magnum

Model: WAVE 200KD

AC/DC Pulse TIG/ARC Welder

QUESTIONS? 1-800-567-8979

Our Customer Service staff are ready to provide assistance. If a part is damaged or missing, replacement parts can be shipped from our facility.

For help with assembly, or for additional product information, call our North American toll-free number: 1-800-567-8979

Notre personnel de service à la clientèle sera prêt à fournir assistance. Si une pièce est endommagée ou manquante, des remplacements seront expédiés de notre usine.

Pour de l'aide avec l'assemblage, ou pour des informations additionnelles sur le produit, appeller notre numéro sans frais nord-américain : 1-800-567-8979

SAVE THIS MANUAL

You will need this manual for safety instructions, operating procedures, and warranty. Put it and the original sales invoice in a safe, dry place for future reference.

CONSERVEZ CE GUIDE

Vous aurez besoin de ce guide pour les instructions de sécurité, les procédures d'utilisation et la garantie. Conservez-le dans un endroit sûr et sec pour référence future.

WE3107 v.110413

CATALOGUE

GENERAL SAFETY RULES

 **WARNING: Read and understand all instructions.** Failure to follow all instructions listed below may result in serious injury.

 **CAUTION: Do not allow persons to operate or assemble this WAVE 200KD until they have read this manual and have developed a thorough understanding of how the WAVE 200KD works.**

 **WARNING: The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions or situations that could occur.** It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

1.1 Your Welding Environment

-Keep the environment you will be welding in free from flammable materials.
-Always keep a fire extinguisher accessible to your welding environment.
-Always have a qualified person install and operate this equipment.
-Make sure the area is clean, dry and ventilated. Do not operate the welder in humid, wet or poorly ventilated areas.
-Always have your welder maintained by a qualified technician in accordance with local, state and national codes.
-Always be aware of your work environment. Be sure to keep other people, especially children, away from you while welding.
-Keep harmful arc rays shielded from the view of others.
-Mount the welder on a secure bench
or cart that will keep the welder secure and prevent it from tipping over or falling.

1.2 Your Welder's Condition

-Check ground cable, power cord and welding cable to be sure the insulation is not damaged. Always replace or repair damaged components before using the welder.
-Check all components to ensure they are clean and in good operating condition before use.

1.3 Use of Your Welder

⚠ CAUTION

Do not operate the welder if the output cable, electrode, torch, wire or wire feed system is wet. Do not immerse them in water. These components and the welder must be completely dry before attempting to use them.
-Follow the instructions in this manual.
-Keep welder in the off position when not in use.
-Connect ground lead as close to the area being welded as possible to ensure a good ground.
-Do not allow any body part to come in contact with the welding wire if you are in contact with the material being welded, ground or electrode from another welder.
-Do not weld if you are in an awkward position. Always have a secure stance while welding to prevent accidents. Wear a safety harness if working above ground.

-Do not drape cables over or around your body.
-Wear a full coverage helmet with appropriate shade (see ANSI Z87.1 safety standard) and safety glasses while welding.
-Wear proper gloves and protective clothing to prevent your skin from being exposed to hot metals, UV and IR rays.
-Do not overuse or overheat your welder. Allow proper cooling time between duty cycles.
-Keep hands and fingers away from moving parts and stay away from the drive rolls.
-Do not point torch at any body part of yourself or anyone else.
-Always use this welder in the rated duty cycle to prevent excessive heat and failure.

1.4 Specific Areas of Danger, Caution or Warning

Electrical Shock

⚠WARNING

Electric arc welders can produce a shock that can cause injury or death. Touching electrically live parts can cause fatal shocks and severe burns. While welding, all metal components connected to the wire are electrically hot. Poor ground connections are a hazard, so secure the ground lead before welding.
-Wear dry protective apparel: coat, shirt, gloves and insulated footwear.
-Insulate yourself from the work piece. Avoid contacting the work piece or ground.
- Do not attempt to repair or maintain the welder while the power is on.
-Inspect all cables and cords for any exposed wire and replace immediately if found.
-Use only recommended replacement cables and cords.
-Always attach ground clamp to the work piece or work table as close to the weld area as possible.
-Do not touch the welding wire and the ground or grounded work piece at the same time.
-Do not use a welder to thaw frozen pipes.

Fumes and Gases

⚠WARNING

-Fumes emitted from the welding process displace clean air and can result in injury or death.
-Do not breathe in fumes emitted by the welding process. Make sure your breathing air is clean and safe.
-Work only in a well-ventilated area or use a ventilation device to remove welding fumes from the environment where you will be working.
-Do not weld on coated materials (galvanized, cadmium plated or containing zinc, mercury or barium). They will emit harmful fumes that are dangerous to breathe. If necessary use a ventilator, respirator with air supply or remove the coating from the material in the weld area.
-The fumes emitted from some metals when heated are extremely toxic. Refer to the material safety data sheet for the manufacturer's instructions.
-Do not weld near materials that will emit toxic fumes when heated. Vapors from cleaners, sprays and degreasers can be highly toxic when heated.

UV and IR Arc Rays

⚠ DANGER

The welding arc produces ultraviolet (UV) and infrared (IR) rays that can cause injury to your eyes and skin. Do not look at the welding arc without proper eye protection.
-Always use a helmet that covers your full face from the neck to top of head and to the back of each ear.
-Use a lens that meets ANSI standards and safety glasses. For welders under 160 Amps output, use a

shade 10 lens; for above 160 Amps, use a shade 12. Refer to the ANSI standard Z87.1 for more information.

-Cover all bare skin areas exposed to the arc with protective clothing and shoes. Flame-retardant cloth or leather shirts, coats, pants or coveralls are available for protection.

-Use screens or other barriers to protect other people from the arc rays emitted from your welding.

-Warn people in your welding area when you are going to strike an arc so they can protect themselves.

Fire Hazards

⚠WARNING

Do not weld on containers or pipes that contain or have had flammable, gaseous or liquid combustibles in them. Welding creates sparks and heat that can ignite flammable and explosive materials.

-Do not operate any electric arc welder in areas where flammable or explosive materials are present.

-Remove all flammable materials within 35 feet of the welding arc. If removal is not possible, tightly cover them with fireproof covers.

-Take precautions to ensure that flying sparks do not cause fires or explosions in hidden areas, cracks or areas you cannot see.

-Keep a fire extinguisher close in the case of fire.

-Wear garments that are oil-free with no pockets or cuffs that will collect sparks.

-Do not have on your person any items that are combustible, such as lighters or matches.

-Keep work lead connected as close to the weld area as possible to prevent any unknown, unintended paths of electrical current from causing electrical shock and fire hazards.

-To prevent any unintended arcs, cut wire back to ¼" stick out after welding.

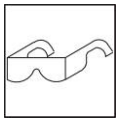
Hot Materials

⚠ CAUTION

Welded materials are hot and can cause severe burns if handled improperly.

-Do not touch welded materials with bare hands.

-Do not touch MIG gun nozzle after welding until it has had time to cool down.



Sparks/Flying Debris

⚠ CAUTION

Welding creates hot sparks that can cause injury. Chipping slag off welds creates flying debris.

-Wear protective apparel at all times: ANSI-approved safety glasses or shield, welder's hat and ear plugs to keep sparks out of ears and hair.

Electromagnetic Field

⚠ CAUTION

-Electromagnetic fields can interfere with various electrical and electronic devices such as pacemakers.

-Consult your doctor before using any electric arc welder or cutting device

-Keep people with pacemakers away from your welding area when welding.

-Do not wrap cable around your body while welding.

-Wrap MIG gun and ground cable together whenever possible.

-Keep MIG gun and ground cables on the same side of your body.

Shielding Gas Cylinders Can Explode

⚠WARNING

High pressure cylinders can explode if damaged, so treat them carefully.

-Never expose cylinders to high heat, sparks, open flames, mechanical shocks or arcs.

-Do not touch cylinder with MIG gun.

-Do not weld on the cylinder

-Always secure cylinder upright to a cart or stationary object.

-Keep cylinders away from welding or electrical circuits.

-Use the proper regulators, gas hose and fittings for the specific application.

-Do not look into the valve when opening it.

-Use protective cylinder cap whenever possible

1.5 Proper Care, Maintenance and Repair

⚠ DANGER

-Always have power disconnected when working on internal components.

- Do not touch or handle PC board without being properly grounded with a wrist strap. Put PC board in static proof bag to move or ship.

-Do not put hands or fingers near moving parts such as drive rolls of fan

WAVE 200KD USE AND CARE

- **Do not modify the WAVE 200KD in any way.** Unauthorized modification may impair the function and/or safety and could affect the life of the equipment. There are specific applications for which the **WAVE 200KD** was designed.
- **Always check of damaged or worn out parts before using the WAVE 200KD.** Broken parts will affect the **WAVE 200KD** operation. Replace or repair damaged or worn parts immediately.
- **Store idle WAVE 200KD.** When **WAVE 200KD** is not in use, store it in a secure place out of the reach of children. Inspect it for good working condition prior to storage and before re-use.

Notice: * If the welder continues to work too long time, the 【Protection Indicator】on the panel would be on, indicating that the inner temperature rise inside the welder had exceed the designed permitted temperature. At this time, stop the welding work, wait until the welder cooled inside and the 【Protection Indicator】 turned off, then continue to work again;

* Cut off the power switch and Argon valve, before leaving the welding place temporarily or after the welding worked finished;

* Welders should wear canvas work clothes and welding face shield to prevent arc light and heat radiation;

* Put light-proof screen around the work area to prevent others influenced by the arc lights.

* Flammable, explosive items could not be put near the welding area;

* Every outlet of the welder should be connected and earthed correctly.

Notice: The cover protection degree of the WAVE series Square Wave AC/DC pulsed inverter TIG welder is IP21S.When the welder is operated, do not insert finger or round stick diameter less than 12.5mm (especially metal stick) into the welder; Do not allow to press heavily onto the welder.

TECHNICAL SPECIFICATION

TERM	UNIT	WAVE 200KD
Rated Input Voltage	V	220
Power Frequency	Hz	50/60
Rated Input Capacity	KVA	7.9
Rated Input Current	A	36
Output No Load Voltage	V	65
Rated Working Voltage	V	18
DC Argon Welding Current	A	5～200
AC Argon Welding Current	A	10～200
Stick Welding Current	A	5～170
Current Up Time	S	0～15
Current Drop Time	S	0～25
Pulse Frequency	Hz	0.5～250
Pulse Width Adjustment (DC)	%	15～85
Clear Area Control（AC）	%	15～65
Gas Stop Delay Time	S	0～30
Rated Duty Cycle	%	35
Cooling Type		Air cooling
Effiency	η	≥ 85%
Power Factor	Cosφ	0.92
Insulation Degree		H
Cover Protection Degree	IP	IP21S
Weight	kg	19.5
Dimension L×W×H	mm	500*240*410

No special advice on above parameter. The nameplate parameter on the welder is prior.

Welding regulations parameter table (only for reference)

Mode	Material Type	Designed Joint	WORK Thickness (mm)	Wire Dia Φ (mm)	Welding Current (A)	Polarity	Argon Flow (dm^3/min)	Tungsten Stick Dia Φ (mm)	Angle	Top Dia Φ (mm)
DC	Stainless Steel	Vertical Joint	1.6~3.0	1.6~2.5	50~90	DC Positive	8~12	1.0	12~20°	0.12~0.25
		V groove	＞3.0~6.0		70~120			1.6	25~30°	0.50~0.75
		X groove	＞6.0~12	2.5~3.2	100~150		10~14	2.4	35~45°	0.75~1.10
AC	Pure Aluminium, Alu-Mag Alloy	Vertical Joint	1~2.5	1.6~2.5	45~90	Positive	2~6	2~3	90°	1.50
		V groove	3~6	2~4	90~180		10~12	3~4		
		X groove	8~12	4~5	150~220		12~16	4~5		

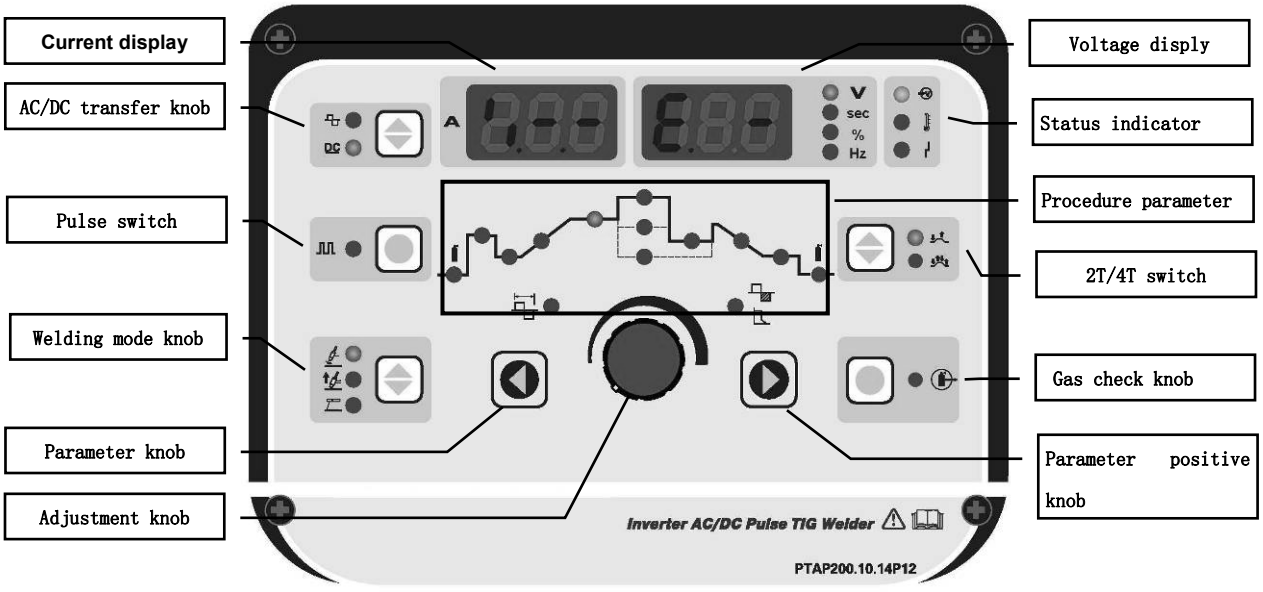
KNOW YOUR WELDER

Description

WAVE200KD is a digitization model can be used for MMA、ACTIG 、DCTIG and PULSE TIG, the parameters can be preset and showed, welding current and voltage can real-time display, this is very easy operation.

1. Front panel

1. 1. Know the Front panel



1.2. Current display

To show the preset current when setting and the welding current when working.

1.3. AC/DC transfer knob

Use this knob to choose the AC or DC, when AC indicator light, means the machine is under AC mode. When DC indicator light, means the machine is under DC mode.

1.4. Pulse switch

Use this knob to choose whether you need the pulse, when the indicator light, means it is under pulse mode.

1.5. Welding mode knob

Use this knob to choose the welding mode, can be used MMA、HF TIG and contact-type TIG.

1.6. Parameter knob and positive knob

Use this knob to choose the different procedure. When selected a procedure, the corresponding indicator light, then use adjustment knob to adjust the parameter.

1.7. Adjustment knob

Use this knob to adjust the parameter, and the parameter can be showed on the display.

1.8. Gas check knob

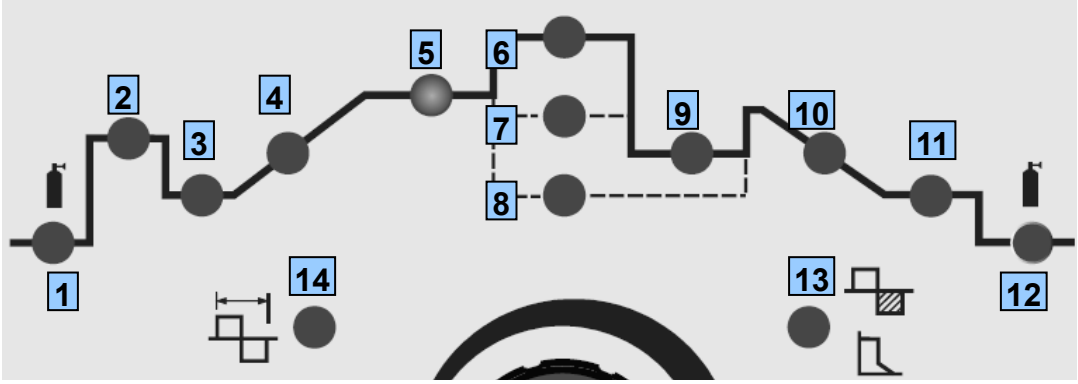
This machine has the gas check function, use knob to check the gas. Press this knob, the gas check indicator light, air valve works, that means the gas circuit is well working. Press this knob again, the indicator extinguish, gas check function does not work.

1.9. Voltage display

To show the preset current when setting and the welding current when working.

1.10. Procedure parameter display

This part is to show the procedure, when the indicator lights, the corresponding parameter can be adjusted with the adjustment knob. See following details:



1	Pre-flow Time indicator light	8	Pulse frequency indicator light（PULSE）
2	Hot start current indicator light（MMA）	9	Background current indicator light（PULSE）
3	Arc starting current indicator light（4T）	10	Minus grade time indicator light （4T）
4	Uphill time indicator light（4T)	11	Arc stopping current indicator light（4T）
5	Welding current indicator light（CC）	12	Gas delay time indicator light
6	Peak current indicator light（PULSE）	13	Clear area width（ACTIG）/ arc force（MMA）
7	Pulse width indicator light（PULSE）	14	AC frequency（ACTIG）

1.11.1. Thermal protection：

This machine use NTC for temperature sensing element to real time monitoring the temperature of the critical component to protect it.

1.11.2. Overvoltage protection:

When the input voltage is below or over the specified voltage, the machine will cut off the power to protect itself until the input voltage is available.

INSTALLATION

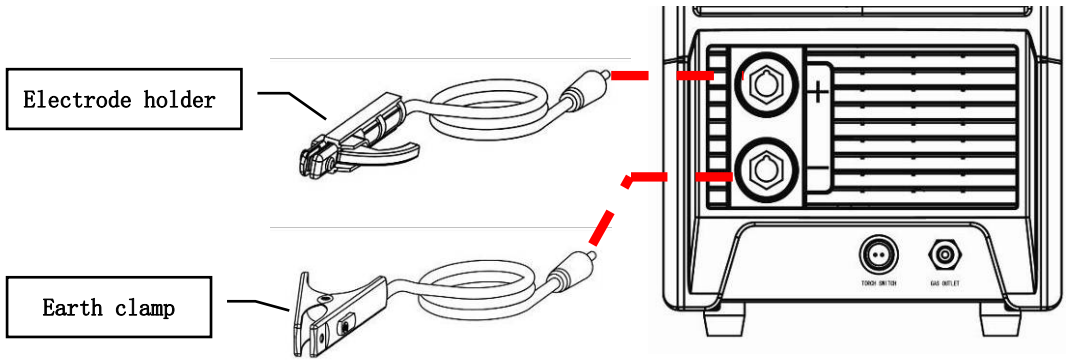
1. **POWER REQUIREMENT** - AC single phase 220V, 60 HZ with a 50 amp circuit breaker is required. DO NOT OPERATE THIS UNIT if the ACTUAL power source voltage is less than 220 volts AC or greater than 240 volts AC.

⚠WARNING

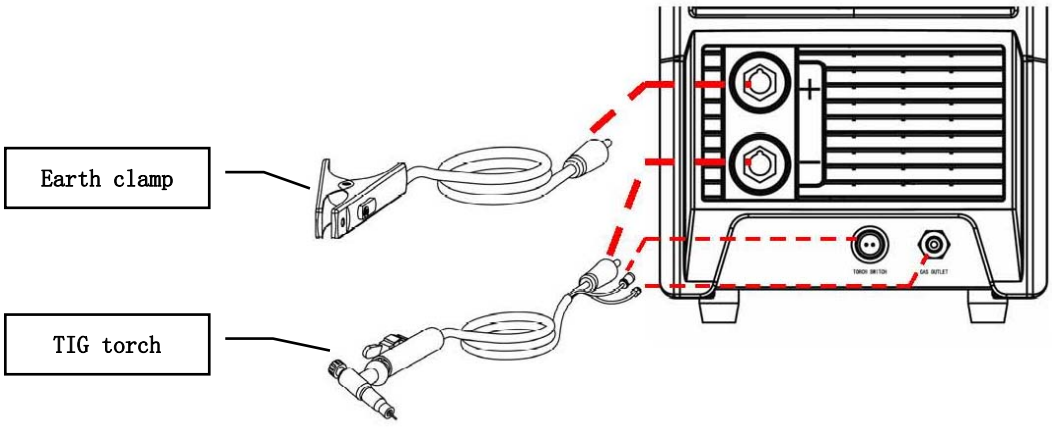
- **High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle. This welder must be grounded while in use to protect the operator from electrical shock.**
- **Do not remove grounding prong or alter the plug in any way. Do not use any adapters between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF when connecting your welder's power cord to a properly grounded 220 VAC, 60 HZ, Single Phase, 50 Amp input power supply.**

2. EXTENSION CORD - We do not recommend an extension cord because of the voltage drop they produce. This drop in voltage can affect the performance of the welder. If you need to use an extension cord, we recommend you check with a qualified electrician and your local electrical codes for your specific area. Do not use an extension cord over 25 ft. in length.

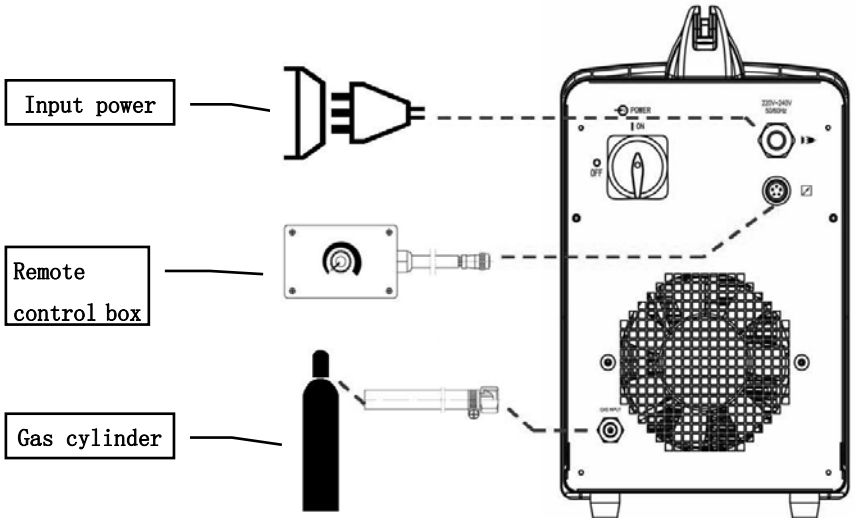
3. MMA mode connection method



4. TIG mode connection method



5. Input connection method



⚠WARNING

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN! Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flame-proof welding gloves, a heavy long sleeved shirt, trousers without cuffs, high topped shoes, and an ANSI approved welding helmet.

OPERATION

⚠WARNING

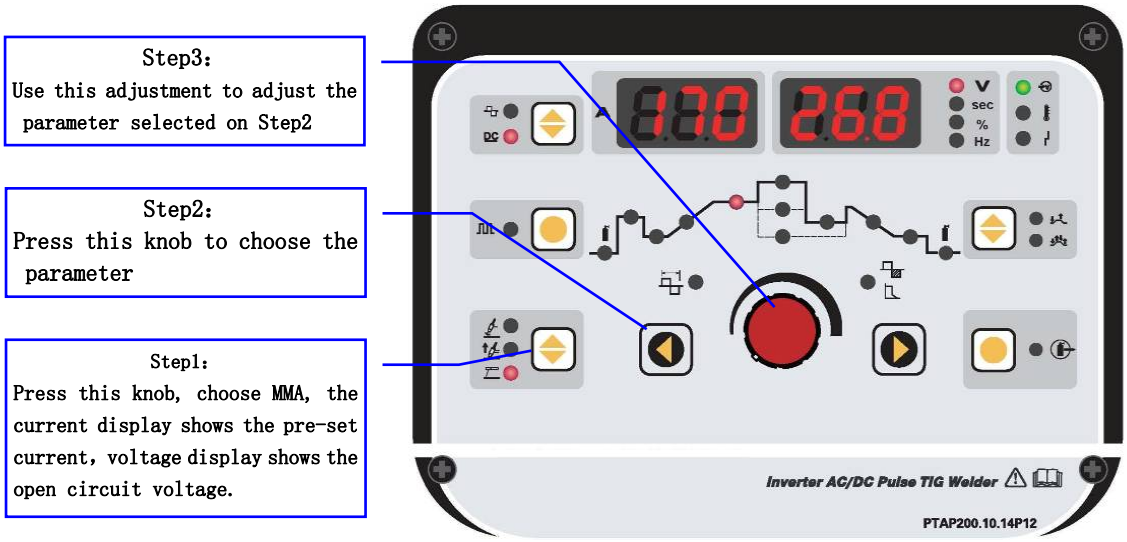
High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle at the power source. This welder must be grounded while in use to protect the operator from electrical shock. If you are not sure if your outlet is properly grounded, have it checked by a qualified electrician. Do not cut off the grounding prong or alter the plug in any way and do not use any adapter between the welder's power cord and the power source receptacle. Make sure the POWER switch is OFF then connect your welder's power cord to a properly grounded 220 VAC, 60 HZ, single phase, 50 amp power source.

1. MMA: DC Stick arc welding

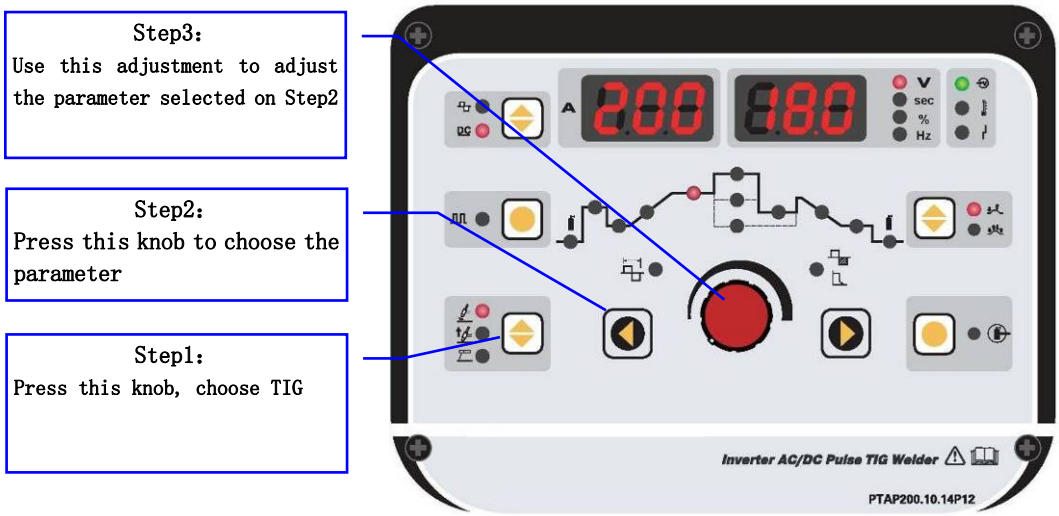
Set the【Welding mode knob】to "", adjust the【Adjustment knob】to change the welding current.

The hot start current "" and arc force current "" can be adjusted at this mode according to the welding materials.

NOTICE：If set【Welding mode knob】to "", just the hot start current "" and arc force current "" can be adjusted.



2. TIG:



2.1 DC TIG welding

Set the【Welding mode knob】to " ", and【AC/DC transfer knob】to DC" ",would enter into DC TIG welding mode. In this mode to adjust by "Parameter knob" "Parameter positive knob":

【 】to adjust the Pre-flow time

【 Ic 】to adjust the welding current;

【 】to adjust the stopping gas delay time;

Choose【2step,4step switch】set on different gears to choose the welding method "2 step "、"four step " (See the details introduction is "Technical Instruction")

2.2 DC pulse TIG welding

Set【Welding mode knob】to “TIG”，【AC/DC transfer knob】to “DC”，【Pulse switch】set on “Pulse” would enter into the by “Parameter knob””Parameter positive knob”:

【】to adjust the Pre-flow time；

【】to adjust the pulse peak current；

【】to adjust the Pulse width；

【】to adjust the Pulse frequency；

【】to adjust the Pulse Background current；

【】to adjust the stopping gas delay time；

2.3 Trigger Mode Control Button (HF TIG and LIFT TIG Mode only)

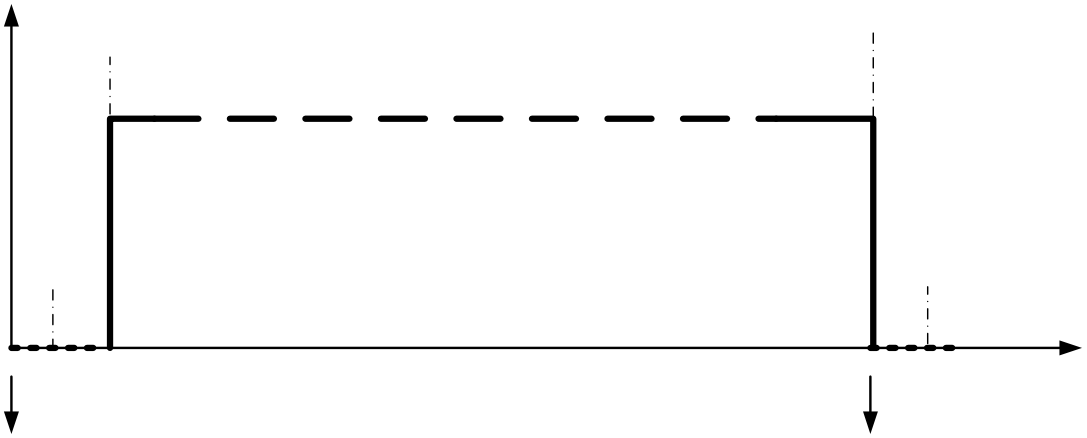
The trigger mode control is used to switch the functionality of the torch trigger between 2T (normal), and 4T (latch mode).

2.3.1 2T Normal Mode

In this mode, the torch trigger must remain depressed for the welding output to be active. Press and hold the torch trigger to activate the power source (weld). Release the torch trigger switch to cease welding.

NOTE

in this operation mode,the function of UP SLOPE and DOWN SLOPE is not used!



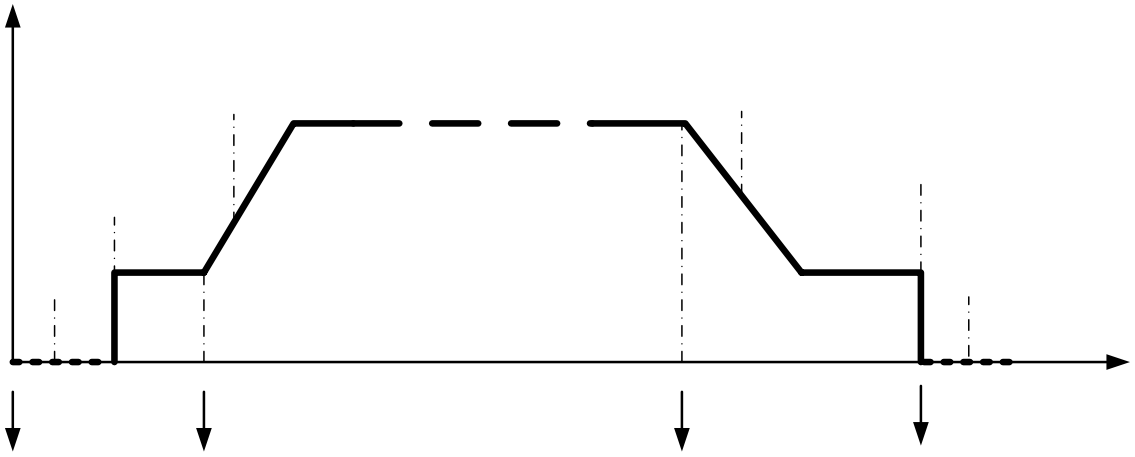
2.3.2 4T Latch Mode

This mode of welding is mainly used for long welding runs to reduce operator fatigue. In this mode the operator can press and release the torch trigger and the output will remain active. To deactivate the power source, the trigger switch must again be depressed and realized, thus eliminating the need for the operator to hold the torch trigger.

Note that when operating in GTAW (HF and LIFT TIG modes), the power source will remain activated until the selected down slope time has elapsed

NOTE

This Up Slope operates in (4T) TIG modes only and is used to set the time for the weld current to ramp up, after the torch trigger switch has been pressed then released, from Initial Current to High or BASE current.



2.4 AC TIG welding

Set 【Welding mode knob】to "TIG" and 【AC/DC transfer knob】to "AC" would enter into AC TIG welding mode. Then to choose by "Parameter knob""Parameter positive knob":

I/A

【 】to adjust the Pre-flow time;

【 】to adjust the welding current;

【 】to adjust the stopping gas delay time;

【 】to adjust the clear area width;

【 】to adjust the AC square wave frequency;

Choose【2step,4step switch】set on different gears to choose the welding method "2 step 2T"、"four step 4T" (See the details introduction is "Technical Instruction")

2.5 AC pulse TIG welding

Set 【Welding mode knob】to "TIG" and 【AC/DC transfer knob】to "AC", 【Pulse switch】set on "Pulse" would enter into AC pulse TIG welding mode. Then to choose by "Parameter knob""Parameter positive knob":

【 】to adjust the Pre-flow time;

【 】to adjust the pulse peak current;

【 】to adjust the Pulse width;

【 】to adjust the Pulse frequency;

【 】to adjust the Pulse Background current;

【 】to adjust the stopping gas delay time;

【 】to adjust the clear area width;

【 】to adjust the AC square wave frequency;

Choose【2step,4step switch】set on different gears to choose the welding method "2 step 2T"、"four step 4T" (See the details introduction is "Technical Instruction")

2.6 LIFT TIG welding

Set 【Welding mode knob】to "TIG", let the TIG torch contact the workpiece, press the switch, at this time there will be a 50A arc starting current, press the switch more than 0.5s(Pre-flow time not included), then lift the torch, make the distance between the torch and workpiece is 2~4mm, then start the welding.

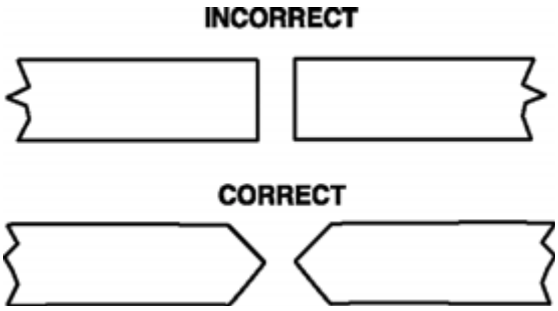
3. Stick welding skill

3.1 Welding positions

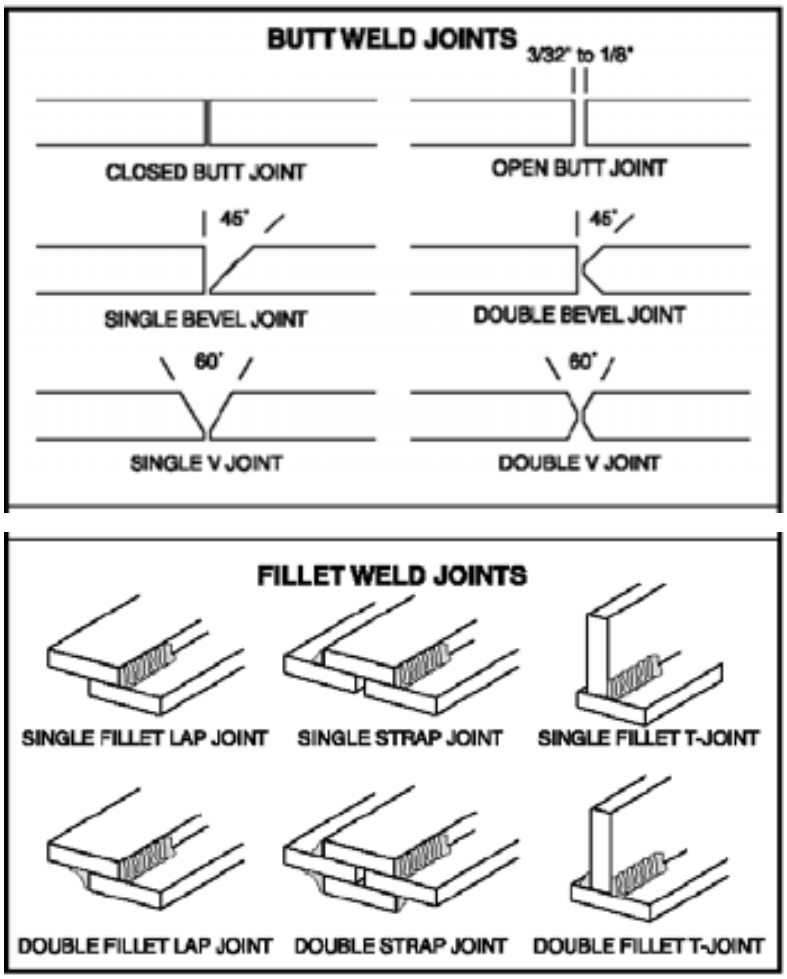
There are two basic positions, for welding: Flat and Horizontal. Flat welding is generally easier, faster, and allows for better penetration. If possible, the work piece should be positioned so that the bead will run on a flat surface.

3.2 Preparing the Joint

Before welding, the surface of work piece needs to be free of dirt, rust, scale, oil or paint or it will create brittle and porous welds. If the base metal pieces to be joined are thick or heavy, it may be necessary to bevel the edges with a metal grinder, the correct bevel should be around 60 degree. See following picture:



Based on different welding position, there are different welding joint, see following images for more information.



3.3 GROUND CLAMP CONNECTION

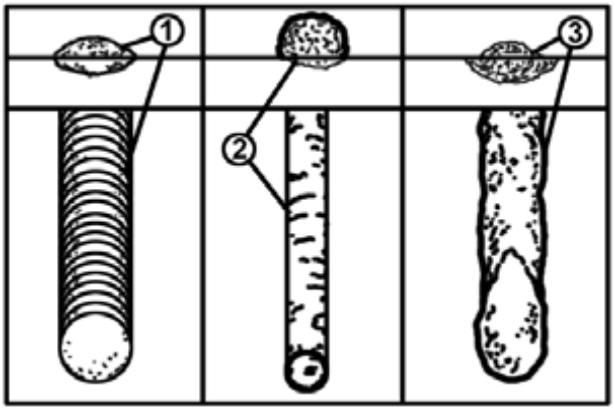
Clear any dirt, rust, scale, oil or paint on the ground clamp. Make certain you have a good solid ground connection. A poor connection at the ground clamp will waste power and heat. Make sure the ground clamp touches the metal.

3.4 ELECTRODE

The welding electrode is a rod coated with a layer of flux. When welding, electrical current flows between the electrode (rod) and the grounded metal work piece. The intense heat of the arc between the rod and the grounded metal melts the electrode and the flux. For best performance on this unit, we suggest the use of 6013 electrodes.

3.5 SELECTING THE PROPER ELECTRODE

There is no golden rule that determine the exact rod or heat setting required for every situation. The type and thickness of metal and the position of the work piece determine the electrode type and the amount of heat needed in the welding process. Heavier and thicker metals required more amperage. It is best to practice your welds on scrap metal which matches the metal you intend to work with to determine correct heat setting and electrode choice. See the following helpful trouble shooting tips to determine if you are using a correct electrode.



3.5.1. When proper rod is used:
3.5.1.a. The bead will lay smoothly over the work without ragged edges
3.5.1.b. The base metal puddle will be as deep as the bead that rises above it
3.5.1.c. The welding operation will make a crackling sound similar to the sound of eggs frying
3.5.2. When a rod too small is used;
3.5.2. a. The bead will be high and irregular
3.5.2. b. The arc will be difficult to maintain
3.5.3. When the rod is too large
3.5.3. a. The arc will burn through light metals
3.5.3. b. The bead will undercut the work
3.5.3. c. The bead will be flat and porous
3.5.3. d. Rod may be freeze or stick to work piece

Note: Rate of travel over the work also affects the weld. To ensure proper penetration and enough deposit of rod, the arc must be moved slowly and evenly along the weld seam.

3.6 SETTING THE AMPERAGE CONTROL

The welder has an infinite current control. It is capable of welding with electrodes up to 3/32” diameter. There is no golden rule that determines the exact amperage required for every situation. It is best to practice your welds on scrap metal which matches the metals you intend to work with to determine correct setting for your job. The electrode type and the thickness of the work piece metal determine the amount of heat needed in the welding process. Heavier and thicker metals require more voltage (amperage), whereas lighter and thinner metals require less voltage (amperage). Consult the welding electrode packaging for recommended welding amperage range.

3.7 WELDING TECHNIQUES

The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. Do not attempt to make any repairs on valuable equipment until you have satisfied yourself that your practice welds are of good appearance and free of slag or gas inclusions.

3.7.1 Holding the electrode

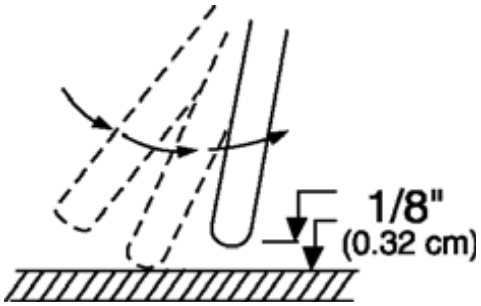
The best way to grip the electrode holder is the way that feels most comfortable to you. Position the Electrode to the work piece when striking the initial arc it may be necessary to hold the electrode perpendicular to the work piece. Once the arc is started the angle of the electrode in relation to the work piece should be between 10 and 30 degrees. This will allow for good penetration, with minimal spatter.

3.7.2 Striking the arc

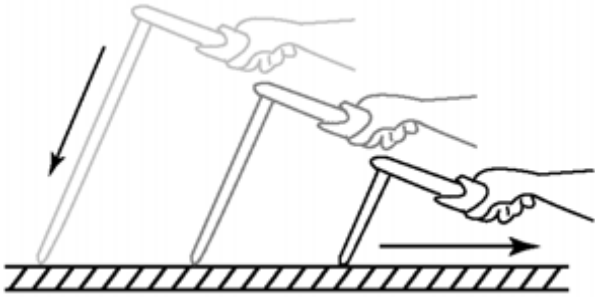
⚠WARNING

EXPOSURE TO A WELDING ARC IS EXTREMELY HARMFUL TO THE EYES AND SKIN! Prolonged exposure to the welding arc can cause blindness and burns. Never strike an arc or begin welding until you are adequately protected. Wear flame-proof welding gloves, a heavy long sleeved shirt, trousers without cuffs, high topped shoes, and an ANSI approved welding helmet.

Scratch the work piece with the end of electrode to start arc and then raise it quickly about 1/8 inch gap between the rod and the work piece, see following picture



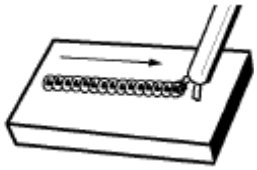
It is important that the gap be maintained during the welding process and it should be neither too wide or too narrow. If too narrow, the rod will stick to the work piece. If too wide, the arc will be extinguished. It needs much practice to maintain the gap. The beginners may usually get sticker or arc extinguishing. When the rod is stuck to the work piece, gently rock it back and forth to make them separate. If not, a short circuit will occur and it will break the welder. A good arc is accompanied by a crisp, cracking sound. The sound is similar to that made by eggs frying. To lay a weld bead, only 2 movements are required; downward (as the electrode is consumed) and in the direction the weld is to be laid, as in following figure:



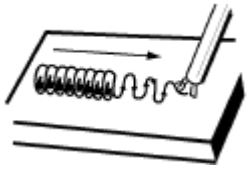
3.7.3 Types of weld bead

The following paragraphs discuss the most commonly used arc welding beads.

The stringer bead Formed by traveling with the electrode in a straight line while keeping the electrode centered over the weld joint.



Stringer Bead



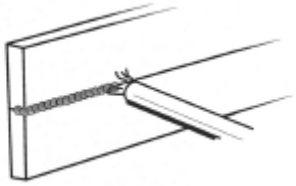
Weave Bead

The weave bead Used when you want to deposit metal over a wider space than would be possible with a stringer bead. It is made by weaving from side to side while moving with the electrode. It is best to hesitate momentarily at each side before weaving back the other way.

3.7.4 Welding position

Flat position It is easiest of the welding positions and is most commonly used. It is best if you can weld in the flat position if at all possible as good results are easier to achieve.

Flat Position

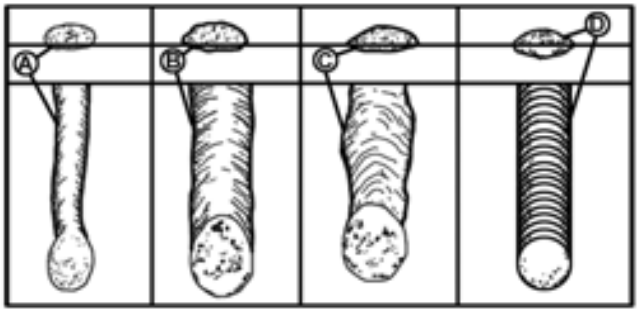


Horizontal Position

The horizontal position it is performed very much the same as the flat weld except that the angle is different such that the electrode, and therefore the arc force, is directed more toward the metal above the weld joint. This more direct angle helps prevent the weld puddle from running downward while still allowing slow enough travel speed to achieve good penetration. A good starting point for your electrode angle is about 30 degrees DOWN from being perpendicular to the work piece.

3.7.5 Judge the good weld bead

When the trick of establishing and holding an arc has been learned, the next step is learning how to run a good bead. The first attempts in practice will probably fall short of acceptable weld beads. Too long of an arc will be held or the travel speed will vary from slow to fast (see following)



A. Weld speed is too fast.

B. Weld speed is too slow.

C. Arc is too long.

D. Ideal weld.

A solid weld bead requires that the electrode be moved slowly and steadily along the weld seam. Moving the electrode rapidly or erratically will prevent proper fusion or create a lumpy, uneven bead.

⚠WARNING

ELECTRIC SHOCK CAN KILL! To prevent ELECTRIC SHOCK, do not perform any welding while standing, kneeling, or lying directly on the grounded workpiece.

3.7.6 Finish the bead

As the coating on the outside of the electrode burns off, it forms an envelope of protective gases around the weld. This prevents air from reaching the molten metal and creating an undesirable chemical reaction. The burning coating, however, forms slag. The slag formation appears as an accumulation of dirty metal scale on the finished weld. Slag should be removed by using a chipping hammer.

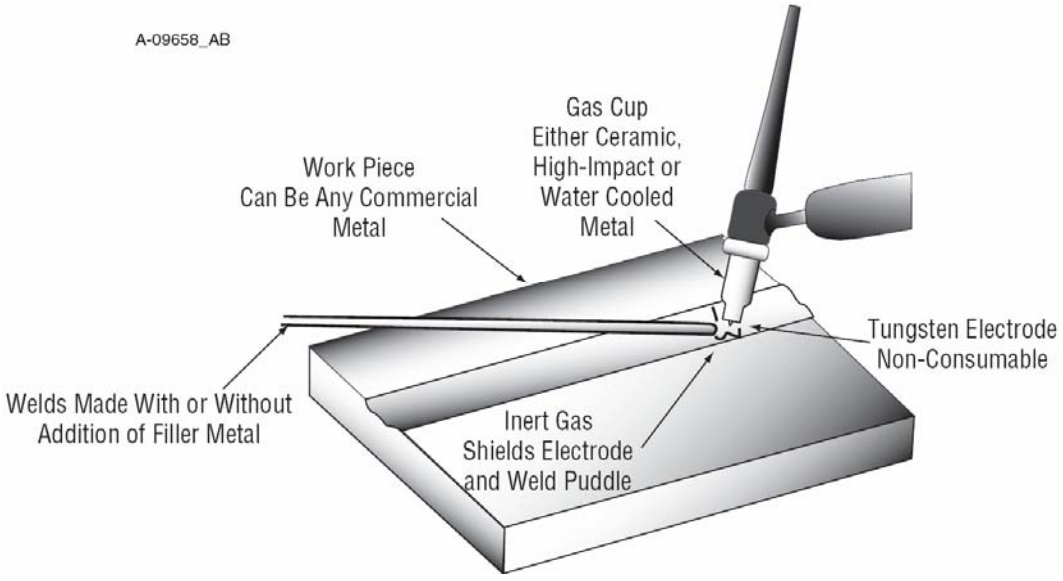
⚠WARNING

PEENING THE SLAG FROM A WELD JOINT CUASES SMALL CHIPS OF METAL TO FLY THROUGH THE AIR! Metallic chips flying through the air can cause eye injury or injury to other parts of the head, hands or exposed portions of the body. Wear goggles or safety glasses with side shields and protect the hands and other exposed parts of the body with protective garments, or if possible, work with a shield between the body and the work piece.

The intense heat produced at the arc sets up strains in the metal joined by welding. Peening the weld not only removes the scale left behind in the welding but relieves the internal strains developed by the heating and cooling process.

4. TIG welding skill

Gas Tungsten Arc Welding (GTAW) or TIG (Tungsten Inert Gas) as it is commonly referred to, is a welding process in which fusion is produced by an electric arc that is established between a single tungsten (non-consumable) electrode and the work piece. Shielding is obtained from a welding grade shielding gas or welding grade shielding gas mixture which is generally Argon based. A filler metal may also be added manually in some circumstances depending on the welding application.



Tungsten Electrode Current Ranges

Electrode Diameter	DC Current (Amps)
0.040" (1.0 mm)	30-60
1/16" (1.6 mm)	60-115
3/32" (2.4 mm)	100-165
1/8" (3.2mm)	135-200
5/32" (4.0 mm)	190-280
3/16" (4.8 mm)	250-340

Guide for Selecting Filler Wire Diameter

Filler Wire Diameter	DC Current Range (Amps)
1/16" (1.6 mm)	20-90
3/32" (2.4 mm)	65-115
1/8" (3.2 mm)	100-165
3/16" (4.8 mm)	200-350

Tungsten Electrode Types

Electrode Type (Ground Finish)	Welding Application	Features	Color Code
Thoriated 2%	DC welding of mild steel, stainless steel and copper	Excellent arc starting, Long life, High current carrying capacity	Red
Zirconated 1%	High quality AC welding of aluminium, magnesium and their alloys.	Self cleaning, Long life, Maintains balled end, High current carrying capacity.	White
Ceriated 2%	AC & DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys	Longer life, More stable arc, Easier starting, Wider current range, Narrower more concentrated arc.	Grey

Aluminium Welding Material

Base Metal Thickness	AC Current for Aluminium	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate	JOINT TYPE
1/16" 1.6 mm	60-80 70-90	1/16" 1.6 mm	1/16" 1.6 mm	15 CFM 7 LPM	Butt/Corner Lap/Fillet
1/8" 3.2 mm	125-145 140-160	3/32" 2.4 mm	1/16"-3/32" 1.6 mm - 2.4 mm	17 CFM 8 LPM	Butt/Corner Lap/Fillet

Welding Rate

Base Metal Thickness	DC Current for Mild Steel	DC Current for Stainless Steel	Tungsten Electrode Diameter	Filler Rod Diameter (if required)	Argon Gas Flow Rate	Joint Type
0.040" 1.0 mm	35-45 40-50	20-30 25-35	0.040" 1.0 mm	1/16" 1.6 mm	10 CFH(5 LPM)	Butt/Corner Lap/Fillet
0.045" 1.2 mm	45-55 50-60	30-45 35-50	0.040" 1.0 mm	1/16" 1.6 mm	13 CFH(6 LPM)	Butt/Corner Lap/Fillet
1/16" 1.6 mm	60-70 70-90	40-60 50-70	1/16" 1.6 mm	1/16" 1.6 mm	15 CFH(7 LPM)	Butt/Corner Lap/Fillet
1/8" 3.2 mm	80-100 90-115	65-85 90-110	1/16" 1.6 mm	3/32" 2.4 mm	15 CFH(7 LPM)	Butt/Corner Lap/Fillet
3/16" 4.8 mm	115-135 140-165	100-125 125-150	3/32" 2.4 mm	1/8" 3.2 mm	21 CFH(10 LPM)	Butt/Corner Lap/Fillet
1/4" 6.4 mm	160-175 170-200	135-160 160-180	1/8" 3.2 mm	5/32" 4.0 mm	21 CFH(10 LPM)	Butt/Corner Lap/Fillet

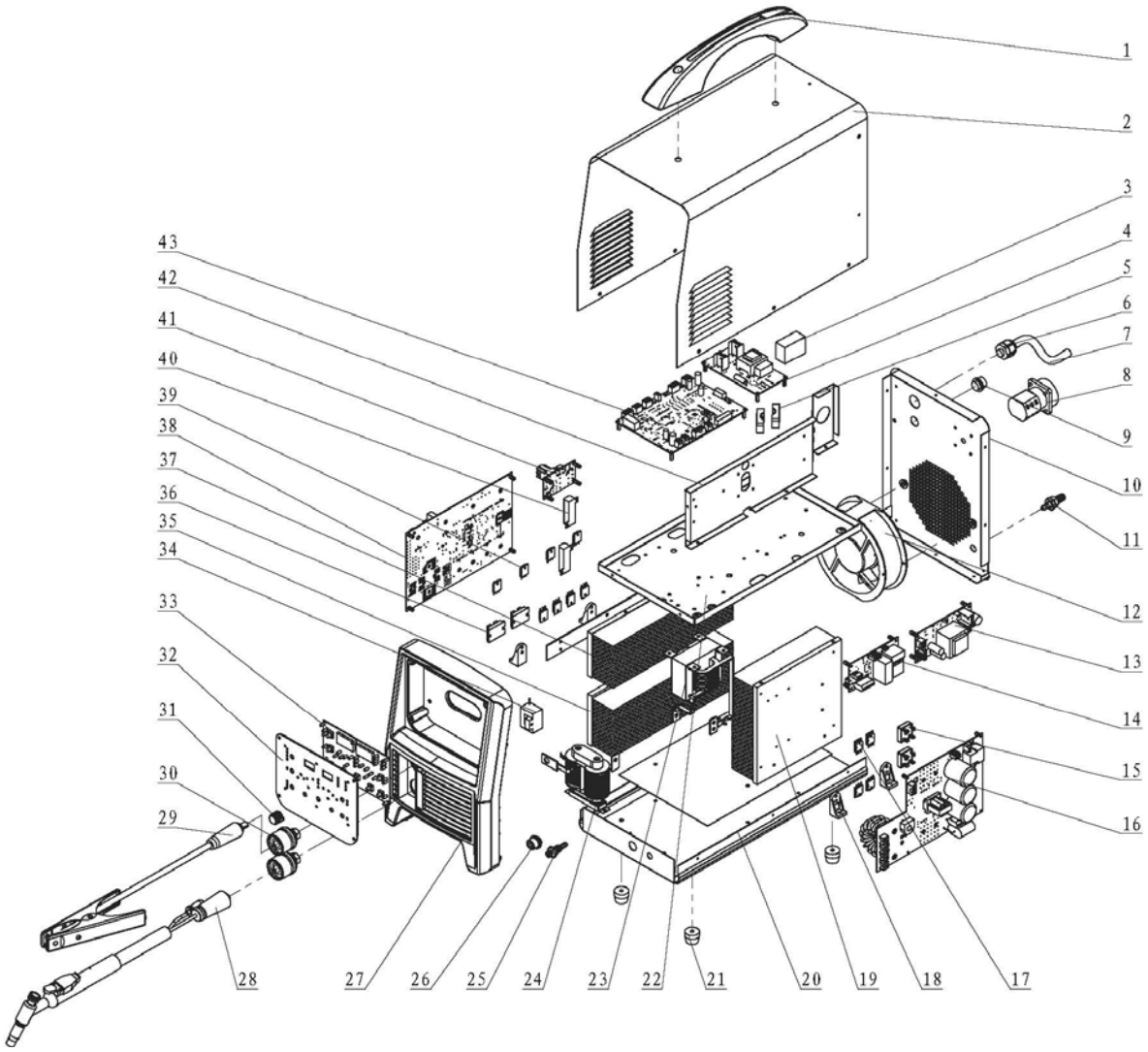
TIG Welding is generally regarded as a specialised process that requires operator competency. While many of the principles outlined in the previous Arc Welding section are applicable a comprehensive outline of the TIG Welding process is outside the scope of this Operating Manual.

TROUBLESHOOTING

No.	Breakdown	Analysis	Solutions
1	Cooling fan Not work	Cooling fan broken	Replace the fan
		Cable broken/fallen off	Find the disconnected wire and Connect reliably
2	No piloting high frequency	Torch switch broken	Replace the torch
		Main PC board broken	Replace the PC board
		Run-on plate	Replace the run-on plate
		Cable broken/fallen off	Find the disconnected wire and Connect reliably
3	No Argon output	No Argon input	Check the flow meter and resume supplying gas to the welder
		Main PC board broken	Replace the PC board
		Electromagnetism Valve broken	Change the electromagnetism valve
		Gas path blocked	Clear the eyewinker and dredge the gas path
4	Protection Indicator On	Overheat inside the machine	Become normal after the inside temperature reduced

		Thermal relay broken	Replace the thermal relay
		Over/Lack voltage more Than 15%	Become normal after voltage ok
5	Panel knob not adjustable	Relevant potentiometer broken	Replace the potentiometer
		Main PC board broken	Replace the PC board
		Cable broken/fallen off	Find the disconnected wire and Connect reliably
6	No display on the AMP meter	Digital Amp meter broken	Change the meter
		Cable broken/fallen off	Find the disconnected wire and Connect reliably
		Main PC board broken	Replace the PC board
7	Arc piloting not smooth	Wrong connection between torch and welder	Check and correct according the manual
		Argon not pure	Use 99.99% pure Argon
		Tungsten electrode or pin broken	Use qualified Tungsten electrode
8	Power trip	First turning on after power long time (2days more) off	Not fault, trip caused by the charging filter capacitor in the main board, return on the power switch
9	Others		Please contact with the supplier/manufacture

DIAGRAM & PARTS LIST



No	Code number	Description	Qty
1	2.05.08.115	Handle	1
2	1.1.01.01.0742	Enclosure	1
3	1.1.10.34.0030	Remote control absorption module	1
4	1.1.05.11.0062	Secondary inverter arc plate	1
5	2.05.17.028	Tension disc	2
6	2.04.30.103	Cable holder	1
7	1.1.11.34.0046	Power line	1
8	2.07.80.987	Switch	1
9	2.07.54.115	Aerial socket	1
10	1.1.01.03.1740	Back panel	1
11	2.02.02.034	Connecting screw rod	1
	2.06.14.813	Copper nut	1

12	1.1.10.34.0029	Fan	1
13	1.1.05.01.0547	Switching power supply board	1
14	1.1.05.10.0038	Pulse run-on plate	1
15	2.07.37.553	Single phase rectifier bridge	2
16	1.1.05.11.0064	Rectifier inverter board	1
17	2.07.33.996	Single tube (IGBT)	4
18	2.05.05.173	Radiator support	4
19	2.07.43.962	Rectifier heat sink	1
20	1.1.01.04.1411	Bottom panel	1
21	2.05.05.999	Feet	4
22	1.1.01.05.3106	Mounting plate	1
23	2.07.25.107	Output reactor	1
24	1.1.04.05.0049	Coupling transformer	1
25	2.07.55.203	Argon joint	1
26	2.03.30.1302	Gun switch wiring harness	1
27	2.05.05.140	Plastic panel	1
28	1.2.08.04.0171	Torch	1
29	1.2.08.02.0466	Earth cable	1
30	2.07.57.960	Europe type quick socket	2
31	2.07.11.022	Potentiometer knob	1
32	1.1.02.01.9020	Board support plate	1
33	1.1.05.07.0157	Faceplate	1
34	1.1.11.34.0043	Hall	1
35	2.07.43.963	Secondary rectifier heat sink(down)	1
36	2.07.28.813	Fast recovery diode	2
37	2.07.43.964	Secondary rectifier heat sink（upper）	1
38	1.1.05.11.0063	Secondary rectifier inverter board	1
39	2.07.33.996	Single tube (IGBT)	8
40	2.03.30.1321	Resistance 2	1
	2.03.30.1320	Resistance 1	1
41	1.1.05.09.0032	Gun switch isolation plate	1
42	1.1.02.01.9019	Board fixed plate	1
43	1.1.05.02.0591	Main PCB	1