BOSSWELD

MST101

INVERTER WELDER

1+1* YEAR LIMITED WARRANTY

ATTENTION
GASLESS MIG WIRE ONLY

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.

CONTENTS

SPECIFICATIONS

Primary Input Power	**1 Phase 240V 50-60 HZ +/-10%**		
Function	MIG	Lift TIG	MMA
Duty Cycle @ 40˚C 10min	**20%@100A 60%@60A 100%@45A**	**20%@800A 60%@45A 100%@35A**	**10%@80A 60%@45A 100%@35A**
Welding Current Range (A)	30 – 100	10 – 80	10 – 80
I Max (A)	17.5	11.5	17.0
I eff (A)	7.8	5.1	7.6
Wire Diameter Range	0.6 – 0.9 mm		
Electrode Diameter Range	2.5 – 5.0 mm		
Protection	IP21S		
Insulation Class	S		
Thermal Overload	Yes		
Dimensions / Weight	370 x 135 x 270 mm		
Weight	5.0 kg		
Part Number	**611101**		

MACHINE CONTENTS

1. MST 101 Gasless MIG Welder with built-in MIG Torch
2. Electrode Holder
3. Earth Clamp

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.

MACHINE CARE / SAFETY

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.

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:

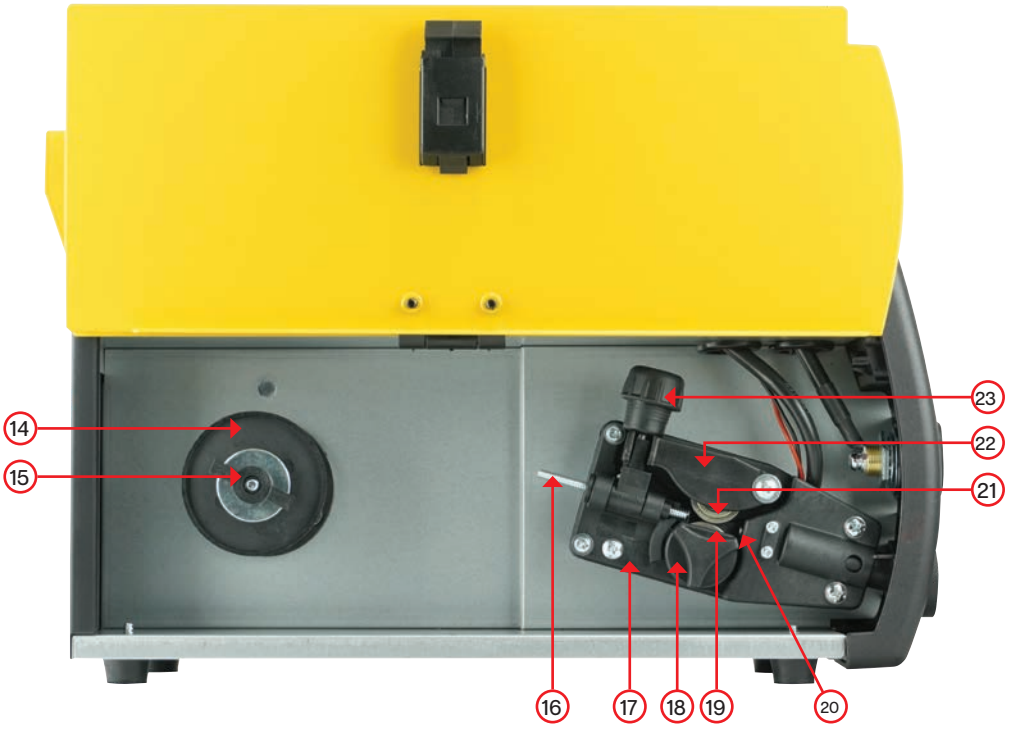
1. Connect the regulator and gas hose assembly and tighten all connectors and clamps.
2. Slowly open the cylinder valve.
3. Set the flow rate on the regulator to approximately 10-15 l/min.
4. Close the cylinder valve and pay attention to the needle indicator of the contents pressure gauge on the regulator, 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.

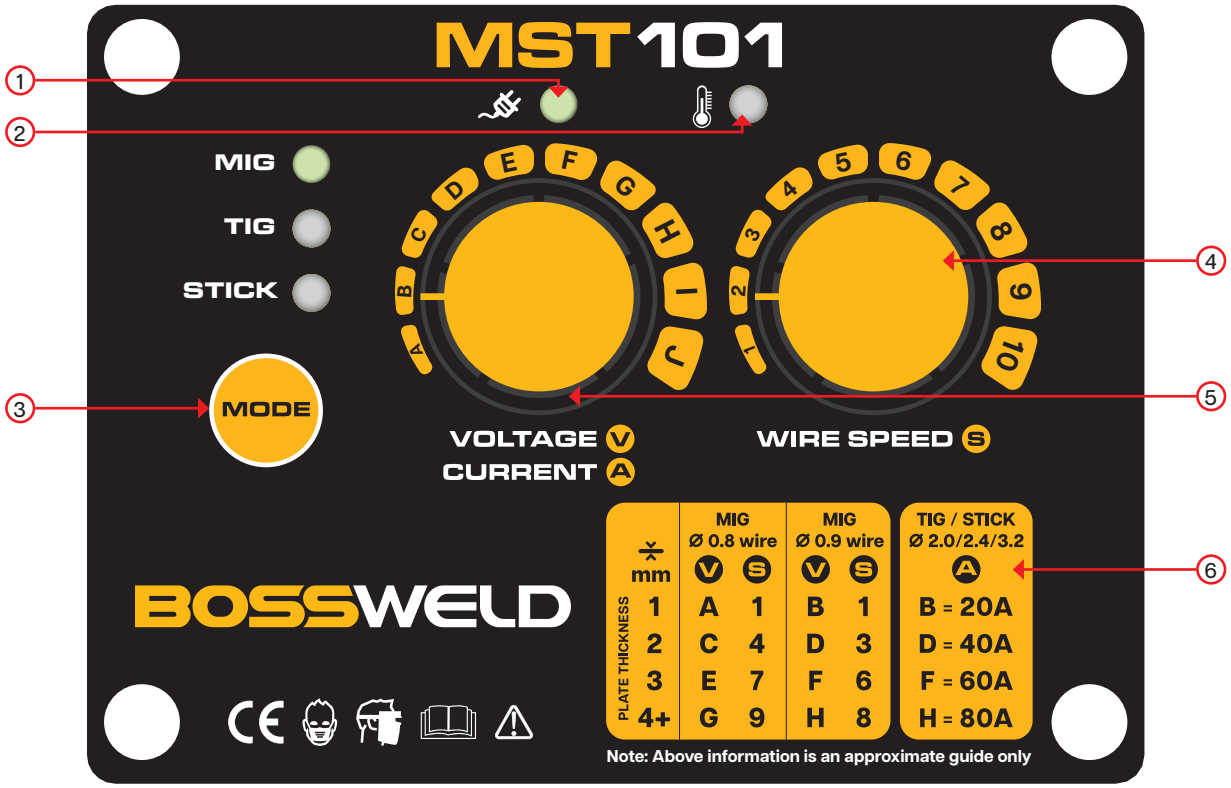
MACHINE PANEL

1. Power Indicator Light
2. Mode button for MIG, TIG, Stick
3. Positive (+) welding power output connection socket
4. Negative (-) welding power output connection socket
5. Built-in MIG Torch BZ15
6. Overload Error Indicator Light
7. Wire Speed Control Knob
8. Welding Voltage Control Knob
9. Setup Guide
10. Polarity change power connection
11. Cooling fan
12. Power switch
13. Input power cable

14. Spool Hub
15. Spool Hub Nut
16. Guide tube
17. Wire Drive Assembly
18. Wire drive roller cover
19. Wire drive roller
20. Wire feeder inlet guide
21. Idle roller
22. Wire feed tension arm
23. Wire feed tension knob adjustment



CONTROL PANEL



1. **Power Indicator**: When the ON/OFF switch is activated, this light should come on.
2. **Alarm Indicator**: When the machine is over-heat or over-voltage, the light is on.
3. **Welding Mode button**: Press to select welding modes: MIG Manual / TIG Lift / Stick VRD
4. **R Parameter knob**: Rotate to adjust the wire speed in MIG mode only.
5. **L Parameter knob**: Rotate to adjust the welding voltage in MIG or welding current in TIG / STICK
6. **Setup Guide**: Check your plate thickness (mm) then find your MIG wire size (0.8/0.9) or TIG/STICK. Rotate the parameter knobs to adjust the values. Guide only; fine-tune as needed.

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.

NOTE MIG SETTINGS SHOW BELOW:
Amps refer to the Current setting

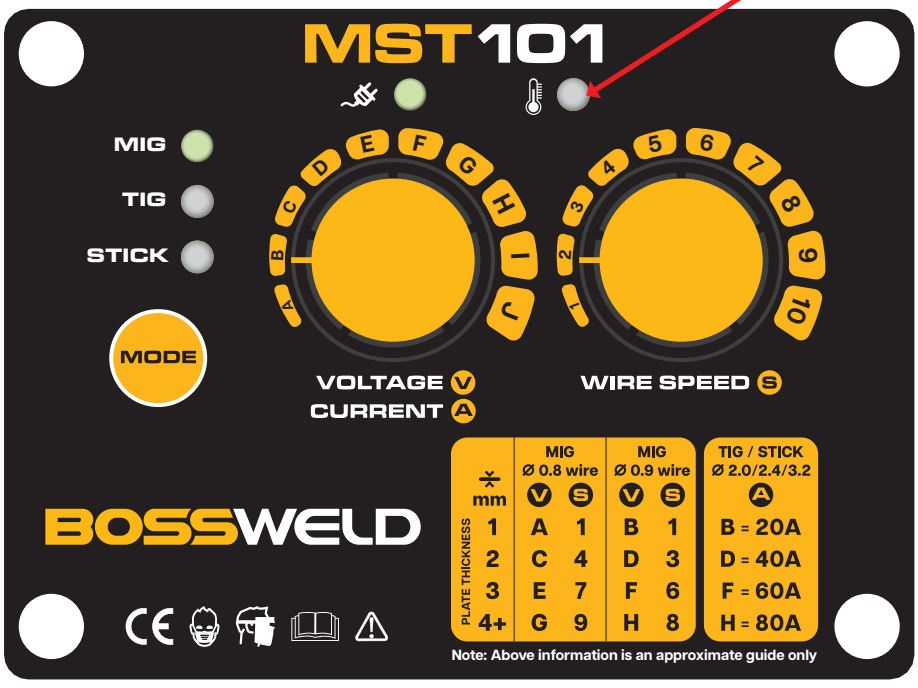
20%	60%	100%
100 - Amps	60-Amps	45-Amps
19 Volts	17 Volts	16.3 Volts

For example this means when the machine is set at is highest current of 100 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.

BOSSWELD MST101
INVERTER DC MIG WELDER

PART NO.	611101				
STANDARD	EN 60974-1:2022				
1~ f_1/f_2					
		30A/15.5V-100A/19V			
		X	20%	60%	100% ← Duty Cycle
	U_0=74V	I_2	100A	60A	45A ← Amperage/Current
		U_2	19V	17V	16.3V ← Voltage
U_1=240V		I_{1max}=17.5A		I_{1eff}=7.8A	
		10A/10.4V-80A/13.2V			
		X	20%	60%	100%
	U_0=72V	I_2	80A	45A	35A
		U_2	13.2V	11.8V	11.4V
U_1=240V		I_{1max}=11.5A		I_{1eff}=5.1A	
		10A/20.4V-80A/23.2V			
		X	20%	60%	100%
	U_0=72V	I_2	80A	45A	35A
		U_2	23.2V	21.8V	21.4V
U_1=240V		I_{1max}=17.0A		I_{1eff}=7.6A	
1~50/60Hz	IP21S	S		5.0kg	

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



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 - 1 Years
A warranty claim must be made within 2 years from the date of purchase of this product. Any claim must include proof of purchase.

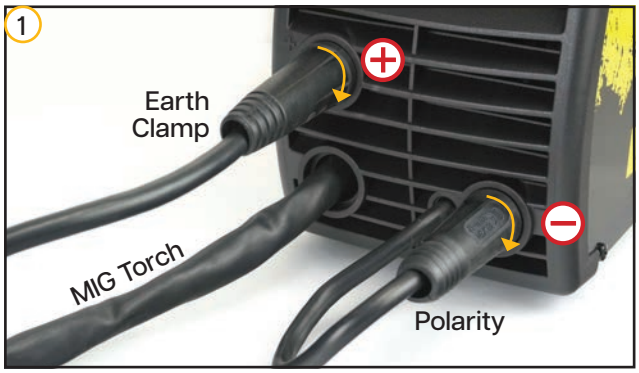
3. HOW TO MAKE A CLAIM - NEED SOME HELP?

- Visit our website www.dynaweld.com.au 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.

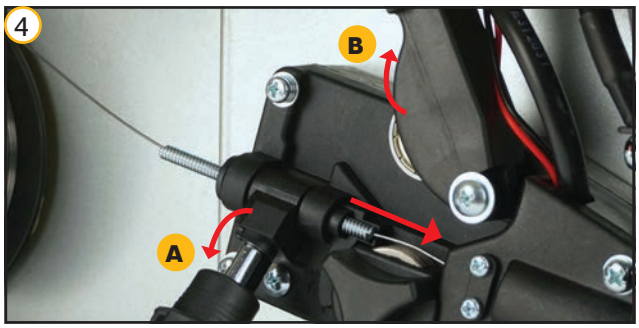
MIG WELDING MACHINE SETUP (GASLESS)



1. Plug **Earth Clamp** into the **Positive** terminal.
2. Plug **Polarity** Change Power Connection into the **Negative** terminal and tighten.

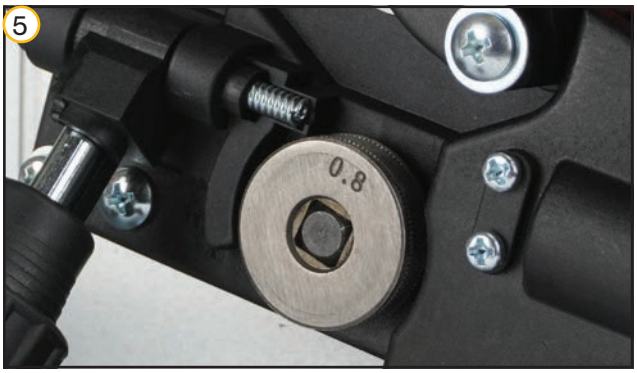
Open the side door of the machine. Remove spool wing nut, washer, spring wire and plastic washer to place a 1kg (D100) **GASLESS** spool of wire on spool hub then reinstall.

Reinstall spool retaining nut and tighten. Do not overtighten. Make sure the spool can rotate smoothly. **Note**: Wire to roll from top spool into wire feeder.



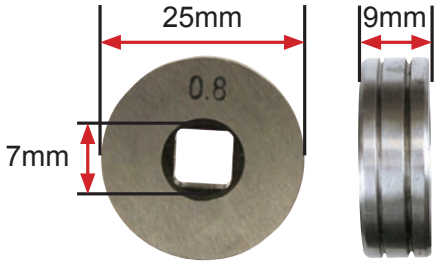
Turn down Wire Tensioning Knob **(A)** then push up the Wire Feed Tensioning Arm **(B)**. Carefully feed wire through the inlet guide tube on to the drive roller and into the outlet guide tube until it passes through the inlet tube, and into the torch.

Note: Hold wire to prevent the spool uncoiling.

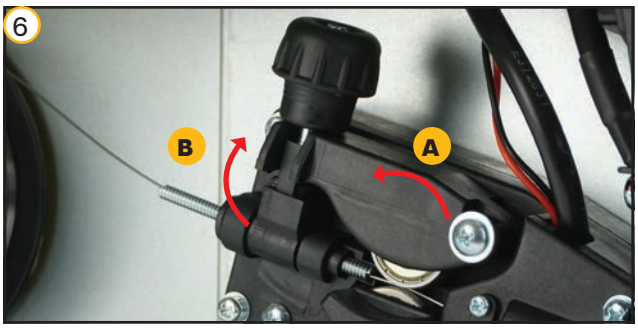


Remove the drive roller cover to check drive roller is matched to the wire size used.

Knurled Groove Drive Roller
Flux Cored Wire / Gasless Flux Cored Wire



PART NO.	DESCRIPTION
	Knurled Drive Roller For Gasless Wire
RK250907.06.08	Drive Roller 0.6/0.8mm Knurled 25 x 9 x 7mm



Put down Wire Tensioning Arm **(A)** so it locks into position, and turn the Wire Feed Tensioning Knob **(B)** to gently tighten. Do not overtighten.

Plug the machine 10Amp input power lead into the wall socket, ensuring that the power switch on the machine is in the **ON** position. The front displays will light up and the cooling fan will start.

MIG WELDING MACHINE SETUP (GASLESS)

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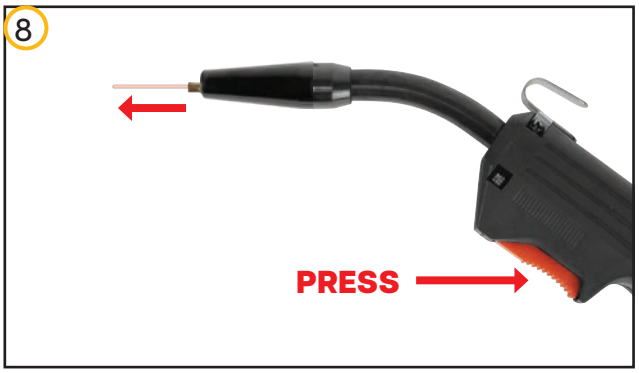

Press and hold the trigger on the MIG Torch. This will feed the wire through the torch. Release trigger when wire appears at the end of the torch.

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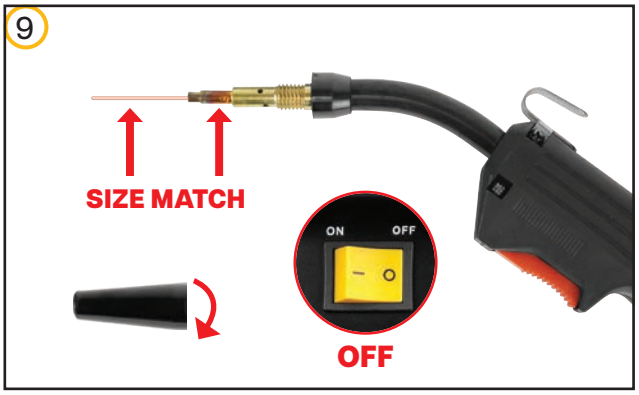

Switch machine **POWER OFF**. Twist to remove nozzle to ensure contact tip size matches the size of the wire being used. Do not overtighten.

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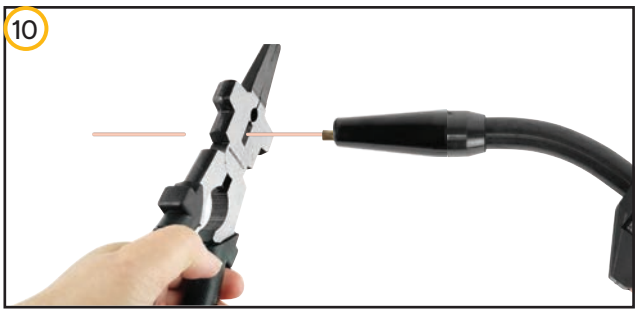

Reinstall nozzle. Trim wire to the end of the nozzle.

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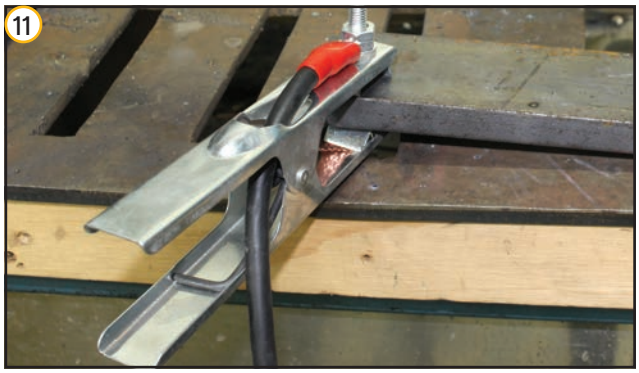

Connect earth clamp firmly to work-piece ensuring that the clamp makes good contact with bare metal.

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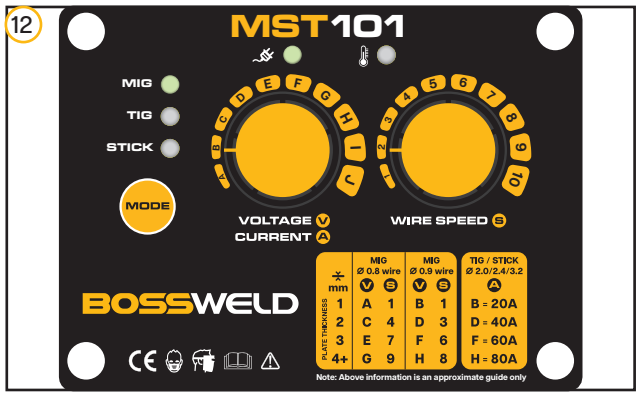


Press **MODE** button to select **MIG** function.

Rotate **Left knob** to adjust the Welding Voltage.
Rotate **Right knob** to trim the Wire Speed.

Refer to settings chart on the front of the machine for suggested machines settings and material thickness. Guide only; fine-tune as needed.

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.

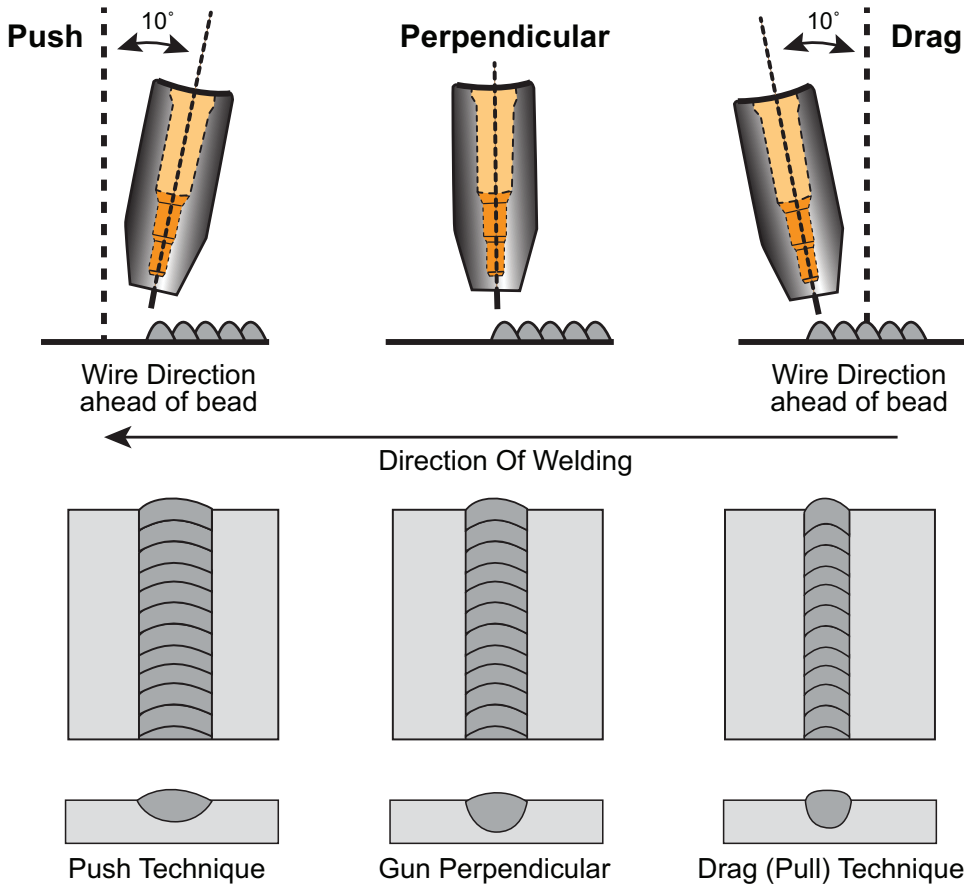
MIG WELDING OPERATION

The welding power supply has two control settings that have to balance. These are voltage control switches and the wire speed control. The welding amperage is determined by the voltage settings, the wire diameter, gas selection and the wire feed speed. The amperage will increase with higher voltage selection on the machine and higher wire feed speed. This is typically used for welding thick sections of steel. When welding thin sections of steel, a lower voltage selection and lower wire feed speed is required.

- When changing to a different wire diameter different control settings are required. A thinner wire needs more wire speed to achieve the same current level.
- A satisfactory weld cannot be obtained if the wire speed and voltage switch settings are not adjusted to suit the wire diameter and thickness of the material being welded.
- If the wire speed is too high for the welding voltage, “stubbing” will occur as the wire dips into the molten pool. If the wire speed is too slow for the welding voltage, large drops will form on the end of the electrode wire, causing spatter. Suppose that wire speed is constant, if the welding voltage is too high, large drops will form on the end of the electrode wire, causing spatter; if the voltage is too low, the wire will not melt.

POSITION OF MIG GUN

The angle of MIG gun to the weld has an effect on the width of the weld run.



DISTANCE FROM THE MIG GUN NOZZLE TO THE WORK PIECE

The electrode stick out from the MIG gun nozzle should be between 2.0mm to 5.0mm when welding with gas shielded wire. An increased distance of 5mm to 10mm is required when welding with Gasless wire. This distance will vary depending on the type of joint that is being weld. .

TRAVEL SPEED

Speed at which a weld travels influences the width of the weld and penetration of the welding run. Welding thin steel will have a faster travel speed than welding thick steel.

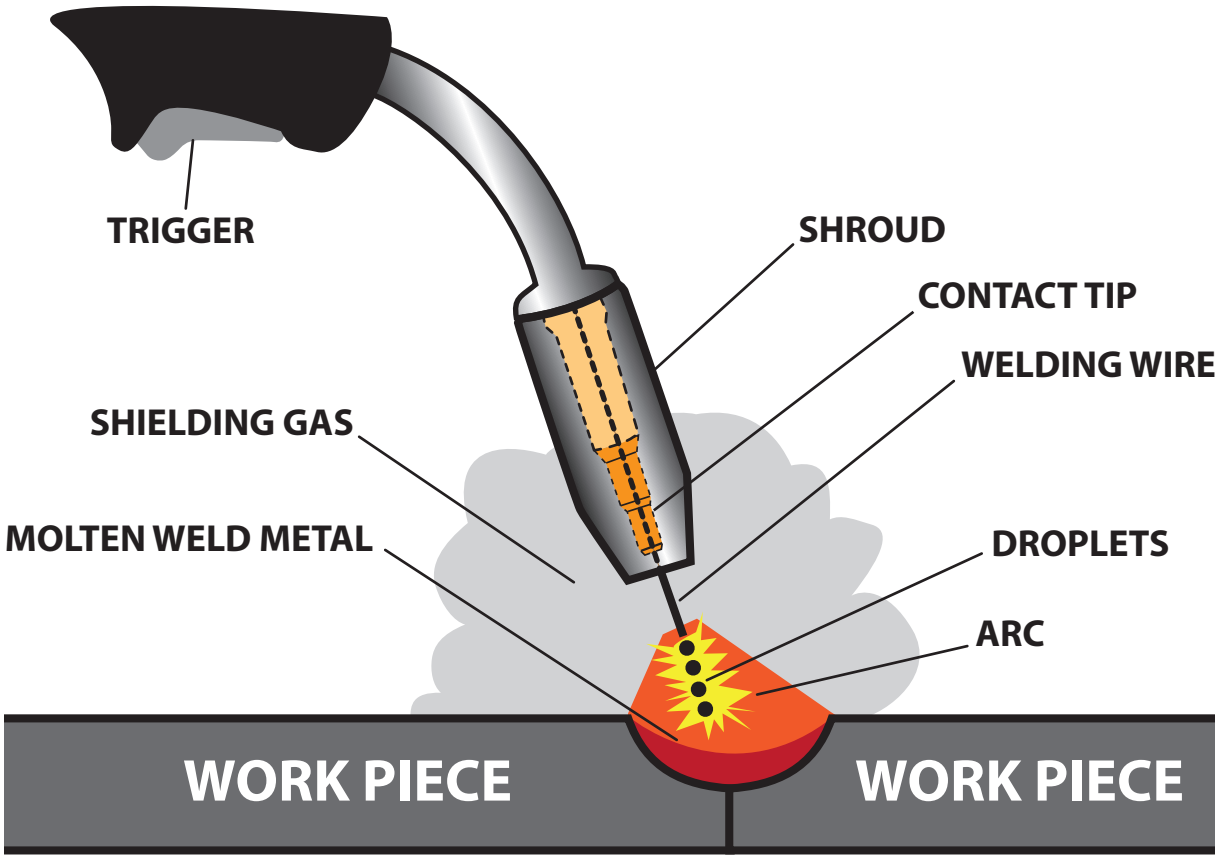
MIG WELDING OPERATION

PROCESS CHARACTERISTICS

MIG welding is a versatile technique suitable for both thin sheet and thick section components. An arc is struck between the end of a wire electrode and the workpiece, melting both of them to form a weld pool. The wire serves as both heat source (via the arc at the wire tip) and filler metal for the joint. The wire is fed through a copper contact tube (contact tip) which conducts welding current into the wire. The weld pool is protected from the surrounding atmosphere by a shielding gas fed through a nozzle surrounding the wire. Shielding gas selection depends on the material being welded and the application. The wire is fed from a reel by a motor drive, and the welder moves the welding torch along the joint line. Wires may be solid (simple drawn wires), or cored (composites formed from a metal sheath with a powdered flux or metal filling).

Consumables are generally competitively priced compared with those for other processes. The process offers high productivity, as the wire is continuously fed.

Manual MIG welding is often referred as a semi-automatic process, as the wire feed rate and arc length are controlled by the power source, but the travel speed and wire position are under manual control. The process can also be mechanised when all the process parameters are not directly controlled by a welder, but might still require manual adjustment during welding. When no manual intervention is needed during welding, the process can be referred to as automatic. The process usually operates with the wire positively charged and connected to a power source delivering a constant voltage. Selection of wire diameter (usually between 0.6 and 1.6mm) and wire feed speed determine the welding current, as the burn-off rate of the wire will form an equilibrium with the feed speed.



MIG TORCH AND CONSUMABLE CARE

PROPER MIG TORCH INSPECTION
Prior to welding, ensure all connections are tight and that consumables and equipment are in good condition and free from damage. Start with the front of the gun and work your way back to the feeder. A tight neck connection is essential to carry the electrical current from the welding cable to the front-end consumables. Also, be sure to visually inspect the handle and trigger to check there are no missing screws or damage. The cable should be free of cuts, kinks and damage along the outer cover. Cuts in the cable can expose the internal copper wiring and create a potential safety hazard to the welding operator. In addition, these issues can lead to electrical resistance that causes heat buildup – and ultimately cable failure.

CONSUMABLES
MIG gun front-end consumables are exposed to heat and spatter and therefore often require frequent replacement. However, performing some simple maintenance can help extend consumable life and improve gun performance and weld quality. The gas diffuser provides gas flow to the weld pool and also connects to the neck and carries the electrical current to the contact tip. Make sure all connections are tight, and check the diffuser's O-rings for cracks, cuts or damage. The nozzle's main role is to focus the shielding gas around the weld pool. Watch for spatter buildup in the nozzle, which can obstruct gas flow and lead to problems due to inadequate shielding coverage. Use MIG pliers to clean spatter from the nozzle. The contact tip is the last point of contact between the welding equipment and the welding wire. Keyholing of the contact tip is a concern to watch for with this consumable. This occurs when the wire passing through the tip wears an oblong-shaped slot into the diameter of the tip. Keyholing can put the wire out of center and cause problems such as an erratic arc. If you are experiencing wire feeding issues, try changing the contact tip or switching to a larger-size contact tip. Tips that look worn should be replaced.

FINAL THOUGHTS
Taking the time for preventative maintenance can pay off in less downtime in the long run. Along with that, always remember to properly store your MIG gun consumables to help you achieve the best results and extend the life of your equipment. When not in use, the MIG gun should be stored in a coiled position, either hanging or lying flat, such as on a shelf. Do not leave MIG gun on the floor of the shop, where there is a chance the cable could be run over, kinked or damaged.

WELDING PRODUCTS TO HELP PROLONG, MAINTAIN AND PRODUCE BETTER WELDS

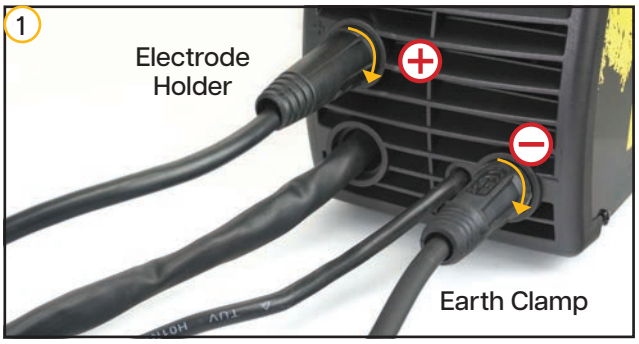
BOSSWELD AEROSOL ANTI SPATTER SPRAY
This silicon free spatter release coating is a colourless film which stops weld spatter from sticking to welding equipment, work pieces & fixtures. Easily removed before painting or finishing.

BOSSWELD TIP DIP GEL
Non toxic water based dipping gel for the prevention of weld spatter adherence to MIG torch parts. This silicon free compound is used to prolong the life of nozzles & tips.

BOSSWELD 8 WAYS MIG WELDING PLIERS
Handy 8 function welders pliers. Functions include, nozzle removal, tip removal, cleaning inside of nozzle and wire cutting.

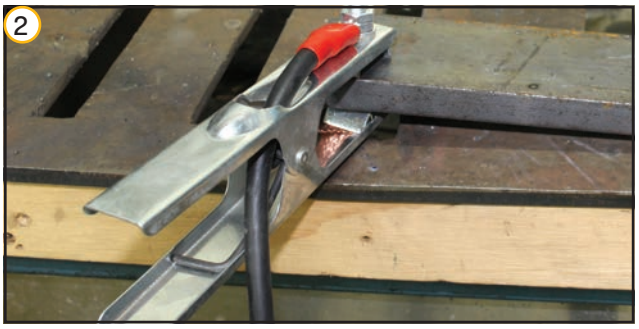
MMA (STICK) WELDING MACHINE SETUP

1



Assemble Electrode Holder to Positive (+) output socket and Earth Clamp to Negative (-) output socket

2



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

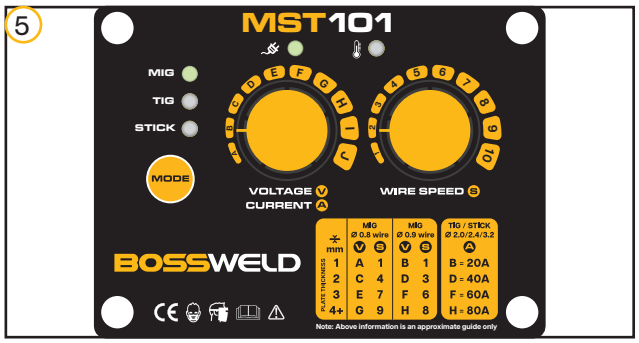
3

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.

4

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.

5



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

Rotate **Left knob** to adjust the welding current (10–80A).

Refer to settings chart on the front of the machine for suggested machines settings and material thickness. Guide only; fine-tune as needed.

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.

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

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

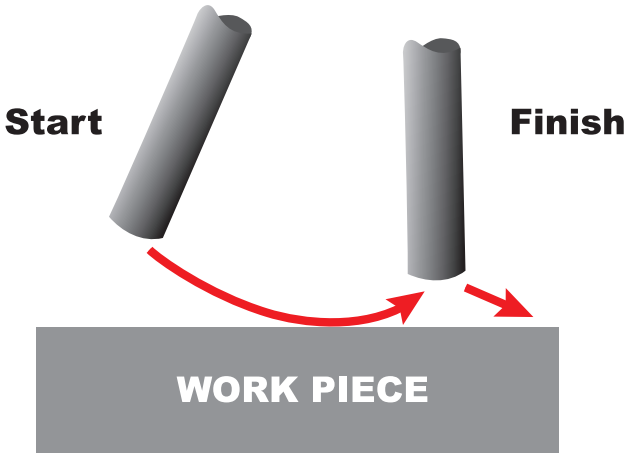
AMPERAGE SELECTION GUIDE	
ROD SIZE/ GAUGE	**WELDING CURRENT**
1.6 mm	40 – 50 Amps
2.0 mm	50 – 75 Amps
2.5 mm	75 – 105 Amps

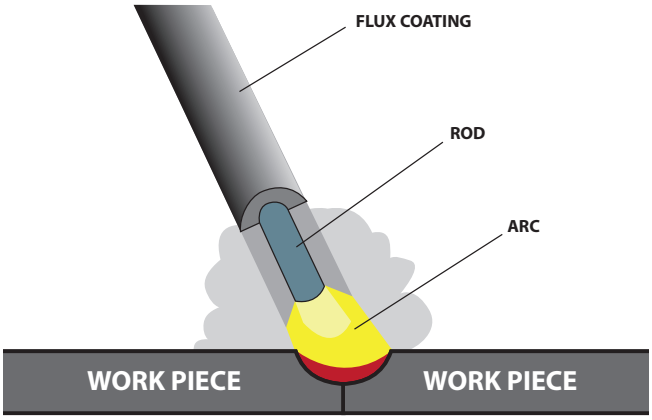
STARTING THE ARC (SCRATCH)

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.

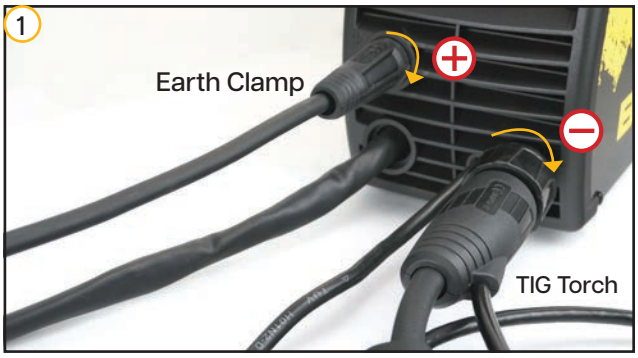
Note: If the duty cycle of the machine is exceeded, the thermostatic protection will activate and the machine will cut out, to cool down.

TIG DC WELDING MACHINE SETUP

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

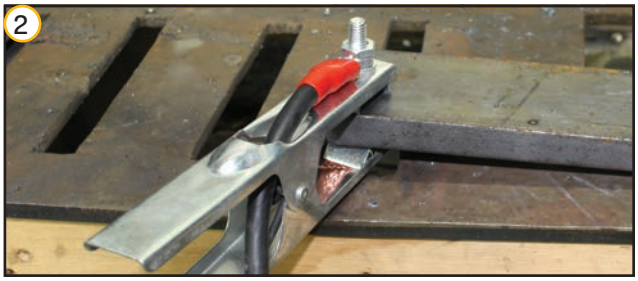
17 Series Complete Air Cooled TIG Torch
Part Number:
95.17FV.4.1.DA25

CX70 25/50 Adaptor

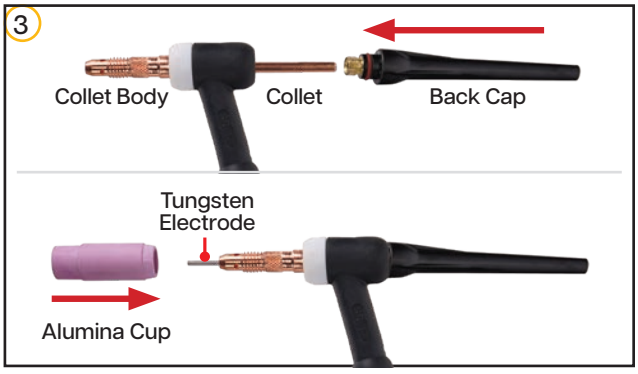


1. Plug **Earth Clamp** into the Positive terminal.
2. Plug **TIG Torch** into the Negative terminal together with **CX70 25/50 Adaptor**.

Twist to ensure a good connection.



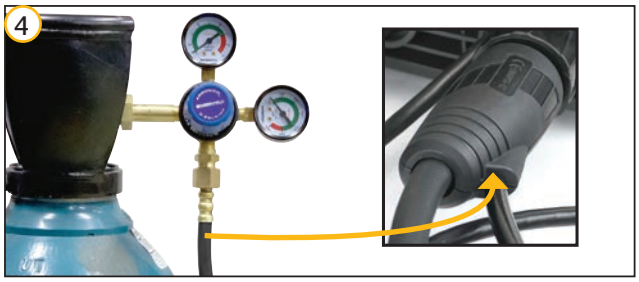
Connect earth clamp firmly to work-piece ensuring that the clamp makes good contact with bare metal.



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.

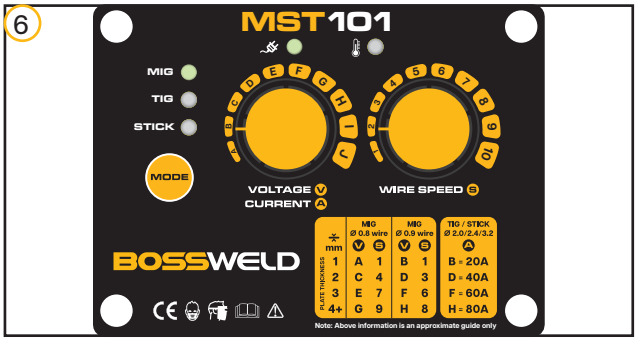
WELDING GAS SELECTION GUIDE
Use the table below as a guide:

METAL TYPE	RECOMMENDED GAS
Mild Steel	Ar
Stainless Steel	Ar
Low Alloy Steel	Ar
Galvanised Steel	Ar



Fit gas regulator to the gas bottle and install gas hose from the TIG torch. Turn on regulator and set gas flow to between **10-15 L/min** depending on your welding environment.

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.



Press **MODE** button to select TIG Lift function.

Rotate **Left knob** to adjust the welding current (10–80A). Refer to settings chart on the front of the machine for suggested machines settings and material thickness. Guide only; fine-tune as needed.

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

PROCESS CHARACTERISTICS

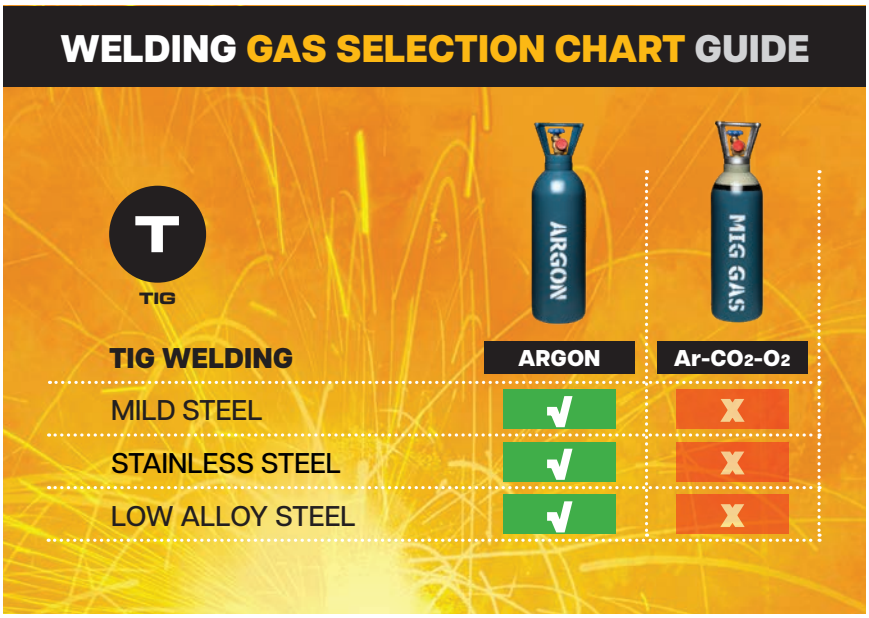
In the TIG process the arc is formed between a pointed tungsten electrode and the workpiece in an inert atmosphere of argon. The small intense arc provided by the pointed electrode is ideal for high quality and precision welding. Because the electrode is not consumed during welding, the welder does not 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.

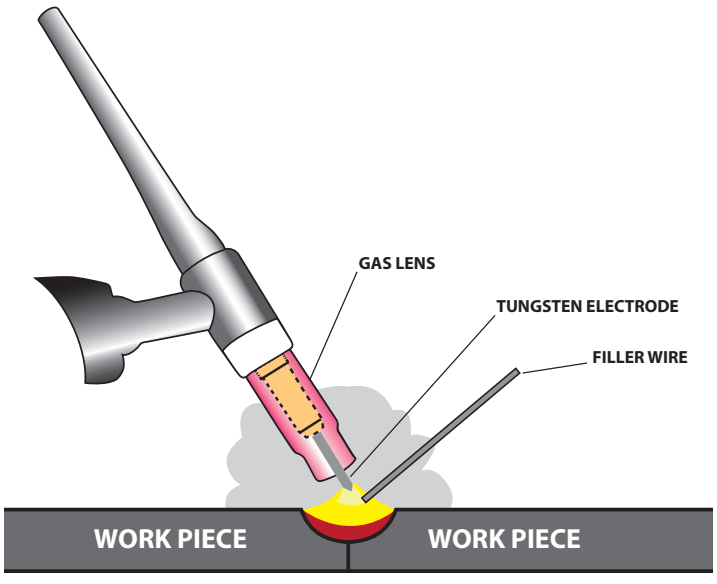
POWER SOURCE

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

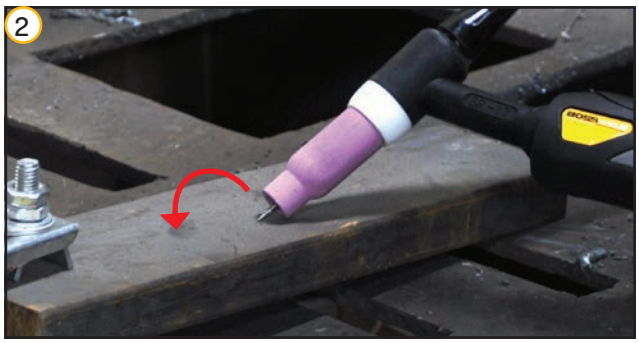
TIG is applied in all industrial sectors but is especially suitable for high quality welding. In manual welding, the relatively small arc is ideal for thin sheet material or controlled penetration (in the root run of pipe welds). Because deposition rate can be quite low (using a separate filler rod)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



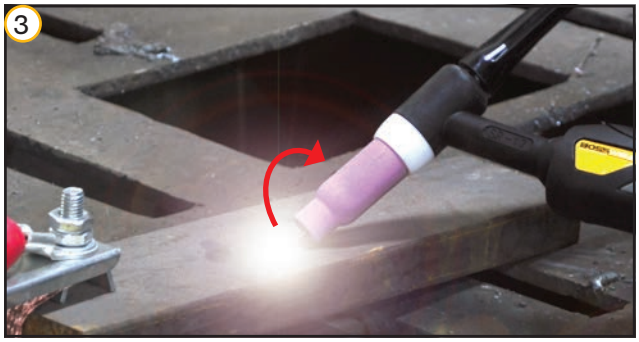


LIFT ARC START

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



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

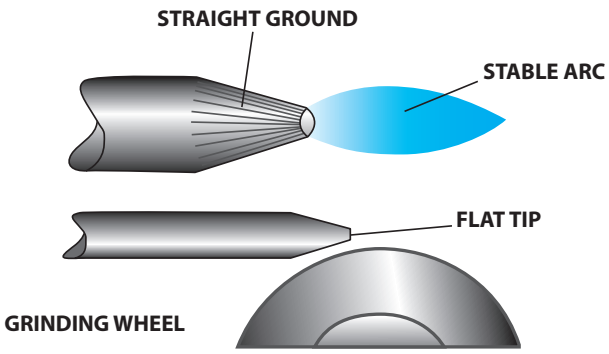


Now rotate the Gas Cup in the reverse direction to lift the Tungsten electrode from the work piece to create the arc.

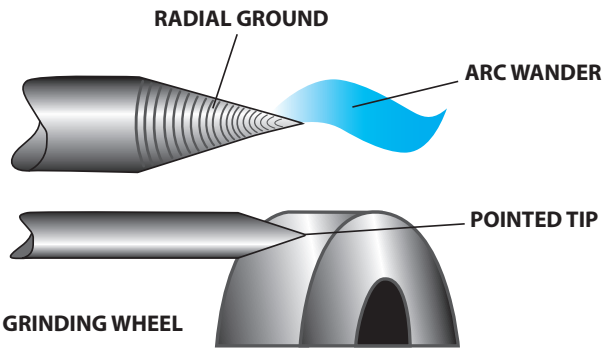
TUNGSTEN PREPARATION & GRINDING

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 tugsten can become contaminated and cause lower weld quality

TROUBLESHOOTING

- 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	SOLUTION
1	Close the breaker, but the power light isn't on		Breaker damaged	Change it
			Fuse damaged	Change it
			Power damaged	Change it
2	After welding machine is over-heat, the fan doesn't work		Fan damaged	Change it
			The cable is loosen	Screw the cable tightly
3	Wire-feeder doesn't work	Wire reel doesn't work	Motor damaged	Check and change it
			Control circuit damaged	Check the board
		Wire reel works	The press wheel is loosen or weld wire skids	Press it tightly again
			The wheel doesn't fit with the diameter of weld wire	Change the wheel
			Wire reel damaged	Change it
			Wire feed pipe is jammed	Repair or change it
			Tip is jammed because of splash	Repair or change it
4	No striking arc and no output voltage		Output cable is connected mistakenly, or loosen	Screw it down or change it
			Control circuit damaged	Check the circuit
5	Welding stops, and alarm light is on		Machine has self-protection	Check over-voltage, over-current, over-temperature, lower-voltage and over-temperature, and solve it
6	Welding current is run away and can be not controlled		The potentiometer damaged	Check or change it
			The control circuit damaged	Check the circuit

MIG WELDING TROUBLE SHOOTING

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

	TROUBLES	POSSIBLE REASON	SUGGESTED REMEDY
1	**Excessive Spatter**	Wire feed speed set too high	Select lower wire feed speed
		Voltage too high	Select a lower voltage setting
		Wrong polarity set	select the correct polarity for the wire being used - see machine setup guide
		Stick out too long	Bring the torch closer to the work
		Contaminated base metal	Remove materials like paint, grease, oil, and dirt, including mill scale from base metal
		Contaminated mig wire	Use clean dry rust free wire. Do not lubricate the wire with oil, grease etc
2	**Wire stubbing during welding**	Holding the torch too far away	Bring the torch closer to the work and maintain stick out of 5-10mm
		Welding voltage set too low	Increase the voltage
		Wire Speed set too high	Decrease the wire feed speed
3	**Lack of Fusion - failure of weld metal to fuse completely with base metal or a proceeding weld bead.**	Contaminated base metal	Remove materials like paint, grease, oil, and dirt, including mill scale from base metal
		Not enough heat input	Select a higher voltage range and /or adjust the wire speed to suit
		Improper welding technique	Keep the arc at the leading edge of the weld pool.
4	**Excessive Penetration - weld metal melting through base metal**	Too much heat	Select a lower voltage range and /or adjust the wire speed to suit Increase travel speed
5	**Lack of Penetration - shallow fusion between weld metal and base metal**	Poor in incorrect joint preparation	Material too thick. Joint preparation and design needs to allow access to bottom of groove while maintaining proper welding wire extension and arc characteristics Keep the arc at the leading edge of the weld pool and maintain the gun angle at 5 & 15° keeping the stick out between 5-10mm
		Not enough heat input	Select a higher voltage range and /or adjust the wire speed to suit Reduce travel speed
		Contaminated base metal	Remove materials like paint, grease, oil, and dirt, including mill scale from base metal

MIG WIRE FEED TROUBLE SHOOTING

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

	TROUBLES	POSSIBLE REASON	SUGGESTED REMEDY
1	**Inconsistent / interrupted wire feed**	Adjusting wrong dial	Be sure to adjust the wire feed and voltage dials for MIG welding.
		Wrong polarity selected	Select the correct polarity for the wire being used - see machine setup guide
		Incorrect wire speed setting	Adjust the wire feed speed
		Voltage setting incorrect	Adjust the voltage setting
		Mig torch lead kinked or too sharp angle being held	Remove the kink, reduce the angle or bend
		Contact tip worn, wrong size, wrong type	Replace the tip with correct size and type
		Liner worn or clogged (the most common causes of bad feeding)	Try to clear the liner by blowing out with compressed air as a temporary cure, it is recommended to replace the liner
		Wrong size liner	Install the correct size liner
		Blocked or worn inlet guide tube	Clear or replace the inlet guide tube
		Wire misaligned in drive roller groove	Locate the wire into the groove of the drive roller
		Incorrect drive roller size	Fit the correct size drive roller eg; 0.8mm wire requires 0.8mm drive roller
		Wrong type of drive roller selected	Fit the correct type roller (e.g. knurled rollers needed for flux cored wires
		Worn drive rollers	Replace the drive rollers
		Drive roller pressure too high	Can flatten the wire electrode causing it to lodge in the contact tip - reduce the drive roller pressure
		Too much tension on wire spool hub	Reduce the spool hub brake tension
		Wire crossed over on the spool or tangled	Remove the spool untangle the wire or replace the wire
		Contaminated mig wire	Use clean dry rust free wire. Do not lubricate the wire with oil, grease etc

MMA 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.

	TROUBLE	POSSIBLE REASON	SUGGESTED REMEDY
1	No arc	Incomplete welding circuit	Check earth lead is connected. Check all cable connections.
		Wrong mode selected	Check the MMA selector switch is selected
		No power supply	Check that the machine is switched ON and has a power
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 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 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 for wire size.
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

DC 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.

	TROUBLE	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 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 appear-ance and color	Wrong gas/ poor gas flow/ gas leak	Gas is connected, valve ON, check hoses, gas valve and torch are not restricted. Set the gas flow between 20-40 CFH (6-12 l/min). Check hoses and fittings for leaks
		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 20-40 CFH (10-20 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 20-40 CFH flow rate
		Incorrect arc length	Lower torch so that the tungsten is off 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 rod.
		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 and oil 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 20-40 CFH 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

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