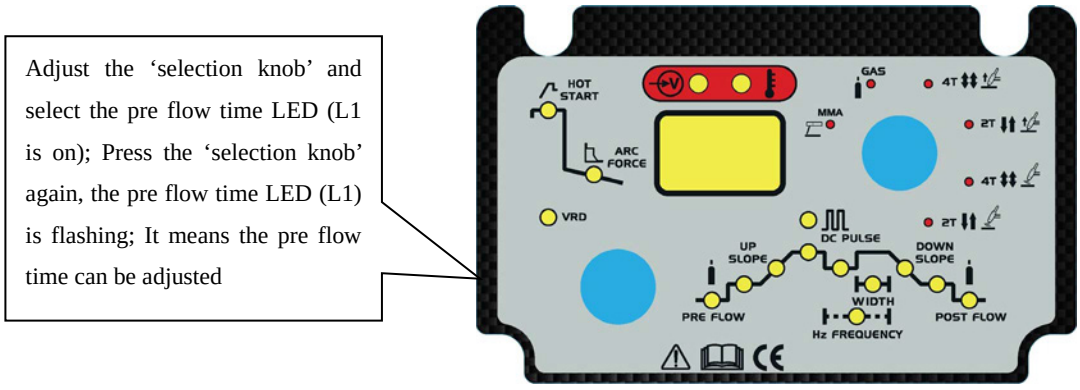
TIG parameters adjustment: The welding current (L4) can be adjusted directly when the welder is on. Adjust the ‘selection knob’, the welding current LED (L4) is flashing; It means the welding current can be adjusted. If the adjustment is completed, confirm the parameter by pressing the ‘selection knob’ or the system will confirm the parameter automatically after 3 seconds.

Other parameters adjustment: Take ‘pre flow time’ for an example. Press the ‘selection knob’; Adjust the ‘selection knob’and select the pre flow time LED (L1 is on); Press the ‘selection knob’ again, the pre flow time LED (L1) is flashing; It means the pre flow time can be adjusted. If the adjustment is completed, confirm the parameter by pressing the ‘selection knob’; or the system will confirm the parameter automatically after 3 seconds. Operation flow as follows:

Step one: ‘Welding mode selection switch’ select TIG 4T or 2T. Press the ‘selection knob’;

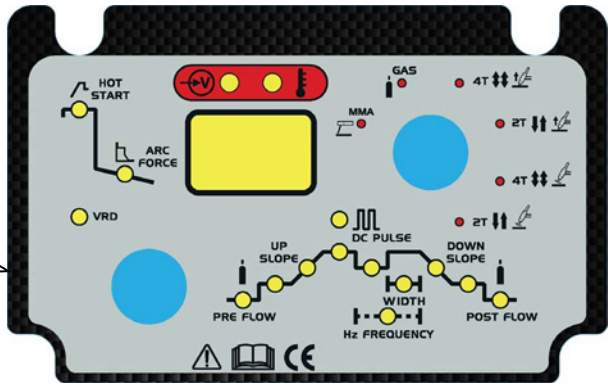


Step two: Adjust the ‘selection knob’and select the pre flow time LED (L1 is on); Press the ‘selection knob’ again, the pre flow time LED (L1) is flashing; It means the pre flow time can be adjusted.



Step three: If the adjustment is completed, confirm the parameter by pressing the ‘selection knob’; or the system will confirm the parameter automatically after 3 seconds.

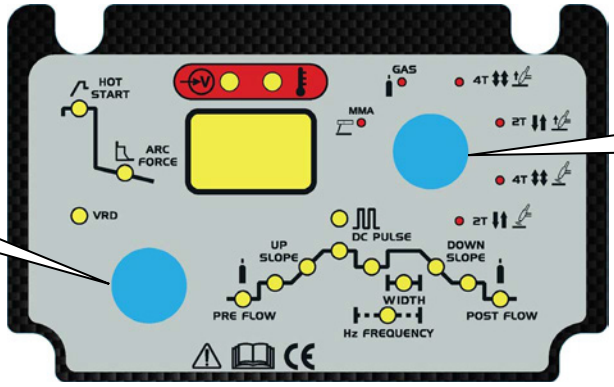
If the adjustment is complete, confirm the parameter by pressing the 'selection knob'; or the system will confirm the parameter automatically after 3 seconds



Output pulse selection: Press the 'selection knob'. Adjust the 'selection knob'and select the pulse LED (L11 is on); press the 'selection knob' again, the pulse LED (L11) is flashing; It means the output pulse function can be turned on or turned off. If the display is "ON", the output pulse function is turned on; if the display is "OFF", the output pulse function is turned off. When the pulse LED (L11) is flashing, press the 'selection knob' again, the output pulsed conditions transform by "ON" into "OFF" or transform by "OFF" into "ON". Operation flow as follows:

Step one: 'Welding mode selection switch' select TIG 4T or 2T. Press the 'selection knob';

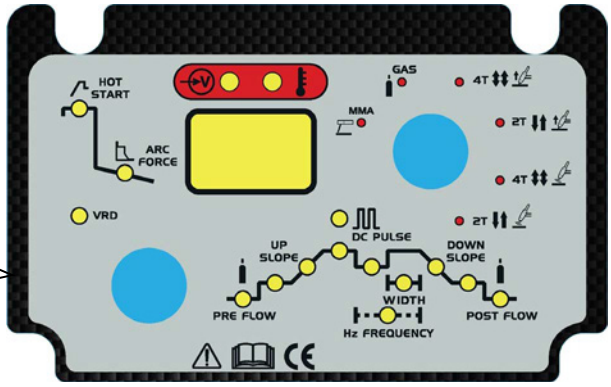
Press the 'selection knob'



Select TIG 4T or 2T

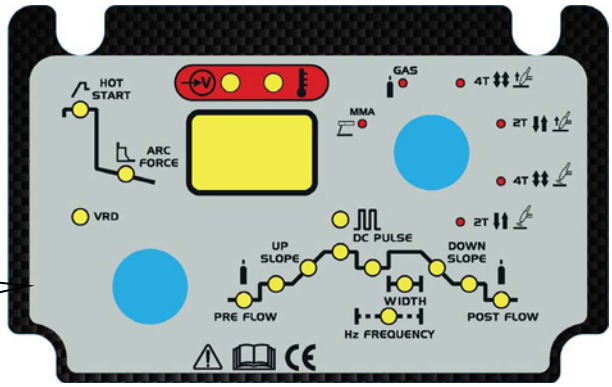
Step two: Adjust the 'selection knob'and select the output pulse LED (L11 is on); press the 'selection knob' again, the pulse LED (L11) is flashing; It means the output pulse function can be turned on or turned off.

Adjust the 'selection knob' and select the pulse LED (L11 is on); Press the 'selection knob' again, the pulse LED (L11) is flashing; It means the output pulse function can be turned on or turned off.

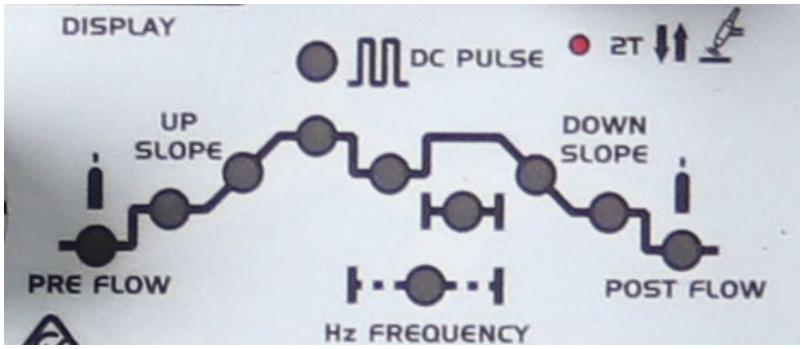


Step three: Press the 'selection knob' again, the output pulsed conditions transform by "ON" into "OFF" or transform by "OFF" into "ON".

Press the ‘selection again, the output pulse function is turned off.



Complete the adjustment after 3 seconds, the operation panel will return to original condition; welding current LED (L4) is on. If the welding mode is TIG and the output pulse function is turned on, the pulse pilot light (L11) is on. If the output pulse function is turned off, the pulse pilot light (L11) is off. In MMA mode, the pulse pilot light (L11) is off. All preset parameters with hold function.



If the parameter indicator lights up, then the selected parameter can be altered on adjusting dial. Available parameters where 2T and 4T mode have been selected:

Gas pre-flow time

Unit	S
Setting range	0.1—1
Factory setting	

Starting current (only with 4T)

Unit	A
Setting range	5—100%of main current Iw
Factory setting	

Upslope time

Unit	S
Setting range	0—5
Factory setting	

Welding current

Unit	A
Setting range	5—200；

Base current

Unit A

Setting range 5—200；

Important! Only selectable when “pulse key” has been pressed.

Ratio of pulse duration to base current duration

Unit %

Setting range 5—100

Factory setting

Important! Only selectable when “pulse key” has been pressed.

Pulse frequency

Unit Hz

Setting range 0.5—100

Factory setting

Important! Only selectable when “pulse key” has been pressed.

Downslope time

Unit S

Setting range 0—5

Factory setting

Crater arc current (only with 4T)

Unit S

Setting range 5—100% of main current Iw ；

Factory setting

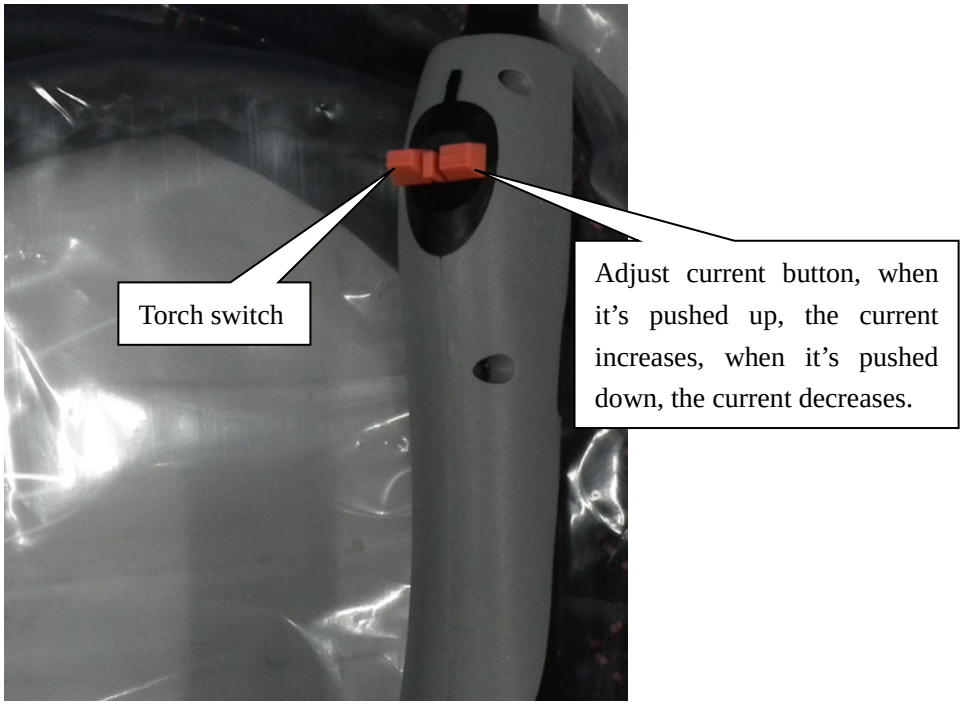
Gas post-flow time

Unit S

Setting range 0.1—10

Factory setting

4.3 Torch switch control current

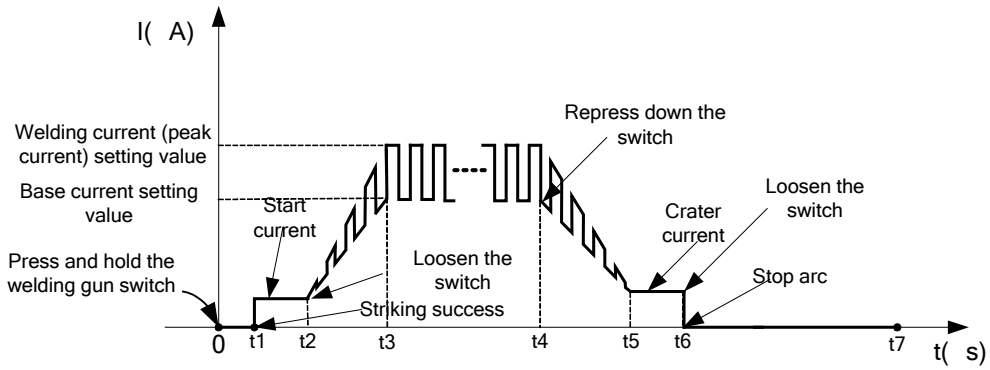


4.4 Argon Arc Welding Operation

4.4.1 TIG welding （4T operation）

The start current and crater current can be pre-set. This function can compensate the possible crater that appears at the beginning and end of the welding. Thus, 4T is suitable for the welding of medium thickness plates.

Pulsed TIG long welding（4T）:



Introduction:

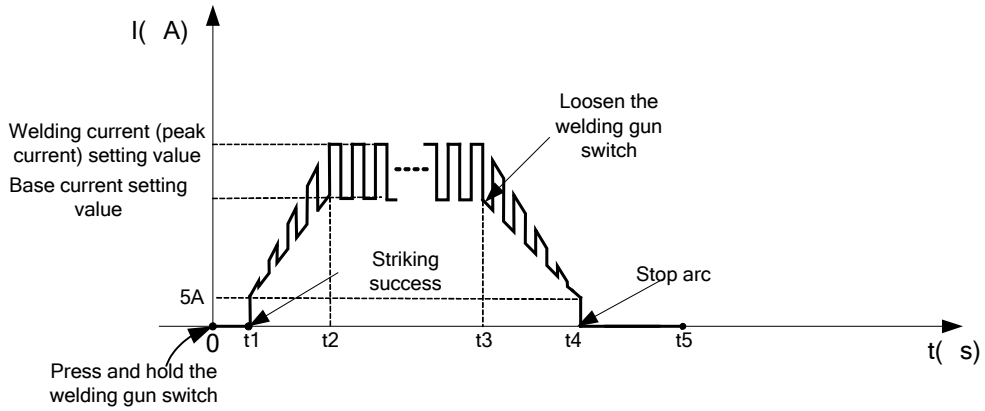
- 0: Press and hold the Torch switch, Electromagnetic gas valve is turned on. The shielding gas starts to flow;
- 0～t1: Pre flow time, adjustment range of pre flow time :0.1~1.0S;
- t1: Striking success, adjustment range of start current: 5~200A;
- t2: Release the Torch switch, the output current slopes up from start current; if the output pulse function is turned on, the output current is pulsed;

- t2～t3： Output current slopes up to the setting current value; adjustment range of up slope time 0~10.0S ;
- t3～t4： Welding process. During this period, the torch switch is released.

  Note: If the output pulse function is turned on, the output current is pulsed. If the output pulse function is turned off, the output current is DC current;
- t4： Repress down the Torch switch, the output current slopes down to crater current; if the output pulse function is turned on, the slope down current is pulsed;
- t4～t5： Down slope time, adjustment rang of down slope time: 0~10.0S;
- t5～t6： Crater current holds time; adjustment range of crater current: 5~200A ;
- t6： Release the Torch switch and arc will stop with gas continuing to flow.
- t6～t7： Post flow time, adjustment range of post flow time: 0.1～10.0S;
- t7： Electromagnetic valve is closed and argon stops flowing. Welding is finished.

4.4.2 TIG welding (2T operation)

Pulsed TIG short welding（2T）：



Introduction：

- 0： Press and hold the Torch, Electromagnetic gas valve is turned on. The shielding gas starts to flow;
- 0～t1： Pre flow time, adjustment range of pre flow time :0.1~1.0S;
- t1～t2： Striking success, the output current slopes up to the setting current from minimum current (5A); if the output pulse function is turned on, the slope up current is pulsed;
- t2～t3： During the whole welding process, the Torch is pressed and held without releasing;

  Note: If the output pulse function is turned on, the output current is pulsed. If the output pulse function is

turned off, the output current is DC current;

- t3: Release the Torch switch, the output current slopes down; if the output pulse function is turned on, the slope down current is pulsed;
- t3～t4： The output current slopes down to minimum current (5A), stop arc; adjustment range of down slope time: 0~5S;
- t4～t5： Post flow time, adjustment range of post flow time: 0.1～10.0S;
- t5： Electromagnetic valve is closed and stop argon flowing. Welding is finished.

Short circuit protect function：

- TIG /DC/LIFT：If the tungesten electrode touches the workpiece when welding, the current will drop to 30A, which can reduce the tungsten spoilage,prolonging the using life of the tungsten electrode，and preventing tungsten clipping.

- TIG /DC/HF：If the tungsten electrode touches the workpiece when welding, the current will drop to 0 within 1s, which can reduce wear,prolonging the life of the tungsten electrode，and prevent tungsten clipping.

- MMA operation： if the electrode touches workpiece over two seconds, the welding current will drop to the 0 automatically to protect the electrode.

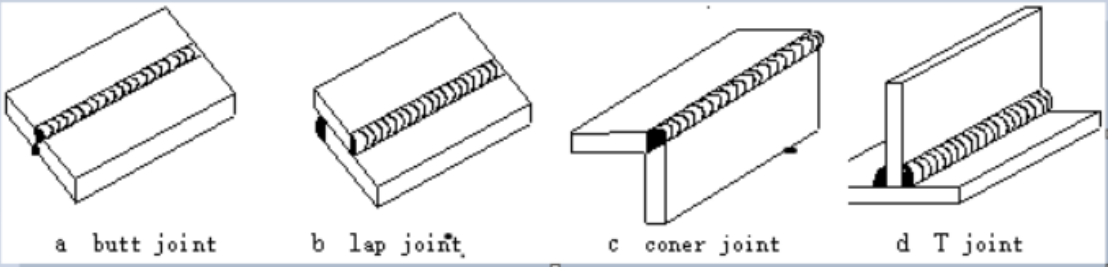
Retains arc function- Even if arc-break occurs the HF will keep the arc stable.

Notices:

- Check the condition of welding and connection units firstly, otherwise there will be a malfunction such as ignition spark、gas leakage、out of control and so on.
- Check whether there is enough Argon gas in the shielding gas cylinder, you can test the electromagnetic gas valve through the switch on the front panel.
- Do not let the torch aim at your hand or your body. When you press the torch switch, the arc is ignited with a high-frequency, high-voltage spark, and the ignition spark can cause interferences in equipment.
- The flow rate is set according to the welding power used in the job. Turn the regulation screw to adjust the gas flow which is shown on the gas hose pressure meter or the gas bottle pressure meter.
- The spark ignition works better if you keep the 3mm distance from the workpiece to the tungsten electrode during the ignition.

4.5 Welding Parameters

4.5.1 Joint forms in TIG/MMA



4.5.2 The explanation of welding quality

The relation of welding area color & protect effect of stainless steel

Welding area color	Silver or golden	blue	red-grey	grey	black
Protect effect	best	better	good	bad	worst

The relation of welding area color & protect effect of Ti-alloy

Welding area color	bright argent	orange-yellow	blue-purple	caesious	white powder of titanium oxide
Protect effect	best	better	good	bad	worst

4.5.3 TIG Parameters Matching

The corresponding relationship between gas nozzle diameter and electrode diameter

Gas nozzle diameter/mm	Electrode diameter/mm
6.4	0.5
8	1.0
9.5	1.6 or 2.4
11.1	3.2
Notice: the above parameters originate from《Welding Dictionary》P142, Volume 1 of Edition 2.	

Welding current range/A	DC positive connection	
	Gas nozzle diameter/mm	Gas flow rate/L·min^{-1}
10～100	4～9.5	4～5

101～150	4～9.5	4～7
151～200	6～13	6～8
201～300	8～13	8～9

tungsten electrode diameter /mm	sharpened of the electrode diameter/mm	angle of cone（°）	background current/A
1.0	0.125	12	2～15
1.0	0.25	20	5～30
1.6	0.5	25	8～50
1.6	0.8	30	10～70
2.4	0.8	35	12～90
2.4	1.1	45	15～150
3.2	1.1	60	20～200

TIG of stainless steel (single run welding)

Workpiece thickness /mm	Joint form	tungsten electrode diameter/mm	welding wire diameter/mm	Argon gas flow rate/ $L \cdot min^{-1}$	welding current (DCEP)	Welding speed/ $cm \cdot min^{-1}$
0.8	Butt joint	1.0	1.6	5	20～50	66
1.0	Butt joint	1.6	1.6	5	50～80	56
1.5	Butt joint	1.6	1.6	7	65～105	30
1.5	Corner joint	1.6	1.6	7	75～125	25
2.4	Butt joint	1.6	2.4	7	85～125	30
2.4	Corner joint	1.6	2.4	7	95～135	25
3.2	Butt joint	1.6	2.4	7	100～135	30
3.2	Corner joint	1.6	2.4	7	115～145	25
4.8	Butt joint	2.4	3.2	8	150～225	25
4.8	Corner joint	3.2	3.2	9	175～250	20

Notice: the above parameters originate from《Welding Dictionary》P150, Volume 1 of Edition 2.

Parameters of piping back sealing welding for mild steel（DCEP）

Piping diameterΦ/mm	Tungsten electrode diameter/mm	Gas nozzle diameter/mm	Welding wire diameter/mm	Welding current/A	Arc voltage/V	Argon flow rate / $L \cdot min^{-1}$	Welding rate / $cm \cdot min^{-1}$
38	2.0	8	2	75～90	11～13	6～8	4～5

42	2.0	8	2	75～95	11～13	6～8	4～5
60	2.0	8	2	75～100	11～13	7～9	4～5
76	2.5	8～10	2.5	80～105	14～16	8～10	4～5
108	2.5	8～10	2.5	90～110	14～16	9～11	5～6
133	2.5	8～10	2.5	90～115	14～16	10～12	5～6
159	2.5	8～10	2.5	95～120	14～16	11～13	5～6
219	2.5	8～10	2.5	100～120	14～16	12～14	5～6
273	2.5	8～10	2.5	110～125	14～16	12～14	5～6
325	2.5	8～10	2.5	120～140	14～16	12～14	5～6
Notice: the above parameters originate from《Welding Dictionary》P167, Volume 1 of Edition 2.							

4.6 Operational Environment

● Height above sea level is below 1000m.

● Operation temperature range: -10^{0}C～+40^{0}C.

● Relative humidity is below 90 % (20^{0}C), relative humidity is below 50 % (40^{0}C).

● The inclination of the power source does not exceed 10^0.

● Protect the machine against heavy rain or in hot circumstance against direct sunshine.

● The content of dust, acid, corrosive gas in the surrounding air or substance can not exceed normal standard.

● Take care that there is sufficient ventilation during welding. There is at least 30cm free distance between the machine and wall.

4.7 Operational Notices

● Read 1 carefully before attempting to use this equipment.

● Connect the ground wire with the machine directly and refer to 3.5.

● Do not touch the output electrode with any part of your body.

● Before operation, only persons relevant to the operation should be present. Do not watch the arc in unprotected eyes.

● Ensure good ventilation of the machine to improve duty ratio.

● Turn off the engine when the operation finished to economize energy source.

● When power switch shuts off protectively because of failure do not restart unit until problem is resolved. Otherwise, the range of problems may be extended.

5.1 Maintenance

In order to guarantee that the arc welding machine works efficiently and in safety, it must be maintained regularly.

Maintenance items in detail are in the following table.

● Warning: For safety while maintaining the machine, please shut off the supply power and wait for 5 minutes, until capacity voltage already drops to safe voltage 36V!

Frequency	Maintenance item
Daily examination	Observe whether panel knob and switch in the front and at the back of arc welding machine are flexible and put correctly in place. If the knob has not been put correctly in place, please correct; If you can't correct or fix the knob, please replace immediately; If the switch is not flexible or it can't be put correctly in place, please replace immediately; Please get in touch with maintenance service department if there are no accessories. After turning on power, watch/listen to ensure nil peculiar smells or noises are present. If there is an issue such as this, please contact local this area agent or the branch company. Observe whether the display value of LED is intact. If the display number is not intact, please replace the damaged LED. If it still doesn't work, please maintain or replace the display PCB. Observe whether the min/max value on LED accords with the set value. If there is any difference and it has affected the normal welding craft, please adjust it. Check whether fan is damaged and is normal to rotate or control. If the fan is damaged, please change immediately. If the fan does not rotate after the arc welding machine is overheated, observe whether there is something blocking the blade. If it's blocked, please remove. If the fan does not rotate after removing object the fan can be moved in the direction of the fan's normal direction. If the fan rotates normally, the start capacity should be replaced; If not, replace the fan. Observe whether the fast connector is loose or overheated. if the arc welding machine has the above problems, it should be fastened or changed. Observe that Whether the current output cable is damaged. If it is damaged, it should be wrapped up, insulated or changed.
Monthly examination	Using dry compressed air to clear the inside of arc welding machine. Especially for clearing up the dusts on radiator, main voltage transformer, inductance, IGBT module, the fast recover diode and PCB, etc. Ensure all connections are tight. If loose please tighten. Please erase rust on connections to ensure good connectivity and performance.
Quarter-yearly examination	Check whether the actual current accords with the displaying value. If they do not accord, they should be recalibrated. The actual current value can be measured by the adjusted plier-type ampere meter.
Yearly examination	Measure the insulating impedance among the main circuit, PCB and case, if it below 1MΩ,

	insulation is thought to be damaged and needs to be changed.

5.2 Troubleshooting

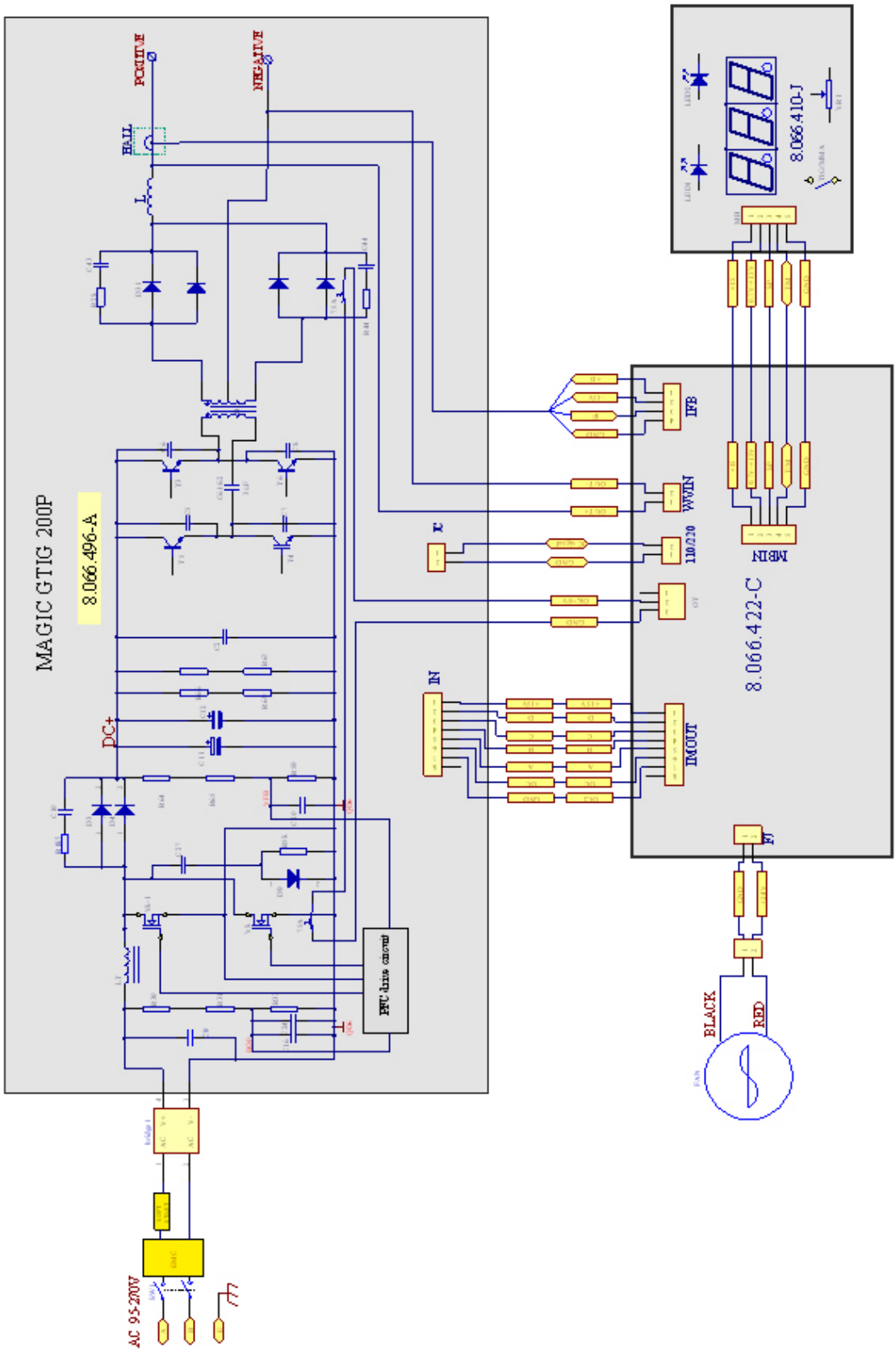
- Before arc welding machines are dispatched from the factory, they have already been debugged accurately.
- Maintenance must be performed carefully. If any wire becomes flexible or is misplaced, it may be a potential danger to user!
- Only Professional maintenance personal who are Authorized by Arcoweld can overhaul or repair the machine.
- Always turn off the power source before removing covers or working on unit.
- If there are any problems, please contact your authorized repairer or distributor.

If there are any issues with the welding machine, please consult the following trouble shooting chart:

S/N	Issue		Reasons	Solution
1	Turning on the power source, and fan works, but the power pilot lamp is not on.		The power light is damaged, or connection is not good	Check and repair Pr7
			The transformer of power is broken	Repair or change the transformer
			Control PCB failures	Repair or change the control Pr4
2	Turning on the power source, and the power lamp is on, but fan doesn't work		There is something in the fan	Clear out
			The start capacitor of fan damaged	Change capacitor
			The fan motor is damaged	Change fan
3	Turning on the power source, the power lamp is not on, and fan doesn't work		No power supply input	Check whether there is power supply
			The fuse inside the machine damaged	Change it (10A)
4	The number on the display is not intact.		The LED in the display is broken	Change the LED
5	The max and min value displayed doesn't accord with the set value.		The max value is not accordant (refer to 3.1)	Adjust potentiometer Imin on the power board.
			The min value is not accordant (refer to 3.1)	Adjust potentiometer Imaxin the current meter.
6	No no-load voltage output (MMA)		The machine is damaged	Check the main circuit and the Pr4.
7	Arc can not be ignited (TIG)	There is spark on the HF igniting board.	The welding cable is not connected with the two output of the welder.	Connect the welding cable to the welder's output.
			The welding cable damaged.	Repair or change it.
			The earth cable connected unstably.	Check the earth cable.
			The welding cable is too long.	Use an appropriate welding cable.
			There is oil or dust on the workpiece.	Check and remove it.

			The distance between tungsten electrode and workpiece is too long.		Reduce the distance (about 3mm).
		There is nil spark on the HF igniting board.	The HF igniting board does not work.		Repair or change Pr8
			The distance between the discharger is too short.		Adjust this distance (about 0.7mm).
			The malfunction of the welding torch switch.		Check the welding torch switch, control cable and aero socket.
8	No gas flow (TIG)		Gas cylinder is closed, or gas pressure is low		Open or change the gas cylinder
			Something in the valve		Remove it
			Electromagnetic valve is damaged		Change it
9	Gas flows continuously.		The gas-test on the front panel is on		The gas-test on the front panel is off
			Something in the valve		Remove it
			Electromagnetic valve is damaged		Change it
			The adjustment knob of pre-gas time on the front panel is damaged		Repair or change it
10	The welding current can not be adjusted		The welding current potentiometer on the front panel connection is not good or damaged		Repair or change the potentiometer
12	The welding current displayed isn't accordant with the actual value.		The min value displayed isn't accordant with the actual value. (Please refer to 3.1)		Adjust potentiometer Imin on the power board.
			The max value displayed isn't accordant with the actual value. (Please refer to 3.1)		Adjust potentiometer Imax on the power board.
13	The penetration of molten pool is not enough.		The welding current is adjusted too low		Increase the welding current
			The arc length is too long.		Use 2T operation
14	The alarm lamp on the front panel is on		Over heat protection	Working time too long	Reduce the duty cycle (work intermittently)
			Over-voltage protection	Power supply fluctuates	Using the stable power supply
			Low-voltage protection	Power supply fluctuates	Using the stable power supply
				Too many machines using power supply in the same time	Reduce the machines using power supply in the same time
			Over-current protection	Unusual current in the main circuit	Check and repair the main circuit and drive Pr6

5.3 Electrical principle drawing



ARCOWELD LIMITED WARRANTY

Arcoweld will repair or replace, at its discretion, any warranted parts or components that fail due to defects in material or workmanship within the time periods set out below. Arcoweld must be notified within 30 days of any failure, at which time Arcoweld will provide instructions on the warranty procedures to be implemented. Arcoweld will honour warranty claims submitted within the warranty periods listed below. All warranty periods begin on the date of sale of the product to the original retail customer or 1 year after sale to an authorized Arcoweld Distributor.

Limited Warranty Period as below –

Model	Components and Accessories	Warranty Details	
ArcoStick MMA DC inverters	Original main transformer,inductors,rectifiers	**Parts**	**Labour**
	Original printed circuiit boards	3 Years	2 years
	All other circuits and componenets including but not limited to relays,switches,contactors,solenoids,fans and electric mototrs.	2 years	1 year
ArcoTig Inverters	Original main transformer,inductors,rectifiers	3 years	3 years
	Original printed circuiit boards	3 years	2 years
	All other circuits and componenets including but not limited to relays,switches,contactors,solenoids,fans and electric motors.	1 year	1 year
	Gas regulator/flowmeter(excluding seat assemblies,pressure gauges,elastomer seals and O-rings	1 year	1 year
	Regulator seat assemblies and pressure gauges	6 Months	6 Months
ArcoCut Plasma Inverters	Power source components	3 years	3 years
	Torch and Leads	1 year	1 year
ArcoMig Inverters	Power source	3 years	3 years
	MIG torch,Electrode holders and work leads	3 Months	3 Months
	Mig torch consumable items	Nil	Nil
	Gas regulator/flowmeter(excluding seat assemblies,pressure gauges,elastomer seals and O-rings	1 year	1 year
	Regulator seat assemblies and pressure gauges	6 Months	6 Months
	Elastomer seal and O-rings used in the equipment	3 Months	3 Months

Arcoweld Makes No Other Warranty, Express or Implied. This Warranty Is Exclusive And In Lieu Of All Others, Including, But Not Limited to Any Warranty of Merchantability or Fitness for Any Particular Purpose.

Limitation of Liability: Arcoweld Shall Not Under Any Circumstances Be Liable for Special, Indirect or Consequential Damages, Such As, But Not Limited To, Lost Profits and Business Interruption.

The remedies of the Purchaser set forth herein are exclusive and the liability of Arcoweld with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Arcoweld whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of Arcoweld is authorized to change this warranty in any way or grant any other warranty.

Purchaser's Rights Under This Warranty Are Void If Replacement Parts or Accessories Are Used Which in Arcoweld's Sole Judgement May Impair the Safety or Performance of Any Arcoweld Product. Purchaser's Rights Under This Warranty Are Void If the Product Is Sold to Purchaser by Non-Authorized Persons.

ARCOWELD LIMITED WARRANTY continued

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Arcoweld delivered the product to the authorized distributor. Any claim under this warranty must be made within the warranty period which commences on the date of purchase of the product.
To make a claim under the warranty, take the product (with proof of purchase from an Arcoweld Accredited Seller) to the store where you purchased the product or contact Arcoweld on + 61 8 9248 3188 for advice on your nearest Service Provider. Arcoweld reserves the right to request documented evidence of date of purchase. Arcoweld or our Accredited Distributor must be notified in writing of its claim within seven (7) days of becoming aware of the basis thereof, and at its own expense returning the goods which are the subject of the claim to Arcoweld or nominated Accredited Distributor/Accredited Service Provider.
Email: info@arcoweld,com.au.

This warranty is provided in addition to other rights and remedies you have under law: Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure and to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Note:

* No employee, agent, or representative of Arcoweld is authorized to change this warranty in any way or grant any other warranty, and Arcoweld shall not be bound by any such attempt. Correction of nonconformities, in the manner and time provided herein, constitutes fulfilment of Arcoweld's obligations to purchaser with respect to the product.

* This warranty is void, and seller bears no liability hereunder, if purchaser used replacement parts or accessories which, in Arcoweld's sole judgment, impaired the safety or performance of any Arcoweld product and if the unit is altered or serviced by an unauthorised Arcoweld Service Provider. Purchaser's rights under this warranty are void if the product is sold to purchaser by unauthorized persons.

'ARCOWELD' relays to customers of its authorized distributors that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the Arcoweld products Arcoweld shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Arcoweld's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at Arcoweld's sole option, of any components or parts of the product determined by Arcoweld to be defective.

Please note that the information detailed in this statement supersedes any prior published data produced by Arcoweld.

ARCOWELD TERMS OF WARRANTY

All warranties from the 1st January 2012 against defects (also known as a manufacturer's warranty) supplied with goods or services must comply with the mandatory requirements in the new Australian Consumer Law and the Trade Practices (Australian Consumer Law) Amendment Regulations (2010) (No.1).This Warranty Statement should be read in conjunction with the Warranty Schedule contained in the operating instructions of your product. This schedule contains the warranty period applicable to your product. Any claim under this warranty must be made within the warranty period which commences on the date of purchase of your product. To make a claim under the warranty, take the product (with proof of purchase from an Arcoweld Accredited Seller) to the store where you purchased the product, or contact Arcoweld on T: + 61 8 9248 3188 All costs associated with lodging the warranty claim including the return of goods to Arcoweld or our Nominated Accredited Distributor / Accredited Service Provider are the responsibility of the consumer.

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Email- info@arcoweld.com.au
Website- www.alloysteel.net

This warranty is provided in addition to other rights and remedies you have under law: Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure and to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. Failures due to incorrect use are not covered by this warranty and consumers are reminded to only use the product in accordance with the Operating Instruction supplied with every product purchased. Additional copies of Operating Instructions are available from Arcoweld on 08 92483188 or the Arcoweld Website