

BOSSWELD

S160 ARC

STICK/DC TIG ARC WELDER



INSTRUCTION MANUAL

Thank you for choosing a BOSSWELD inverter welder.

In this manual you will find instructions on how to set up your welder along with general welding information safety information and helpful tips. We encourage you to go online to our website for more tips and troubleshooting as well as many welding resources.

We truly hope you enjoy using your welder!

Please ensure you read and understand the instructions before installation and operation of this machinery.

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SPECIFICATIONS

Primary Input Power	1 Phase 240V 50-60 HZ +/-10%	
Function	MMA	Lift TIG
Duty Cycle @ 40°C 10min	8%@160A 60%@60A 100%@45A	19%@160A 60%@90A 100%@70A
Welding Current Range (A)	10 – 160	10 – 160
I Max (A)	34.0A	23.0A
I eff (A)	9.6A	10.0A
Rated Input Power (kVA)	8.14	5.49
Electrode Diameter Range	1.6 – 3.2 mm	
Protection	IP21S	
Insulation Class	S	
Thermal Overload	Yes	
Dimensions / Weight	290L x 105W x 180H mm	
Weight	2.7 kg	
Part Number	611010	

BOX CONTENTS

1. Bossweld ARC160 Inverter Welder
2. Earth Clamp
3. Electrode Holder



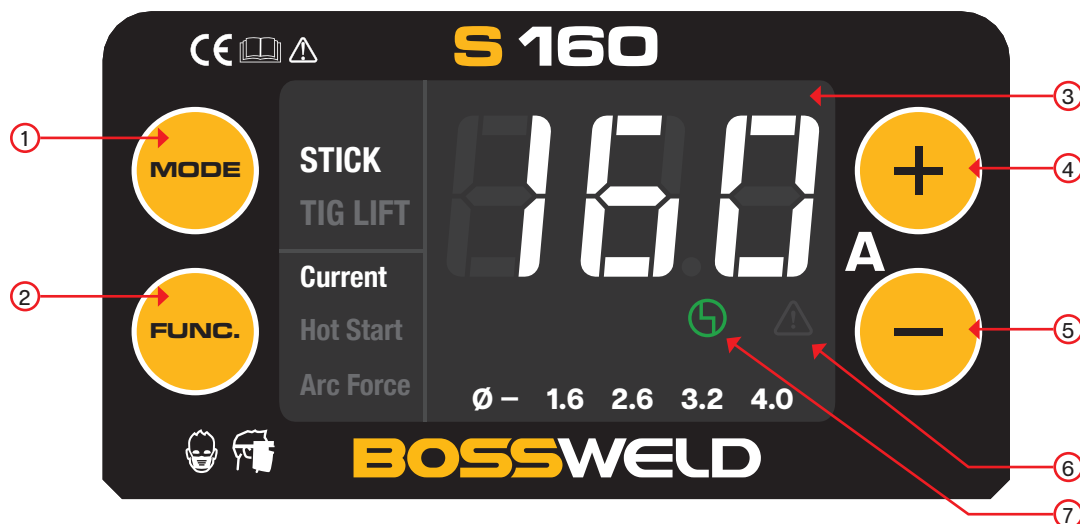
MACHINE PANEL

1. "+" Output terminal
2. "-" Output terminal

3. Power switch
4. Input Power Cable
5. Cooling Fan



CONTROL PANEL



1. **Welding mode button:** Press it to select MMA/VRD/TIG LIFT welding mode.
2. **Parameter select button:** Press it to select Current, Hot Start / Arc Force parameters.
3. **Screen:** It will show all welding parameters, such as welding mode, welding current and other parameters set or error code. *
4. **Parameter adjust button (+):** Press it to adjust parameters' value (increase).
5. **Parameter adjust button (-):** Press it to adjust parameters' value (decrease).
6. **Power display:** The corresponding icon on the screen will light up when over voltage, over current, input phase loss or electrical overheating (due to exceeding duty cycle) is detected and protection is activated.
7. **Alarm display:** The corresponding icon on the screen will light up when input power connected and machine switched on.

DUTY CYCLE

SPECIAL NOTE:

If this welders duty cycle is exceeded the welder will enter “thermal overload” which will automatically stop the welding output in order to protect, both the user and the welder. You will know the welder has gone into thermal overload when the overload error signal show on screen.

The welder should not be welding for 10~15 minutes to cool down with the fan running. When operating the machine again, the welding output current or the duty cycle should be reduced. Please note. Exceeding the machine’s duty cycle, cannot be considered grounds for warranty or return.

The term duty cycle indicates the percentage welding time available at the output current for each 10 min period over 4 hours, The specification plate on the machine list three given ratings at a given current and voltage.

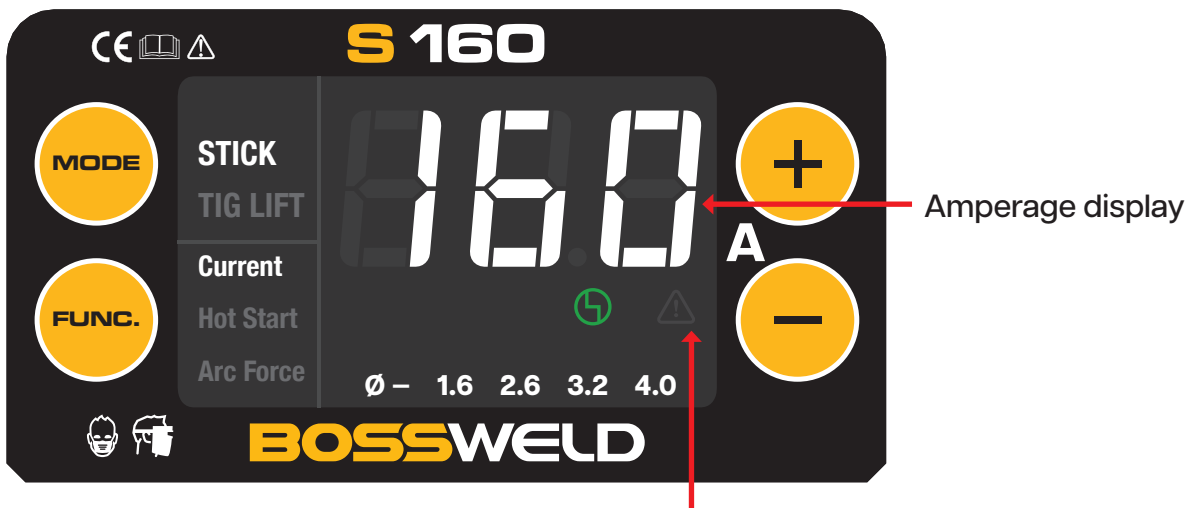
BOSSWELD				PART NO.	611010				
S160				STANDARD	EN 60974-1:2022				
INVERTER DC MMA WELDER									
	10A/10.4V-160A/16.4V				10A/20.4V-160A/26.4V				
	X	19%	60%		100%	X	8%	60%	100%
	I₂	160A	90A	70A		I₂	160A	60A	45A
U₀=72.5V	U₂	16.4V	13.6V	12.8V	U₀=72.5V	U₂	26.4V	22.4V	21.8V
U_i=240V	I_{1max}=23.0A		I_{1eff}=10.0A		U_i=240V	I_{1max}=34.0A		I_{1eff}=9.6A	
	1~50/60Hz		IP21S		S		2.7kg		

→ Duty Cycle
→ Amperage/Current
→ Voltage

NOTE: Amps refer to the Current setting 160 duty cycle shown

8%	60%	100%
160 Amps	60 Amps	45 Amps
26.4 Volts	22.4 Volts	21.8 Volts

For example this means when the machine is set at its highest current of 160 Amps it can weld for 1 minute in a Ten minute period. The power source is protected by a built in temperature protection device, This will activate if the machine is operated in excess of its amperage and duty cycle rating.



The Overload Error Indicator light indicates Over temperature / Duty cycle exceeded

WARNING



The device and packaging material are not toys! Children must not be allowed to play with the machine and its accessories. Plastic parts and packaging are choking risks for children.

- Open the packaging and remove the welder carefully.
- Check that the delivery is complete.
- If possible, store the packaging until the warranty period has expired.

PERSONAL PROTECTIVE EQUIPMENT (PPE)



GLOVES AND PROTECTIVE CLOTHING

Use protective gloves and fire resistant protective clothing when welding. Avoid exposing skin to ultraviolet rays produced by the arc.



WELDING HELMET

Under no circumstances should the welder be operated unless the operator is wearing a welding helmet to protect the eyes and face. There is serious risk of eye damage if a helmet is not used. The sparks and metal projectiles can cause serious damage to the eyes and face. The light radiation produced by the arc can cause damage to eyesight, and burns to skin. Never remove the welding helmet whilst welding.



SAFETY GLASSES

After welding use appropriate safety glasses when brushing, chipping or grinding the slag from the weld.



OTHER PERSONS

Ensure that other persons are screened from the welding arc and are at least 15 metres away from the work piece. Always ensure that the welding arc is screened from onlookers, or people just passing by. Use screens if necessary, or non-reflecting welding curtain. Do not let children or animals have access to the welding equipment or to the work area.



SWITCHING OFF

When the operator has finished welding they must switch the welder off.

DO NOT put the electrode holder down with the welder switched ON.

When leaving the welder unattended, move the ON/OFF switch to the OFF position and disconnect the welder from the electrical mains supply.

Do not leave hot material unattended after welding.



FUMES & GASES ARE DANGEROUS

Smoke and gas generated whilst welding or cutting can be harmful to people's health. Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Do not breathe the smoke and gas generated whilst welding or cutting, keep your head out of the fumes.
- Keep the working area well ventilated, use fume extraction or ventilation to remove welding fumes and gases.
- In confined or heavy fume environments always wear an approved air-supplied respirator.
- Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near de-greasing, cleaning, or spraying operations.
The heat and rays of the arc can react with vapours to form highly toxic and irritating gases.
- Materials such as galvanized, lead, or cadmium plated steel, containing elements that can give off toxic fumes when welded. Do not weld these materials unless the area is very well ventilated, and or wearing an air supplied respirator.



Keep the welding cables, earth clamp and electrode holder in good condition. Failure to do this can result in poor welding quality, which could be dangerous in structural situations.

Prior to use, check for breakage of parts and any other conditions that may affect operation of the welder.

Any part of the welder that is damaged should be carefully checked to determine whether it will perform its intended function whilst being safe for the operator. Any part that is damaged should be properly repaired, or replaced by an authorised service centre.

IMPROPER USE

It is hazardous to use the welding machine for any work other than that for which it was designed e.g. do not use welder for thawing pipes.

HANDLING

Ensure the handle is correctly fitted. As welding machines can be heavy, always use safe lifting practices when lifting.

POSITION AND HANDLING

To reduce risk of the machine being unstable / danger of overturning, position the welding machine on a horizontal surface that is able to support the machine weight. Operators **MUST NOT BE ALLOWED** to weld in raised positions unless safety platforms are used.

SAFETY INSTRUCTIONS



WARNING

The user of this welder is responsible for their own safety and the safety of others. It is important to read, understand and respect the contents of this user guide. When using this welder, basic safety precautions, including those in the following sections must be followed to reduce the risk of fire, electric shock and personal injury. Ensure that you have read and understood all of these instructions before using this welder.

Persons who are not familiar with this user guide should not use this welder. Keep this booklet in a safe place for future reference.

TRAINING

The operator should be properly trained to use the welding machine safely and should be informed about the risks relating to arc welding procedures. This user guide does not attempt to cover welding technique. Training should be sought from qualified / experienced personnel on this aspect, especially for any welds requiring a high level of integrity for safety.

SERIOUS FIRE RISK

The welding process produces sparks, droplets of fused metal, metal projectiles and fumes. This constitutes a serious fire risk. Ensure that the area in which welding will be undertaken is clear of all inflammable materials. It is also advisable to have a fire extinguisher, and a welding blanket on hand to protect work surfaces.

WORK AREA



- Ensure a clear, well lit work area with unrestricted movement for the operator.
- The work area should be well ventilated, as welding emits fumes which can be dangerous.
- Always maintain easy access to the ON/OFF switch of the welder, and the electrical mains supply.
- Do not expose the welder to rain and do not operate in damp or wet locations

Where welding must be undertaken in environments with increased risk of electric shock, confined spaces or in the presence of flammable or explosive materials, it is important that the environment be evaluated in advance by an “expert supervisor”. It is also recommended that welding in these circumstances be carried out in the presence of persons trained to intervene in emergencies.

AVOID ELECTRICAL CONTACT

Use adequate electrical insulation with regard to the electrode, the work piece and any accessible earthed metal parts in the vicinity. Avoid direct contact with the welding circuit. The no load voltage between the earth clamp and the electrode can be dangerous under certain circumstances. Note: For additional protection from electric shock. It is recommended that this welder be used in conjunction with a residual current device (RCD) with rated residual current of 30MA or less. In general the use of extension leads should be avoided. If used however, ensure that the extension lead is used with the welder is of a suitable current rating and heavy duty in nature that **MUST** have an earth connection. If using the welder outdoors, ensure that the extension lead is suitable for outdoor use. Always keep extension leads away from the welding zone, moisture and any hot materials.

WELDING SURFACES

Do not weld containers or pipes that hold, or have held, flammable liquids or combustible gases or pressure. Do not weld on coated, painted or varnished surfaces as the coatings may ignite, or can give off dangerous fumes.

WORK PIECE

When welding, the work piece will remain at high temperature for a relatively long period. The operator must not touch the weld or the work piece unless wearing welding gloves. Always use pliers or tongs. Never touch the welded material with bare hands until it has completely cooled.

VOLTAGE BETWEEN ELECTRODE HOLDERS OR TORCHES

Working with more than one welding machine on a single work piece, or on work pieces that are connected, may generate a dangerous accumulation of no-load voltage between two different electrode holders or torches, the value of which may reach double the allowed limit.

OPERATIONAL ENVIRONMENT

- Height above sea level ≤1000m
- Operation temperature range -10~+40°C
- Air relative humidity is below 90%(20°C)
- Preferably site the machine above floor level, ensure the maximum angle does not exceed 15 degrees.
- Protect the machine against heavy rain and against direct sunshine.
- The content of dust, acid, corrosive gas in the surrounding air or substance must not exceed normal standard.
- Take care that there is sufficient ventilation during welding. There must be at least 30cm free distance between the machine and wall.

MAINTENANCE



WARNING

Before starting any cleaning, or maintenance procedures on the welding machine, make sure that it is switched OFF and disconnected from the mains supply. There are no user serviceable parts inside the welder. Refer to a qualified service personnel if any internal maintenance is required. After use, wipe the welder down with a clean soft dry cloth.

Regular inspection of the supply cord is required and if damaged is suspected, it must be immediately replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard

STORAGE/ TRANSPORT

Store the welder and accessories out of children's reach in a dry place. If possible store the welder in the original packaging. The appliance must unconditionally be secured against falling or rolling over during transport.

DISPOSAL



DISPOSING OF THE PACKAGING

Recycling packaging reduces the need for landfill and raw materials. Reuse of the recycled material decreases pollution in the environment. Please recycle packaging where facilities exist. Check with your local council authority for recycling advice.

DISPOSING OF THE WELDER

Welders that are no longer usable should not be disposed of with household waste but in an environmentally friendly way. Please recycle where facilities exist. Check with your local council authority for recycling advice.

GAS BOTTLE



ATTENTION! - CHECK FOR GAS LEAKS

At initial set up and at regular intervals we recommend to check for gas leakage
Recommended procedure is as follows:

1. Connect the regulator and gas hose assembly and tighten all connectors and clamps.
2. Slowly open the cylinder valve.
3. Set the flow rate on the regulator to approximately 10-15 l/min.
4. Close the cylinder valve and pay attention to the needle indicator of the contents pressure gauge on the regulator, if the needle drops away towards zero there is a gas leak. Sometimes a gas leak can be slow and to identify it will require leaving the gas pressure in the regulator and line for an extended time period. In this situation it is recommended to open the cylinder valve, set the flow rate to 8-10 l/min, close the cylinder valve and check after a minimum of 15 minutes. Ensuring adequate ventilation fore small spaces.
5. If there is a gas loss then check all connectors and clamps for leakage by brushing or spraying with / soapy water, bubbles will appear at the leakage point.
6. Tighten clamps or fittings to eliminate gas leakage.

IMPORTANT! - We strongly recommend that you check for gas leakage prior to operation of your machine. We recommend that you close the cylinder valve when the machine is not in use. BOSSWELD, authorised representatives or agents of BOSSWELD will not be liable or responsible for the loss of any gas.

WARRANTY

This warranty is in addition to the statutory warranty provided under Australian Consumer Law, but does not include damage resulting from transport, misuse, neglect or if the product has been tampered with. The product must be maintained as per this manual, and installed and used according to these instructions on an appropriate power supply. The product must be used in accordance with industry standards and acceptable practice.

This warranty covers the materials used to manufacture the machine and the workmanship used to produce the item. This Warranty does not cover damage caused by:

1. Normal wear and tear due to usage
2. Misuse /abuse or Neglect of the item
3. Transport / handling breakages
4. Lack of maintenance, care and cleaning
5. Environmental factors, such as usage in temperatures exceeding 40 degrees, above 1000mt sea level, rain, water, excessive damp, cold or humid conditions.
6. Improper setup or installation
7. Use on Incorrect voltage or non authorised electrical connections and plugs
8. Use of non standard parts
9. Repair, case opening, tampering with, modifications to any part of the item by non authorised BOSSWELD repairers.

This warranty covers the machine only and does not include Torches, Leads, Earth Clamps, Electrode holders, Plasma Torches, Tig Torches and any of the parts on those items unless there is a manufacturing fault.

1. REGISTRATION

Purchasers are encouraged to register for warranty on our website. www.bossweld.com.au/warranty

2. TIME PERIOD - 3 Years

A warranty claim must be made within 3 years from the date of purchase of this product. Any claim must include proof of purchase.

3. HOW TO MAKE A CLAIM - NEED SOME HELP?

- Visit our website www.bossweld.com.au/troubleshooting for many helpful tips and guides to assist with the setup and usage of your new machine. Still stuck....?
- Call the BOSSWELD Helpdesk on 1300 899 710 for over the phone assistance.
- If the machine is not operational then return the item to the place of purchase.

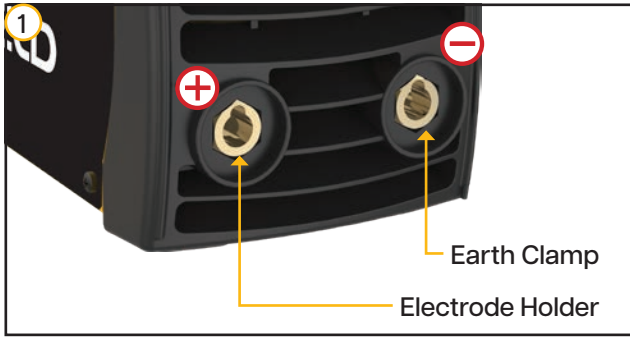
Note:

If this welders duty cycle is exceeded the welder will enter “thermal overload” which will automatically stop the welding output in order to protect, both the user and the welder. You will know the welder has gone into thermal overload when the overload error indicator light is illuminated. The welder will then cool itself down, and once the overload error indicator light is no longer illuminated, welding can then re-commence. Please note. Exceeding the machine’s duty cycle, cannot be considered grounds for warranty or return.

BOSSWELD 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.



MMA (STICK) WELDING MACHINE SET UP



Assemble Arc and Earth leads into the welding terminals depending on requirements of electrodes.

DCEP: Electrode connected to Positive (+) output socket

DCEN: Electrode connected to Negative (-) output socket



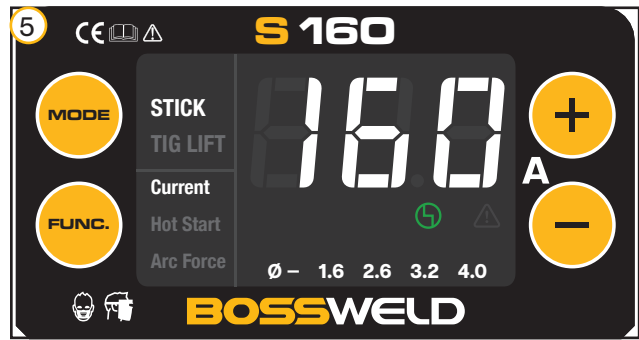
Connect earth clamp firmly to work-piece ensuring that the clamp makes good contact with bare metal.



Take the electrode holder and press the handle to open the tong. Insert the bare metal rod end of the electrode and release the handle to clamp the electrode.



Plug the machine 10Amp input power lead into the wall socket, ensuring that the power switch on the machine is in the **ON** position. **Ensure the electrode / electrode holder is not near the work-piece or can earth out.** The front displays will light up and the cooling fan will start.



Press **MODE** button to select Stick function.

Select your required welding current by pressing the **+ & -** buttons.

Hot Start: This control provides extra power when the weld starts to counteract the high resistance of the electrode and workpiece as the arc is started.

Arc Force: This control boosts the welding power if it senses the welding voltage is getting too low. The higher the arc force adjustment, the higher the minimum voltage that the power source will allow. This effect will also cause the welding current to increase.

Note: It is advisable to run a few test welds using scrap or offcut materials, in order to tune the machine to the correct settings prior to welding the job. Pictures may vary from your machine model

MMA (STICK) WELDING OPERATION

MANUAL METAL ARC PROCESS (MMA WELDING)

When an arc is struck between the metal rod (electrode) and the workpiece, both the rod and workpiece surface melt to form a weld pool. Simultaneous melting of the flux coating on the rod will form gas and slag which protects the weld pool from the surrounding atmosphere. The slag will solidify and cool and must be chipped off the weld bead once the weld run is complete (or before the next weld pass is deposited).

The process allows only short lengths of weld to be produced before a new electrode needs to be inserted in the holder. Weld penetration is low and the quality of the weld deposit is highly dependent on the skill of the welder.

TYPES OF ELECTRODES

Arc stability, depth of penetration, metal deposition rate and positional capability are greatly influenced by the chemical composition of the flux coating on the electrode. There are many types of Electrodes, and these are generally matched to the base metal. For example if welding Mild Steel then select a Mild Steel (General Purpose Electrode). Electrodes are identified by a universal numbering system (AWS Type code).

BASE METAL	ELECTRODE TYPE	TYPE
Mild Steel	Mild Steel General Purpose	6013
Stainless Steel	Stainless Steel 316L	316L
Dissimilar Metals	Dissimilar 680	312
Cast Iron	Nickel Arc 98	Ni99
High Strength Steel	Low Hydrogen	TC16

Electrodes are often packed in sealed packaging to keep moisture out. However, if a pack has been opened or damaged, it is essential that the electrodes are redried according to the manufacturer's instructions.

ARC FORCE

Also called Dig and Arc Control. Gives a power source variable additional amperage during low voltage (short arc length) conditions while welding. Helps avoid "sticking" stick electrodes when a short arc length is used.

POWER SOURCE

Electrodes can be operated with AC and DC power supplies. Not all DC electrodes can be operated on AC power sources; however AC electrodes may be used on either AC or DC

ELECTRODE SIZE SELECTION

Electrode size selection will be determined by the thickness of the section being welded. A thicker section will need a larger diameter electrode. The table below shows the maximum size of electrodes for average thicknesses of section (based on General Purpose 6013 Electrode).

AVERAGE METAL THICKNESS	ELECTRODE SIZE
1.0 – 2.0 mm	2.0 mm
2.0 – 5.0 mm	2.6 mm
5.0 – 8.0 mm	3.2 mm
8.0 mm +	4.0 mm

WELDING CURRENT

Welding current level is determined by the size of electrode - the normal operating range and current are recommended by manufacturers. Typical operating ranges for a selection of electrode sizes are illustrated in the table. As a rule of thumb when selecting a suitable current level, an electrode will require about 40 Amps per millimetre (diameter). Therefore, the preferred current level for a 4mm diameter electrode would be 160 Amps, but the acceptable operating range is 140 to 180 Amps. It is important to match the machine to the job

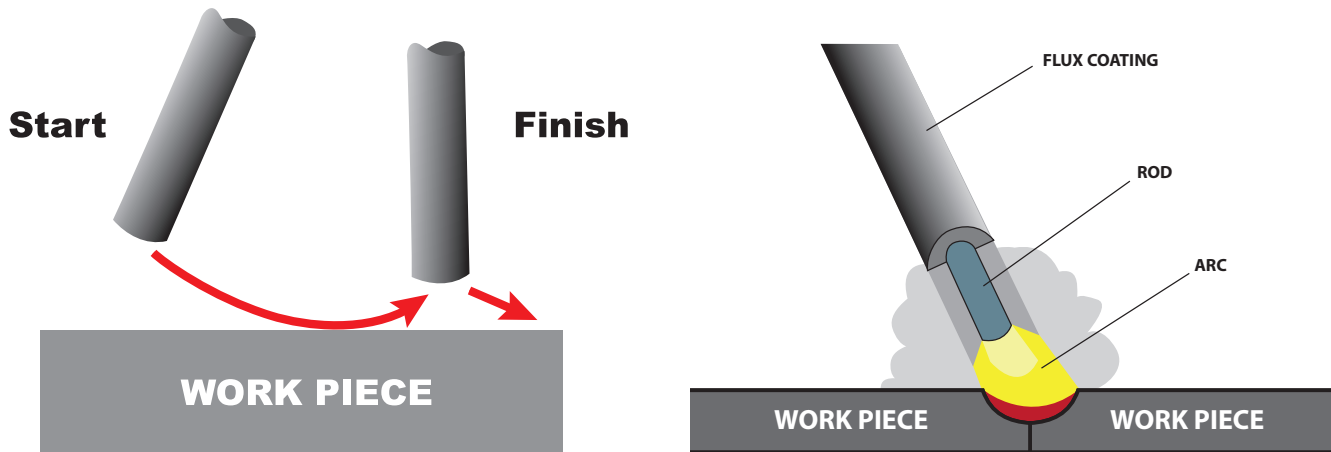
AMPERAGE SELECTION GUIDE	
ROD SIZE/ GAUGE	WELDING CURRENT
1.6 mm	40 – 50 Amps
2.0 mm	50 – 75 Amps
2.5 mm	75 – 105 Amps
3.2 mm	105 – 140 Amps
4.0 mm	140 – 160 Amps

STARTING THE ARC (SCRATCH)

The welding arc is obtained when the welding current is forced across a gap between the electrode tip and the workpiece. A welder must be able to strike and establish the correct arc easily and quickly.

The scratching method is easier for beginners. The electrode is moved across the plate inclined at an angle, as you would strike a match. As the electrode scratches the plate an arc is struck. When the arc has formed, withdraw the electrode momentarily to form an excessively long arc, then return to optimal arc length.

The optimal arc length, or distance between electrode and puddle, is the same as the diameter of the electrode (the actual metal part within the flux covering). Holding the electrode too closely to the joint decreases welding voltage, which creates an erratic arc that may extinguish itself.



TIPS

- Keep the welding current as low as possible for the job at hand to maintain the best duty cycle from your welding machine, prevent the flux from burning and make removal slag easier.
- To break the circuit withdraw the electrode from the work piece. Be careful with the end of the electrode, as it will be HOT. Provided the current setting is correct, the surface of the work piece will also melt by the intensity of the electric arc. A degree of "penetration" is thereby obtained, and a complete "fusion" of the work piece and the deposited electrode is met.
- If the transformer overheats, the overload cut-out protector will activate and cut off. The light will illuminate to show that the cut out has operated.
- After cooling, the protector will reconnect the supply circuit and the welder will be ready for further use.

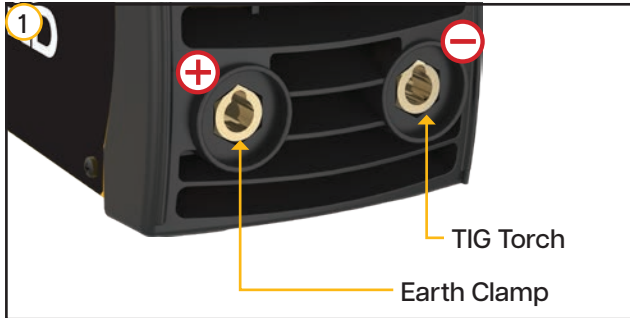
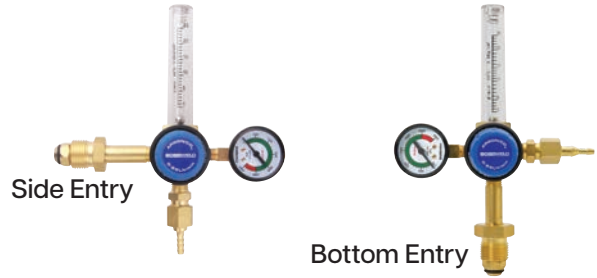
Note: If the duty cycle of the machine is exceeded, the thermostatic protection will activate and the machine will cut out, to cool down.

TIG WELDING MACHINE SET UP

NOTE: TIG TORCH OPTION AND REGULATOR SHOWN ARE NOT SUPPLIED WITH THE MACHINE

17 Series Complete Air Cooled TIG Torch
 95.17V.4.1.DA25 (Torch Head with Valve)
 95.17FV.4.1.DA25 (Flex Torch Head with Valve)

Bossweld Argon Dual Stage Regulator with Flowmeter.
 Part Number:
 400209 Bossweld Argon Dual Stage Regulator (side entry)
 400214 Bossweld Argon Dual Stage Regulator (bottom entry)



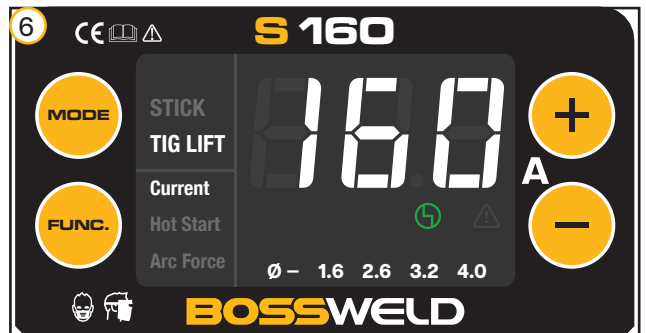
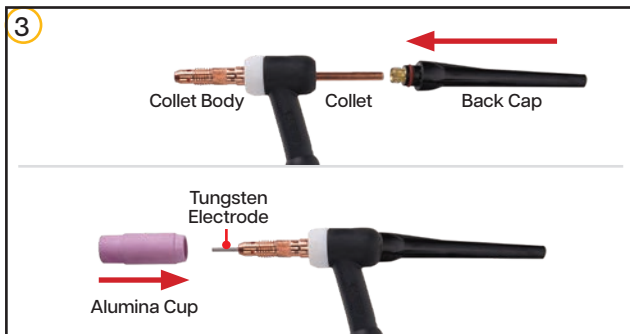
Install the TIG Torch to the machine by connecting the Dinse Connector to the Negative Output Connection Socket, the Gas hose to the Gas Output and the TIG Torch Control Socket and screw the nut up firmly.

Connect gas line to regulator on gas bottle. Note: CHECK FOR LEAKS prior to welding. Carefully open the valve of the gas cylinder. Adjust to required gas flow rate as indicated on the regulator.



Connect earth clamp firmly to work-piece ensuring that the clamp makes good contact with bare metal.

Plug the machine 10Amp input power lead into the wall socket, ensuring that the power switch on the machine is in the **ON** position. **Ensure the TIG torch is not near the work-piece or can earth out.** The front displays will light up and the cooling fan will start.



Set up the TIG torch. Ensure collect body, collet with back cap are screw in firmly. Place the Tungsten Electrode into the torch head then screw in alumina cup.

Press **MODE** button to select TIG function. Select your required welding current by pressing the **+** & **-** buttons.

Note: It is advisable to run a few test welds using scrap or offcut materials, in order to tune the machine to the correct settings prior to welding the job. Pictures may vary from your machine model.

IMPORTANT! - We strongly recommend that you check for gas leakage prior to operation of your machine. We recommend that you close the cylinder valve when the machine is not in use. BOSSWELD authorised representatives or agents of BOSSWELD will not be liable or responsible for the loss of any gas.

TIG WELDING OPERATION

This risk can be minimised using the 'lift arc' technique where the short-circuit is formed at a very low current level. The most common way of starting the TIG arc is to use HF (High Frequency). HF consists of high voltage sparks of several thousand volts which last for a few microseconds. The HF sparks will cause the electrode - workpiece gap to break down or ionise. Once an electron/ion cloud is formed, current can flow from the power source.

Note: As HF generates abnormally high electromagnetic emission (EM), welders should be aware that its use can cause interference especially in electronic equipment. As EM emission can be airborne, like radio waves, or transmitted along power cables, care must be taken to avoid interference with control systems and instruments in the vicinity of welding.

HF is also important in stabilising the AC arc; in AC, electrode polarity is reversed at a frequency of about 50 times per second, causing the arc to be extinguished at each polarity change. To ensure that the arc is reignited at each reversal of polarity, HF sparks are generated across the electrode/workpiece gap to coincide with the beginning of each half-cycle.

PROCESS CHARACTERISTICS




In the TIG process the arc is formed between a pointed tungsten electrode and the workpiece in an inert atmosphere of argon. The small intense arc provided by the pointed electrode is ideal for high quality and precision welding. Because the electrode is not consumed during welding, the welder does not have to balance the heat input from the arc as the metal is deposited from the melting electrode. When filler metal is required, it must be added separately to the weldpool.

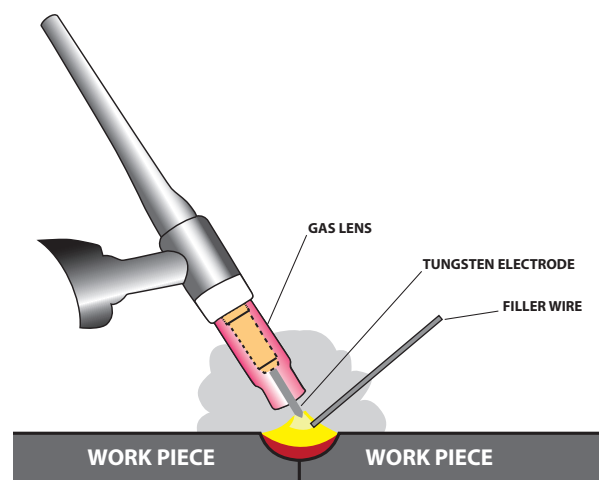
POWER SOURCE

TIG must be operated with a constant current power source. A constant current power source is essential to avoid excessively high currents being drawn when the electrode is short-circuited onto the workpiece surface. This could happen either deliberately during arc starting or inadvertently during welding. If, as in MIG welding, a flat characteristic power source is used, any contact with the workpiece surface would damage the electrode tip or fuse the electrode to the workpiece surface. In DC, because arc heat is distributed approximately one-third at the cathode (negative) and two-thirds at the anode (positive), the electrode is always negative polarity to prevent overheating and melting. However, the alternative power source connection of DC electrode positive polarity has the advantage in that when the cathode is on the workpiece, the surface is cleaned of oxide contamination.

APPLICATIONS

TIG is applied in all industrial sectors but is especially suitable for high quality welding. In manual welding, the relatively small arc is ideal for thin sheet material or controlled penetration (in the root run of pipe welds). Because deposition rate can be quite low (using a separate filler rod) MMA or MIG may be preferable for thicker material and for fill passes in thick-wall pipe welds.

WELDING GAS SELECTION CHART GUIDE		
 TIG TIG WELDING	 ARGON	 Ar-CO ₂ -O ₂
	MILD STEEL	✓
STAINLESS STEEL	✓	✗
LOW ALLOY STEEL	✓	✗
ALUMINIUM	✗	✗



LIFT ARC START



1 Lay the outside edge of the Gas Cup on the work piece with the Tungsten Electrode 1- 2mm from the work piece.



2 With a small movement rotate the Gas Cup forward so that the Tungsten Electrode touches the work piece.

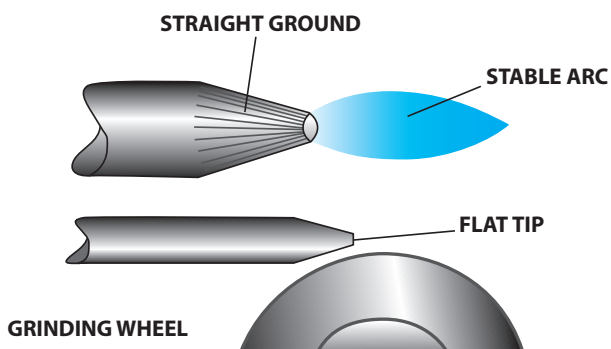


3 Now rotate the Gas Cup in the reverse direction to lift the Tungsten electrode from the work piece to create the arc.

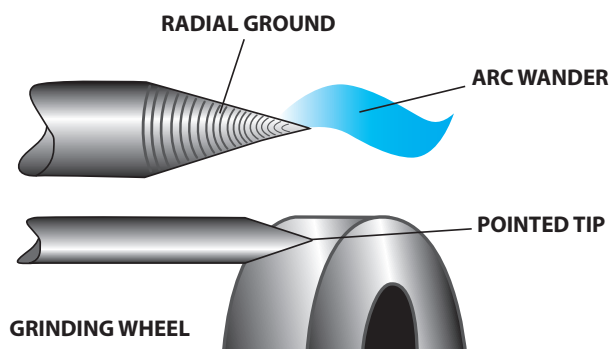
TUNGSTEN PREPARATION & GRINDING

Caution: Grinding can create a hazard as the exposed tungsten/thoria area is greatly increased and fine particles of dust are released into the atmosphere. It is recommended that a dedicated grindstone with local dust extraction is used, and a simple filter mask is worn. If the grinding wheel is not fitted with a protective viewing screen, eye protection must be worn.

CORRECT PREPERATION - STABLE ARC



INCORRECT PREPERATION - STABLE ARC



Note: Do not use wheel for other jobs or tungsten can become contaminated and cause lower weld quality

TROUBLE SHOOTING

- Before the welding machines are dispatched from the factory, they have already been tested and calibrated accurately. It is forbidden for anyone who is not authorized by our company to do any change to the equipment!
- Maintenance course must be operated carefully. If any wire becomes flexible or is misplaced, it maybe potential danger to user!
- Only professional maintenance staff that is authorized by our company could overhaul the machine!
- Be sure to shut off the Main Input Power before doing any repair work on the welding machine!
- If there is any problem and there is no authorized professional maintenance personal on site, please contact local agent or the distributor!

If there are some simple troubles with the welding machine, you can consult the following Chart:

	TROUBLES	REASONS		SOLUTIONS
1	Turn on the power source, and the LCD is on, but fan doesn't work	There is something in the fan		Clear out
		The fan motor damaged		Change fan motor
2	Turn on the power source, and the LCD is not on, and fan doesn't work	No input voltage		Check whether there is input voltage
		Overvoltage (Input voltage is too much or not)		Check input voltage
3	No no-load voltage output	There is trouble inside the machine		Check the main circuit, Pr1 and Pr2
4	No current output in the welding	Welding cable is not connected with the two output of the welder		Connect the welding cable to the welder's output
		Welding cable is broken		Wrap, repair or change the welding cable
		Earth cable is not connected or loosen		Check the earth clamp
5	Not easy to start arc in the welding, or easy to cause sticking	The plug loosen or connect not well		Check and tighten the plug
		Oil or dust covered the workpiece		Check and clear out
6	The arc is not stable in the welding process	The arc force is too small		Increase the arc force
7	The welding current cannot be adjusted	Welding current potentiometer in the front panel connection not so good or damaged		Repair or change the potentiometer
8	The penetration of molten pool is not enough (MMA)	The welding current adjusted too low		Increase the welding current
		The arc force adjusted too small		Increase the arc force
9	Arc blow	Airflow disturbance		Use the shelter from airflow
		The electrode eccentricity		Adjust the electrode angle Change the electrode
		Magnetic effect		Incline the electrode to the opposite way of the magnetic blow
				Change the position of earth clamp or add earth cable in the two side of workpiece
Use the short arc operation				
10	The error code appears on the screen	Over heat protection	Over welding current	Induce the welding current output
			Working time too long	Induce the duty cycle (interval work)
		Over current protection	Unusual current in the main circuit	Test and repair the main circuit and drive PCB

MMA (STICK) WELDING TROUBLE SHOOTING

The following chart addresses some of the common problems of MMA welding. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly adhered to and followed.

	TROUBLES	POSSIBLE REASON	SUGGESTED REMEDY
1	No arc	Incomplete welding circuit	Check earth lead is connected. Check all cable connections
		No power supply	Check that the machine is switched on and has a power supply
2	Porosity - small cavities or holes resulting from gas pockets in weld metal	Arc length too long	Shorten the arc length
		Work piece dirty, contaminated or moisture	Remove moisture and materials like paint, grease, oil and dirt, including mill scale from base metal
		Damp electrodes	Use only dry electrodes
3	Excessive Spatter	Amperage too high	Decrease the amperage or choose a larger electrode
		Arc length too long	Shorten the arc length
4	Weld sits on top, lack of fusion	Insufficient heat input	Increase the amperage or choose a larger electrode
		Work piece dirty, contaminated or moisture	Remove moisture and materials like paint, grease, oil and dirt, including mill scale from base metal
		Poor welding technique	Use the correct welding technique or seek assistance for the correct technique
5	Lack of penetration	Insufficient heat input	Increase the amperage or choose a larger electrode
		Poor welding technique	Use the correct welding technique or seek assistance for the correct technique
		Poor joint preparation	Check the joint design and fit up, make sure the material is not too thick. Seek assistance for the correct joint design and fit up
6	Excessive penetration - burn through	Excessive heat input	Reduce the amperage or use a smaller electrode
		Incorrect travel speed	Try increasing the weld travel speed
7	Uneven weld appearance	Unsteady hand, wavering hand	Use two hands where possible to steady up, practice your technique
8	Distortion - movement of base metal during welding	Excessive heat input	Reduce the amperage or use a smaller electrode
		Poor welding technique	Use the correct welding technique or seek assistance for the correct technique
		Poor joint preparation and or joint design	Check the joint design and fit up, make sure the material is not too thick. Seek assistance for the correct joint design and fit up
9	Electrode welds with different or unusual arc characteristic	Incorrect polarity	Change the polarity, check the electrode manufacturer for correct polarity

TIG WELDING TROUBLE SHOOTING

The following chart addresses some of the common problems of DC TIG welding. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly adhered to and followed.

	TROUBLES	POSSIBLE REASON	SUGGESTED REMEDY
1	Tungsten burning away quickly	Incorrect Gas or No Gas	Use pure Argon. Check cylinder has gas, connected, turned on and torch valve is open
		Inadequate gas flow	Check the gas is connected, check hoses, gas valve and torch are not restricted
		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 10amps of welding current.
2	Contaminated tungsten	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 2~5mm
		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
3	Porosity - poor weld appearance and color	Wrong gas/ poor gas flow/ gas leak	Use pure argon. Gas is connected, check hoses, gas valve and torch are not restricted. Set the gas flow between 6~12 l/min. Check hoses and fittings for holes, leaks et
		Contaminated base metal	Remove moisture and materials like paint, grease, oil and dirt 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
4	Yellowish residue/ smoke on the alumina nozzle & discolored tungsten	Incorrect Gas	Use pure Argon gas
		Inadequate gas flow	Set the gas flow between 10~15 l/min flow rate
		Alumina gas nozzle too small	Increase the size of the alumina gas nozzle
5	Unstable Arc during DC welding	Torch connected to DC+	Connect the torch to the DC- output terminal
		Contaminated base metal	Remove materials like paint, grease, oil and dirt, including mill scale from base metal.
		Tungsten is contaminated	Remove 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 2~5mm
6	Arc wanders during DC welding	Poor gas flow	Check and set the gas flow between 10~15 l/min flow rate
		Incorrect arc length	Lower torch so that the tungsten is off of the work piece 2~5mm
		Tungsten incorrect or in poor condition	Check that correct type of tungsten is being used. Remove 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 or filler wire	Remove contaminating materials like paint, grease, oil and dirt, including mill scale from base metal. Remove all grease, oil or moisture from filler metal
7	Arc difficult to start or will not start DC welding	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 10~15 l/min flow rate
		Incorrect tungsten size or type	Check and change the size and or the tungsten if required
		Loose connection	Check all connectors and tighten
		Earth clamp not connected to work	Connect the earth clamp directly to the work piece wherever possible

LIST OF ERROR CODE

ERROR TYPE	ERROR CODE	DESCRIPTION
Thermal relay	E01	Over-heating (1st thermal relay)
	E02	Over-heating (2nd thermal relay)
	E03	Over-heating (3rd thermal relay)
	E04	Over-heating (4th thermal relay)
	E09	Over-heating (Program in default)
Welding machine	E10	Phase loss
	E11	No water
	E12	No gas
	E13	Under voltage
	E14	Over voltage
	E15	Over current
	E16	Wire feeder over load
Switch	E20	Button fault on operating panel when switch on the machine
	E21	Other faults on operating panel when switch on the machine
	E22	Torch fault when switch on the machine
	E23	Torch fault during normal working process
Accessory	E30	Cutting torch disconnection
Communication	E40	Connection problem between wire feeder and power source
	E41	Communication error

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This warranty is given by Dynaweld Industrial Supplies Pty Ltd

Ph.1300 899 710

Australia (Head Office)

2/10 Jessica Place, Prestons, NSW, Australia, 2170

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