

SWS *ALUMTIG 200* **AC/DC TIG/MMA DIGITAL WELDING SYSTEM**

Operating Manual





THANK YOU FOR YOUR PURCHASE OF THE ALUMTIG™ 200 Digital TIG/MMA WELDING SYSTEM.

At SWS, we take pride in the professional quality, innovation, and support we deliver to our customers and the welding industry as a whole. The ALUMTIG™ 200 is the next step in our progression as the new standard in welding and cutting products delivered fast marking the continuing evolution of SWS. This welding machine is the latest development in inverter technology. It has been tested and approved by production welders and the best fabricating professionals in the industry.

Providing better outcomes through innovation and new product creation have been staples of SWS since its inception. It is the very principle by which we do business. Our goal has always been to provide an outstanding product that not only stands out from the competition but also reflects the quality we strive for in every aspect of our business philosophy. From our second to none customer service excellence to technical support, we work hard at what we do so that you can too.

We know you will enjoy using this machine!

The ALUMTIG™ 200 is manufactured and compliant with AS60974.1:2006, IEC60974.10, CE
Guaranteeing you electrical safety and performance.

PLEASE DOWNLOAD AND READ THE OPERATING MANUAL BEFORE OPERATION!

TURN OVER FOR WARRANTY INFORMATION!

www.sws welding.com.au/pages/manuals

CAUTION!: The ALUMTIG™ 200 Operating Manual has been designed to instruct you on the proper use and operation of your SWS product. Your satisfaction with this system and its safe operation is our primary concern. It is important to take the time to read the entire manual, especially the safety sections. They will help you to avoid potential hazards that may exist when working with this product.

WARRANTY INFORMATION

This product comes with a 3 year warranty, for an extra 2 years extension please go to our website create a **MY SWS ACCOUNT** and register the equipment. This also helps us to assist you quickly in the event of a claim and gives you access to the MY SWS support portal.



This warranty does not cover

1. If repairs are made or attempted by other than Specialised Welding Systems Australia, New Zealand or a Specialised Welding Systems authorised service centre.
2. Normal wear and tear. Parts such as control boards main PCB boards etc. must be regularly inspected and kept as dust free as possible.
3. Abuse, misuse, the subject of an accident, being dropped, crushed, impacted with any hard surface, exposed to extreme heat (including fire) or cold, improper maintenance, continued use after partial fail.
4. Acts of God, vermin or foreign matter entering, e.g. dirt and moisture. The tool should be regularly blown out with low-pressure air if the equipment is used near metal shavings.
5. If the Product has been modified, incorrectly adjusted or operated, the subject of incorrect electrical supply or inconsistent supply, or used with inappropriate accessories.
6. If the Product is tampered with anyway or if any event of force has caused the damage.
7. If the Product has not been used or maintained in accordance with the manufacturer's instructions as provided with the product.
8. If the Product's serial number, as applied by the manufacturer, has been altered or removed from the product.

Liability

To the extent permitted by law (including the Competition and Consumer Act 2010(Cth) or New Zealand Consumer Guarantee Act 1993), in no event shall Specialised Welding Systems, be liable for consequential, incidental or indirect damages or other losses or expenses incurred because of use or sale of the product.

How do you make a claim under warranty?

If your Product may be faulty, please contact Specialised Welding Systems so a qualified technician can diagnose any issues and the equipment can be returned to make warranty repairs, if necessary.

Australia/New Zealand

For service in Australia and New Zealand, the customer should contact the Australian Customer Service line on (03) 5766 2331 to obtain the nearest authorised service center.

Return to Specialised Welding Systems

If you qualify for a warranty claim, you will not be liable for any postage costs along with parts and labour. If you do not qualify for a claim, you will incur all expenses including postage cost and parts and labour for the repairs. All warranty claims and non-claimable maintenance will be done within one business day to ensure minimum downtime.

Important information

This warranty is in addition to all other rights and remedies you have under the Competition and Consumer Act 2010 (Cth) and the New Zealand Consumer Guarantee Act 1993 and any other laws in relation to the Products. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also allowed to have the goods repaired or replaced if the products fail to be of acceptable quality, and the failure does not amount to a significant failure. Goods presented for repair may be replaced by refurbished goods of the same type rather than being repaired. Refurbished parts may be used to repair the products.

SPECIALISED WELDING SYSTEMS

WEBSITE: WWW.SWSWELDING.COM.AU

EMAIL: SUPPORT@SWSWELDING.COM.AU

TELEPHONE: (03) 5766 2331

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INTRODUCTION

1.0 Welcome

The SWS ALUMTIG™ 200 is one of the most advanced, feature-packed and affordable digital AC/DC TIG/ MMA welding systems on the Australian market for welding of almost all ferrous and non-ferrous metals. Featuring smart programming with auto and advanced modes make setting up easy for the beginner and versatile for the pro. You can depend on the ALUMTIG™ 200 to weld all day at its rated capacity and to pack more punch when you need it most.



<p>Latest Inverter Technology Embedded microprocessor with Infineon components delivers ultimate durability and perfect welding characteristics.</p>	<p>Revolutionary Digital Display Large high visibility durable display allows easy viewing from a distance and continually provides you with necessary feedback for optimum welds.</p>
<p>Smart Programming AUTO AC TIG, AUTO DC TIG and AUTO MMA modes will have you welding in no time flat using optimised settings with the beginner in mind. For more proficient users, you have complete control over welding parameters with the ability to store settings for later.</p>	<p>AC Features The advanced square wave with a wide balance and frequency range gives you the versatility for any Aluminium or Magnesium job.</p>
<p>Digital Pulse for AC and DC welding When welding thin gauge materials and joints like thin sheet metal and outside corners pulse allows you to focus the arc increase travel speed and minimise warpage.</p>	<p>Superior Duty Cycle Make bigger longer welds with ease. The duty cycle of 25% at 200 Amps and 100% at 25 Amps (40°C) gets most if not all jobs done.</p>
<p>Highly Portable Dependable IGBT inverter technology ensures a highly portable and lightweight unit weighing only 11kg.</p>	<p>Meets the Highest Standards Meets and exceeds the latest Australian, NZ and International electrical and electromagnetic compatibility standards. AS60974.1:2006, IEC60974.10, CE</p>

INTRODUCTION

1.1 Specifications

Processes	HF TIG AC/DC (GTAW-AC/DC), LIFT TIG AC/DC (GTAW-AC/DC), Pulsed TIG (GTAW-P), Stick AC/DC (MMA)
Current Type	AC/DC
Weldable Metals	Aluminium, Mild Steel, Stainless Steel, Specialty Metals
Industries	General Aluminium, Steel and Stainless Steel Fabrication, Stainless Steel Tank and Pipe Fabrication, Boat Building / Shipyards, Motorcycle custom shops, Automotive customs shops, Automotive Components and Repairs, Motorcycle Components and Repairs, Technical Schools, Aerospace, Agriculture, Farming, Building and Construction, Home Repair Workshops.
Input Voltage/Hz	1 Phase 230V +/- 15% (15 Amp Plug) 50/60 Hz
Minimum Generator	6.6kW (8.5kVA at 0.8 PF)
Duty Cycle 40°C AMB (TIG/MMA)	25% @ 200A, 100% @ 100A
Duty Cycle 25°C AMB (TIG/MMA)	40% @ 200A, 100% @ 140A
Welding Current Range (TIG/MMA)	10-200 Amps
Arc Ignition (TIG)	HF, Lift TIG
AC Frequency (TIG)	10-200Hz
AC Balance (TIG)	50-98%
Adjustable Parameters (TIG)	Pre-Flow, Post-Flow / Start-Amps, End-Amps / Upslope, Downslope
Pulse Peak Amps (TIG)	10-200 Amps
Pulse Time On (TIG)	10-90%
Pulse Frequency (TIG)	1-500Hz
Pulse Base Amps (TIG)	20-50%
Hot Start (MMA)	0-60 Amps
Arc Force (MMA)	0-99%
Dimensions	L 435mm H 265mm W 180mm
Weight	11Kg
Warranty	5 Years registered (3 Years standard)
Manufactured to Standards	AS60974.1:2006, IEC60974.10, CE

SAFETY

2.0 Hazards

WARNING



Arc welding and plasma cutting can be dangerous to yourself and others. Take special care when welding and cutting. Note your employer's safety practices which should be based on manufacturers' hazard data documents.

ELECTRIC SHOCK - Can kill

- Connect and earth (ground) the welding or plasma cutting unit adhering to applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from the natural ground and the workpiece.
- Ensure your working stance is safe.

FUMES AND GASES - Can be dangerous to health.

- Keep your head out of the fumes.
- Use ventilation, extraction at the welding or cutting arc, or both, to take fumes and gases away from your breathing zone and the surrounding area.

ARC RAYS - Can injure eyes and burn skin.

- Protect your eyes and body. Use an approved welding/plasma cutting helmet and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD

- Sparks (spatter) can cause fires. Make sure therefore that there are no flammable materials nearby.

NOISE - Excessive noise can damage hearing.

- Protect your ears. Use ear muffs or other suitable hearing protection.
- Warn all bystanders of the risk.

MALFUNCTION - Call an for expert assistance in the event of a malfunction.



CAUTION

This product is only intended welding. Any other use may result in personal injury and equipment damage.



CAUTION

Read and understand the instruction manual before installing or operating.

SAFETY

2.1 Precautions

Users of SWS welding and plasma cutting products have the primary responsibility for ensuring that anyone who works on or near this equipment adheres to all the relevant safety precautions. The following listed recommendations must be observed along with the standard regulations that apply to the workplace.

All use must be carried out by trained personnel well versed with the safe operation of the equipment. Incorrect operation of plasma cutting or welding equipment may lead to hazardous events which can result in serious injury to the user and damage to the equipment. Safety precautions must meet the requirements that apply to this type of welding or plasma cutting equipment.

1. Persons who use welding or plasma cutting equipment must be familiar with the following:
 - Welding and plasma cutting machine operation
 - Location of emergency stops
 - The machines purpose
 - Relevant safety precautions
 - Arc welding and / or hand held plasma cutting
2. The user must make sure that:
 - No unauthorized person in the vicinity of the working area of the equipment when it is used.
 - No person is unprotected when the arc is started.
3. The workplace must:
 - Be suitable for the purpose
 - Be free from weather
4. Personal safety equipment:
 - Always wear approved personal safety equipment, such as welding helmets, safety glasses, flame proof clothing and safety gloves.
 - Never wear loose fitting items, such as hooded jumpers, bracelets, rings, etc., which can become trapped or cause serious injury burns.
5. General safety precautions:
 - Ensure the return cable is connected securely.
 - Work on high voltage equipment must only be carried out by a qualified electrician or electrical technician.
 - Approved fire extinguishing equipment must be clearly marked and in the vicinity.
 - Lubrication and maintenance must not be carried out on the equipment during operation.



**READ AND UNDERSTAND THE OPERATING MANUAL BEFORE
INSTALLING OR USING THIS EQUIPMENT - ALWAYS PROTECT
YOURSELF AND OTHERS!**

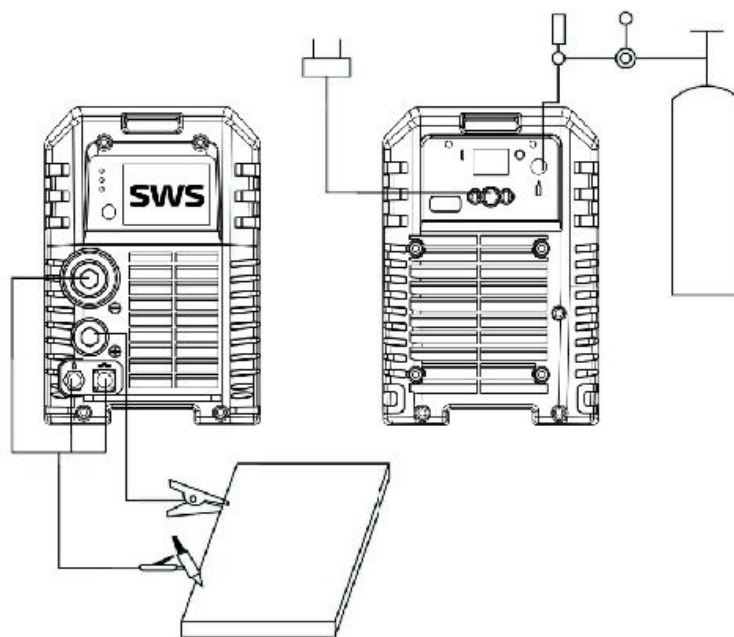
GTAW (TIG)

3.0 GTAW (TIG) Welding Process

The heat needed for Gas Tungsten Arc Welding is produced by an electric arc maintained between a non-consumable tungsten electrode and the workpiece to be welded. The heat-affected zone (HAZ) molten metal and the tungsten electrode are all shielded from the atmosphere by a blanket of inert gas typically argon ran through the TIG torch. An inert gas such as argon is inactive, or deficient in active chemical properties making it non-reactive so it does not take from or add anything to the metal. Inert gases like argon and helium do not chemically react or mix with other types of gases. They have no smell and are transparent, giving the welder maximum visibility of the arc. In some cases, small amounts of a reactive gas such as hydrogen can be added to enable faster travel speeds.

The TIG welding process produces extreme temperatures of up to 19,426°C, and the TIG torch contributes only heat to the workpiece through the tungsten electrode. If some filler metal is needed to perform the weld, it may be added manually in the same way as it is in the oxyacetylene welding process. There are also ways to feed the filler metal in automatically by specialist systems.

3.1 Typical TIG Welding Setup



3.2 Advantages of the TIG Welding Process

The biggest advantage of the TIG welding process is that it will weld more metals and metal alloys than any other type of arc welding process. TIG is used to weld almost all steels including mild steel, stainless steel, Chromoly, titanium, aluminium, magnesium, copper, brass, bronze, and you can even weld gold. You can also join dissimilar metals to one another such as stainless to mild steel.

GTAW (TIG)

3.3 Concentrated Arc

The precise nature of the TIG welding arc allows a high level of control of heat input to the metal resulting in a narrow HAZ (heat-affected zone). This high concentration of heat is a significant advantage when welding metals with very high heat conductivity such as aluminium and copper. A narrow HAZ is an advantage because the base metal has undergone a change due to the very fast heating of the arc and rapid cooling rate. The HAZ is where the welded joint is the weakest and is the area that is most likely to break under destructive testing.

3.4 Slag Free

Unlike stick welding, there is no need for flux with TIG. Therefore, there is no slag to obscure vision of the weld pool. The finished weld also does not have the layer of slag left.

3.5 No Sparks and Spatter

In the TIG welding process, there is no transfer of metal across the arc, so there is no molten globules of spatter to deal with and no sparks produced if the metal being welded is free of contaminants. TIG is also very quiet compared to stick or MIG welding and the only time any real noise will be present is when using a pulsed arc, or AC welding is being done.

3.6 No Smoke or Fumes

TIG welding on its own does not produce smoke or dangerous fumes. But if the base metal contains coatings or elements like lead, zinc, nickel or copper that do produce fumes, these must be dealt with as in any electric arc welding process. If the workpiece has oil present, paint, grease or other contaminants, harmful smoke and fumes will always be made as the heat of the process burns them away. It is of the utmost importance when TIG welding to clean and prepare your meals with diligence.

3.7 TIG Disadvantages

The major disadvantage of the TIG welding process is the slow and low filler metal deposition rate. Another disadvantage is that the skills needed to accomplish a beautiful sound weld can be difficult to learn, and requires a good deal of practice to become skilled. The higher amounts of ultraviolet rays from the arc also causes the formation of ozone and nitrous oxides. Extra care should be taken to protect skin with the proper PPE with the correct shade welding filter and helmet.

3.8 Process Overview

TIG is a very clean process, and it is a great choice from a welders point of view because of the reasons above. For an excellent result, it is a must that the welder maintains sound welding conditions by always properly cleaning the material, using cleaning and using clean filler metal, clean gloves, and ensuring to keep oil, dirt and other contaminants away from the welding area. Cleanliness is one of the most important factors with TIG, especially on aluminium and magnesium. These metals are more prone to contaminants than ferrous metals the porosity in aluminium welds has been known to be caused by hydrogen this is why it is the most necessary to completely remove hydrogen containing elements such as moisture and hydrocarbons that reside in the form of oils and paint.

RECEIPT OF EQUIPMENT

4.0 Unboxing

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify us immediately so that we can file a claim. Please Include all equipment identification numbers as on parts or a full description of the parts in error. (SHOP KIT PICTURED)



SPECIALISED WELDING SYSTEMS

WEBSITE: WWW.SWSWELDING.COM.AU

EMAIL: SUPPORT@SWSWELDING.COM.AU

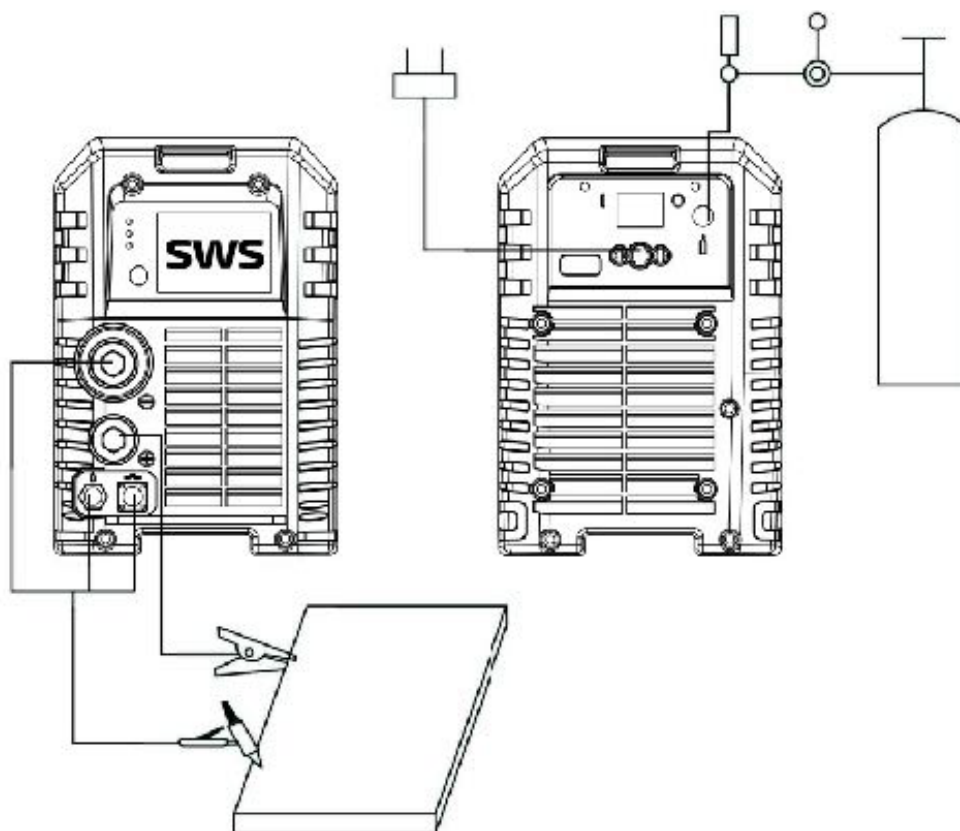
TELEPHONE: (03) 5766 2331

INSTALLATION

5.0 Working Environment

- The workspace in which this equipment is installed must be free of excessive grinding dust, natural dust, flammable and corrosive chemicals, flammable gas or materials, etc. And at no more than a maximum of 80% humidity.
- When using the equipment outdoors protect the machine from precipitation and direct sun light. The working temperature environment should be kept within -15°C to $+40^{\circ}\text{C}$.
- Keep this machine as least 250mm away from walls.
- Ensure the working environment is well ventilated with fan extraction when necessary.

5.1 Machine Installation GTAW (TIG)



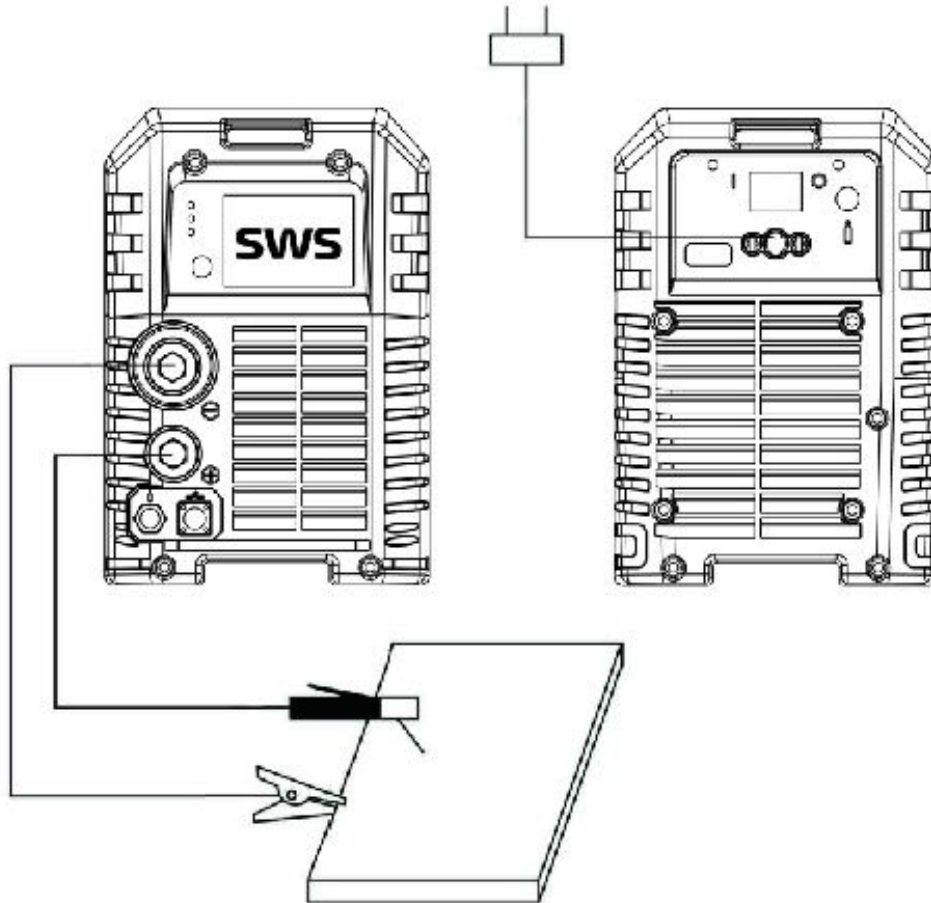
1. Connect the ground clamp to the positive connection (+) and the Welding torch to the Negative (-) connection DCEN (Direct current electrode negative)
2. Connect the 7-Pin plug into the 7-Pin control connector taking care to align correctly.
3. Connect the gas line.

NOTE: In almost all TIG welding applications DCEN (Direct Current Electrode Negative) is used.

NOTE: This machine uses high frequency arc start or LIFT arc starting, when operating nearby to high frequency sensitive equipment, it is recommended to use LIFT TIG.

INSTALLATION

5.2 Machine Installation MMA (Stick)

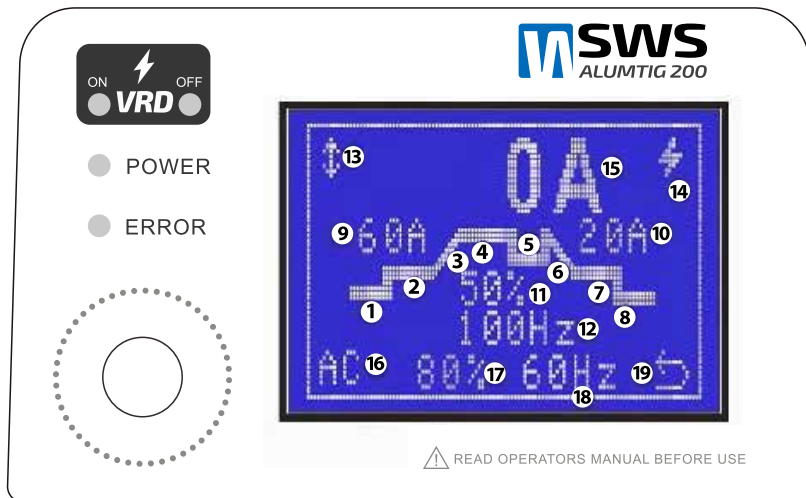


1. Connect the ground clamp to the negative connection (DCEP) and the torch to the positive connection.

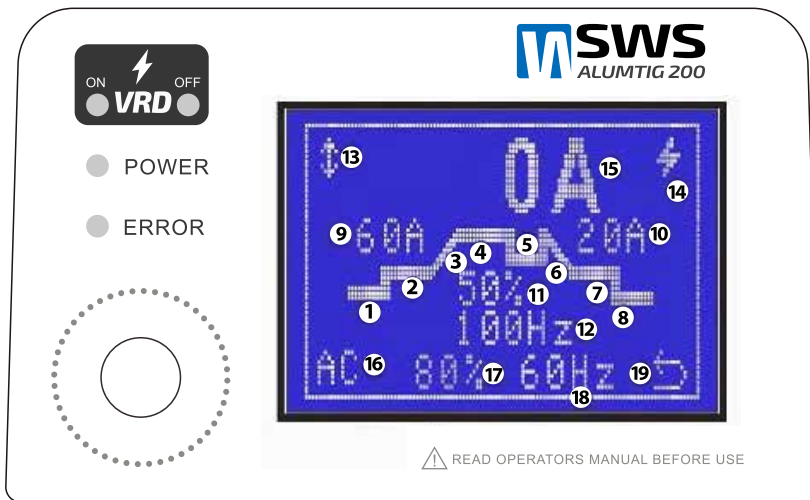
NOTE: In most welding applications DCEP (Direct Current Electrode Positive) is used. In some cases when welding very thin material using DCEN may be an advantage.

OPERATION & FUNCTIONS

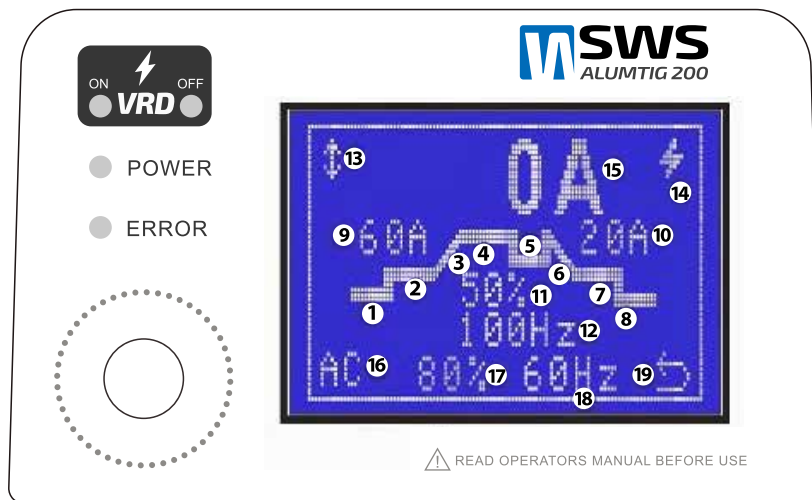
6.0 Digital Control & Functions AC/DC TIG



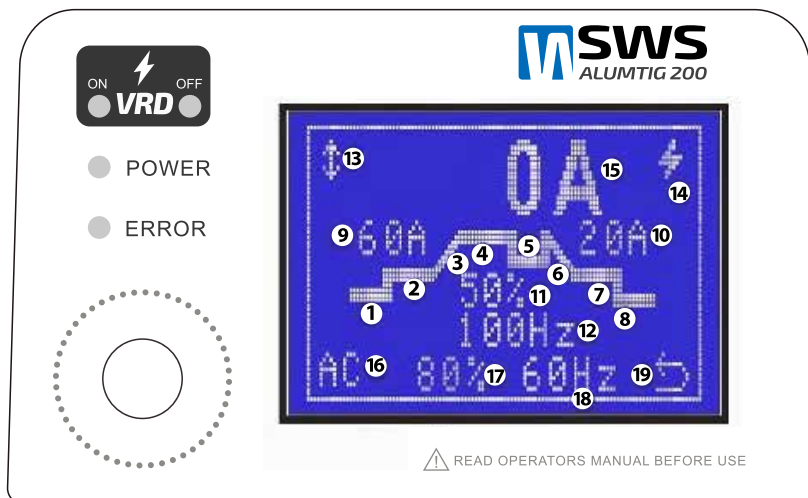
FUNCTION	PARAMETERS	PURPOSE
1. Pre-Flow	1-10 Seconds (N/A AUTO MODES)	This parameter operates in 2T and 4T HF TIG mode only and is used to provide gas to the weld zone prior to striking the arc, once the torch trigger switch has been pressed. This control is used to dramatically reduce weld porosity at the start of a weld.
2. Start Amps	10-200 Amps (N/A AUTO MODES) (N/A FOOT CONTROL)	This parameter is used to set the start current for TIG. In 4T mode the Initial Current remains on until the torch trigger switch is released after it has been depressed. In 2T mode this is the Initial Current for the Up Slope current ramp.
3. Upslope	0-10 Seconds (N/A AUTO MODES)	This parameter is used to set the time for the weld current to ramp up from INITIAL current to BASE current. (N/A AUTO MODES) (N/A FOOT PEDAL)
4. Welding Amps	10-200 Amps (N/A AUTO MODES)	This parameter sets the welding current. In PULSE TIG mode, this parameter sets the PEAK current. (N/A AUTO MODES)
5. Pulse Base Amps	10-200 Amps (N/A AUTO MODES)	This parameter sets the welding current. In PULSE TIG mode, this parameter sets the BASE current. (N/A AUTO MODES)
6. Downslope	0-10 Seconds (N/A AUTO MODES)	Down Slope will ramp amps “down” from the welding amp value to the end amp value to give time to fill the crater left at the end of the weld bead. Can also be used in the 4T mode to help with heat control by briefly tapping the switch to cool off the weld before tapping it again to restart the up slope sequence before the arc reaches the end amp stage.
7. End Amps	10-200 Amps (N/A AUTO MODES)	Sets the final or minimum current before the arc is terminated. Used for filling craters at the ends of the weld and crack prevention.



FUNCTION	PARAMETERS	PURPOSE
8. Post-Flow	1-10 Seconds (N/A AUTO MODES)	Controls the amount of time in seconds that the argon flows after the arc has terminated. Provides proper shielding during cooling to prevent rapid oxidation of the weld which results in porosity the weld pool.
9. Pulse Peak Amps	10-200 Amps (N/A AUTO MODES)	This displays the parameter.
10. Pulse Base Amps	10-200 Amps (N/A AUTO MODES)	This displays the parameter.
11. Pulse Time On (Balance) %	10-90% (N/A AUTO MODES)	Defines the duty cycle (balance) of the pulse, by dividing or skewing the amount of time the pulse stays in the lower or upper stage of the pulse. The pulse consists of two stages: Welding amps (upper /Peak) and Pulse amps (lower/ background current). This is represented by a % of total time the pulse spends in the pulse amp stage of the cycle during one full pulse. The feature can be used to increase or decrease pulse amp time relative to the welding amp time of the cycle to help manage heat input.
12. Pulse Frequency Hertz (Pulses per second)	1-500Hz (N/A AUTO MODES)	Represented by Hertz (Hz), the pulse frequency defines the actual number of times each second the pulse makes one complete cycle between welding amps (peak/high amp value) and pulse amps (background/low amp value). This is also commonly referred to as Pulses Per Second (PPS). Low pulse frequencies are ideal for timing the point where filler metal is added. This helps improve appearance and uniformity. Higher pulse frequencies are useful for welding seams and edges of thin material. Also it is useful for overall heat input control for thicker metals. Higher pulse frequencies are highly useful for automated welding processes. WARNING: WELDING AT HIGH PULSE FREQUENCIES INCREASES THE DECIBEL /NOISE LEVEL OF THE ARC. HEARING PROTECTION IS HIGHLY RECOMMENDED!

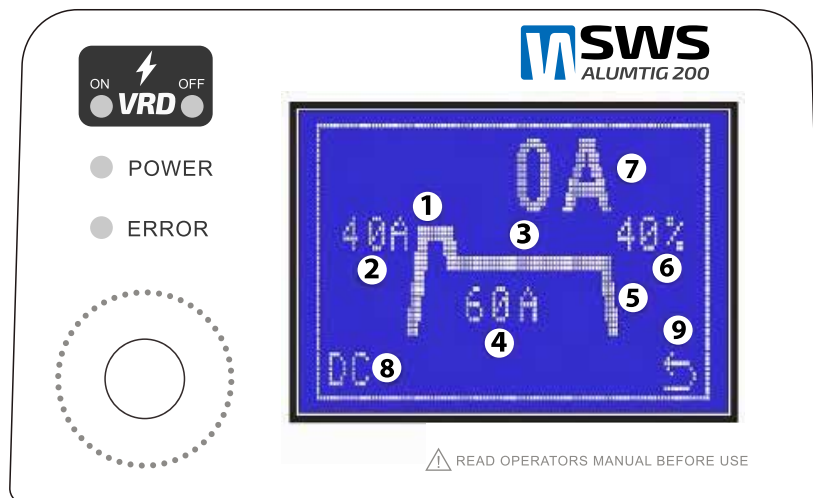


FUNCTION	PARAMETERS	PURPOSE
13. 2T/4T Selection	N/A	To operate with the torch switch, select 2T or 4T (2T Double ended arrow 4T separate arrows). For 2T operation, simply press and hold the switch. The panel program will cycle automatically. When the switch is released, the arc will downslope and terminate with post gas flow. When in 4T mode, the switch is pressed, and held to start the pre-flow and the start amps part of the cycle. When released, upslope begins and continues until the amps are raised to the preset welding amps. When pressed and held again, downslope starts and ramps down to the end amp stage (crater current). When released, the arc terminates, and post flow begins. If desired, before the downslope finishes, the switch may be tapped again to start the up slope again.
14. HF or Lift TIG Selection	N/A	The Process selector offers the choice of Lift Tig (for DC only) which requires contact with the metal to initiate the arc and High Frequency Start which allows non contact starting of the arc (for AC and DC). (HF is selected when symbol is not striked out) The lift start function on the ALUMTIG 200 provides a cold electrode for safety, and prevents accidental starts. This requires that the pedal or torch switch must be used to energise the arc. HF refers to the start type only. The inverter design of the welder eliminates the need for a constant HF overlay in AC.
15. Welding Current	N/A	This displays the Amps in real time while welding and will hold after weld is complete.
16. AC or DC Selection	N/A	The unit features AC/DC operation. This machine uses advanced square wave for AC that has excellent wet in, and arc stability.



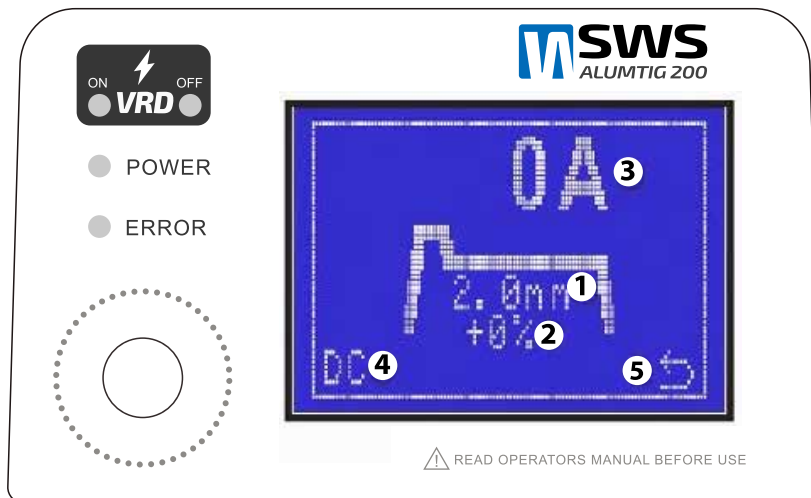
FUNCTION		PURPOSE
17. AC Balance	50-98%	This divides the time that the AC cycle spends in Electrode Positive or Electrode Negative during one full AC cycle. Too much cleaning action (lower %) will result in lower penetration and even tungsten balling or splitting. Too little cleaning (higher %) gives better penetration but can result in dirty, sooty welds and even a dull weld appearance. The optimum range is normally between 65% and 75%.
18. AC Frequency	10-200 Hz	Governs the number of times per second that the current alternates in AC mode. To achieve greater arc focus (constriction) and increase puddle agitation while welding in AC mode, increase AC frequency. This allows pinpoint use on thin materials, and helps penetration on thicker materials. Ideal adjustment range is usually between 80-120Hertz. For comparison most transformer welders operate on 60 Hz. Greater arc control and stability can be achieved through the higher frequency range offered by this welder. Lower Frequencies will widen and soften the arc and reduce the level of control.
19. Main Menu	N/A	This takes you back to main menu.

6.1 Digital Control & Functions Pro MMA (Stick)



FUNCTION	PARAMETERS	PURPOSE
1. Hot Start	0-60 Amps	Sets the length of time that the Hot Start is active while starting the arc. Used to reduce sticking of the electrode during the arc strike phase.
2. Hot Start Value	N/A	This displays the value.
3. Welding Amps	10-200 Amps	Welding amps define the top limit of amps at which the machine has been programmed to operate.
4. Welding Amps Value	N/A	This displays the parameter.
5. Arc Force	0-99%	Controls the arc response when an arc is held short and voltage begins to drop. Arc force automatically compensates by modifying the volt/amp curve to maintain the energy needed to weld. Represented as a percent of available arc force amperage.
6. Arc Force Display	N/A	This displays the value.
7. Actual Welding Amps	N/A	Real time display of welding Amps will hold for 5 seconds when weld is complete for reference.
9. AC or DC Selection		N/A
9. Main Menu	N/A	This takes you back to main menu.

6.2 Digital Control & Functions AUTO MMA (Stick)



FUNCTION	PARAMETERS	PURPOSE
1. Electrode Diameter Selection	2.0-5mm	Machine automatically set amps relevant to the diameter of electrode being used.
2. Amps Fine Tuning	-20-20%	Fine tunes the amps for the metal being welded.
3. Welding Amps	10-200 Amps	Real time display of welding Amps will hold for 5 seconds when weld is complete for reference.
4. AC or DC Selection	N/A	Selects AC or DC modes
5. Main Menu	N/A	This takes you back to main menu.

SERVICE

7.0 General Maintenance



Warning!

There is extremely dangerous voltage, and power levels present inside this product. Do not attempt to open or repair unless you are a qualified electrical tradespersons and you are qualified in training in power measurements and troubleshooting techniques. If major complex sub-assemblies are faulty, then the Power Source must be returned to an accredited service provider.

3 Months

Carefully clean exterior of power source with a dry brush.

6 Months

Unplug the power source remove cover and visually check and carefully clean the interior without touching any internal electrical components, wires or PCB boards and by taking special care not to damage any components. Use compressed air set at no more than 70 Psi to carefully blow out all dust and debris.

TROUBLESHOOTING

8.0 Machine Codes

CODE DISPLAYED	CODE INFORMATION
ERROR! Over Temperature	Machine has reached its duty cycle limit. DO NOT turn off and let it complete cooling cycle until display return to normal.
ERROR! Over Current	Over current has been supplied to the machine turn off and locate the correct input power. This may have damaged the machine if display persists.

8.1 GTAW (TIG)

8.2 Tungsten corrodes quickly

POSSIBLE REASON	SUGGESTED SOLUTION
Incorrect Gas	Check that 100% Argon is being used.
No gas	Check the gas cylinder contains gas and is connected.
Inadequate gas flow	Check the gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 15–25 CFH (7–12 LMN) flow rate.
Back cap not fitted correctly	Make sure the torch back cap is fitted so that the o-ring is inside the torch body.
Torch connected to DC +	Connect the torch to the DC – output terminal.
Incorrect tungsten being used	Check and change the tungsten type if necessary.
Tungsten being oxidized after weld is finished	Keep shielding gas flowing 10–15 seconds after arc stoppage. 1 second for each 10 amps of weld current.
Tungsten melting back into the nozzle on AC welding	Check that correct type of tungsten is being used. Check the balance control is not set too high — reduce to a lower setting.

8.3 Contaminated Tungsten Electrode

POSSIBLE REASON	SUGGESTED SOLUTION
Touching tungsten into the weld pool	Keep tungsten from contacting weld puddle. Raise the torch so that the tungsten is off of the work piece 1/8”–1/4” (3.2– 6.35mm).
Touching the filler wire to the tungsten	Keep the filler wire from touching the tungsten during welding, feed the filler wire into the leading edge of the weld pool in front of the tungsten.
Tungsten melting into the weld pool	Check that correct type of tungsten is being used. Too much current for the tungsten size so reduce the amps or change to a larger tungsten.

7.2 GTAW (TIG)

8.4 Porosity and or poor weld appearance and color

POSSIBLE REASON	SUGGESTED SOLUTION
Incorrect Gas	Check that 100% Argon is being used.
Inadequate gas flow / gas leaks	Check the gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 7–14 LMN (15–25 CFH) flow rate. Check hoses and fittings for holes, leaks, etc.
Moisture on the base metal	Remove all moisture from base metal before welding.
Contaminated base metal	Remove materials like paint, grease, oil, and dirt, including mill scale from base metal.
Contaminated filler wire	Remove all grease, oil, or moisture from filler metal.
Incorrect filler wire	Check the filler wire and change if necessary.

8.5 Unstable arc during DC welding

POSSIBLE REASON	SUGGESTED SOLUTION
Torch connected to DC +	Connect the torch to the DC – output terminal.
Contaminated base metal	Check the gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 15–25 CFH (7–12 LMN) flow rate. Check hoses and fittings for holes, leaks, etc.
Tungsten is contaminated	Remove 3/8" (10mm) of contaminated tungsten and re-grind the tungsten.
Arc length too long	Lower torch so that the tungsten is off of the work piece 1/8"–1/4" (3.2– 6.35mm).

8.6 Unstable arc during AC welding

POSSIBLE REASON	SUGGESTED SOLUTION
Incorrect gas or inadequate gas flow	Check that pure Argon is being used. Check the gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 15–25 CFH (7–12 LMN) flow rate flow rate.
Incorrect tungsten being used	Check and change the tungsten type if necessary.
Tungsten is contaminated	Remove 3/8" (10mm) of contaminated tungsten and re-grind the tungsten.
Excessive rectification in the base metal	Adjust balance control. Increase travel speed. Add filler wire during welding.

7.2 GTAW (TIG)

8.7 HF present but no welding power

POSSIBLE REASON	SUGGESTED SOLUTION
Incomplete welding circuit	Confirm that the ground clamp is connected. Check all cable connections. Check that the power cable is not separated.
No gas	Check that correct type of tungsten is being used. Too much current for the tungsten size so reduce the amps or change to a larger tungsten.
Incorrect filler wire	Check the filler wire and change if necessary.

8.8 Arc wanders during DC welding

POSSIBLE REASON	SUGGESTED SOLUTION
Poor gas flow	Check and set the gas flow between 15–25 CFH (7–12 LMN) flow rate.
Incorrect arc length	Lower torch so that the tungsten is off of the work piece 1/8”–1/4” (3.2– 6.35mm).
Tungsten incorrect or in poor condition	Check that correct type of tungsten is being used. Remove 3/8” (10mm) from the weld end of the tungsten and re-sharpen the tungsten.
Poorly prepared tungsten	Grind marks should run lengthwise with tungsten, not circular. Use proper grinding method and wheel.
Contaminated base metal	Remove contaminating materials like paint, grease, oil, and dirt, including mill scale from base metal.
Contaminated filler wire	Remove all grease, oil, or moisture from filler metal.
Incorrect filler wire	Check the filler wire and change if necessary.

8.9 Arc wanders during AC welding

POSSIBLE REASON	SUGGESTED SOLUTION
Inadequate gas flow	Set the gas flow between 15–25 CFH (7–12 LMN) flow rate.
Incorrect arc length	Set the torch so that the tungsten is off of the work piece 1/8”–1/4” (3.2– 6.35mm).
Tungsten is contaminated	Check and change the size and or the tungsten if required.
Incorrect tungsten size and or tungsten being used	Grind marks should run lengthwise with tungsten, not circular. Use proper grinding method and wheel.
Excessive rectification in the base metal	Increase balance control. Increase travel speed. Add filler wire during welding.
Contaminated base metal	Remove all grease, oil, or moisture from filler metal.
Incorrect filler wire	Remove contaminating materials like paint, grease, oil, and dirt, including mill scale from base metal.

7. GTAW (TIG)

8.10 Arc difficult to start or will not start DC welding

POSSIBLE REASON	SUGGESTED SOLUTION
Incorrect machine set up	Check machine set up is correct.
No gas, incorrect gas flow	Check the gas is connected and cylinder valve open, check hoses, gas valve and torch are not restricted. Set the gas flow between 15–25 CFH (7–12 LMN) flow rate.
Tungsten is contaminated	Remove 3/8" (10mm) of contaminated tungsten and re-grind the tungsten.
Incorrect tungsten size and or tungsten being used	Check and change the size and or the tungsten if required.
Loose connection	Check all connectors and tighten.
Ground clamp not connected to work	Connect the ground clamp directly to the work piece wherever possible.
Loss of high frequency	Check torch and cables for cracked insulation or bad connections.

8.11 Arc difficult to start or will not start DC welding

POSSIBLE REASON	SUGGESTED SOLUTION
Incorrect machine set up	Check machine set up is correct.
No gas, incorrect gas flow	Check the gas is connected and cylinder valve open, check hoses, gas valve and torch are not restricted. Set the gas flow between 15–25 CFH (7–12 LMN) flow rate.
Incorrect tungsten size and or tungsten being used	Check and change the size and or the tungsten if required.
Tungsten is contaminated	Remove 3/8" (10mm) of contaminated tungsten and re grind the tungsten. Use a pointed tungsten with AC squarewave inverter machines. The point will round off after welding.
Loose connection	Check all connectors and tighten.
Ground clamp not connected to work	Connect the Ground clamp directly to the work piece wherever possible.
Loss of high frequency	Check torch and cables for cracked insulation or bad connections.

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