

weldtech

EZITIG 200AC/DC

200A MULTI-PROCESS TIG WELDER

WORKSHOP RANGE



**IGBT
INVERTER
TECHNOLOGY**

OPERATING INSTRUCTIONS

www.weldtech.net.nz



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Congratulations on your new Weldtech product!

The Weldtech range from Euroquip uses latest technology design and engineering to produce welding products that combine market leading value and features with durability. Designed for discerning operators who seek professional results and product quality without the price tag of a full professional setup. Design emphasis is placed on simple, functional design and operation. Weldtech product is subject to stringent quality control and designed and manufactured to NZ & Australian standards.

Common use of Weldtech products include:

- Light Engineering
- Automotive
- Home/ Hobby Engineering
- Farming
- Maintenance & Repairs

For industrial welding solutions, check out the Strata range from Euroquip:

www.strata.co.nz

Euroquip is a market leading provider of innovative power equipment solutions to a wide range of industries across New Zealand and Australia. Key product categories are; welding equipment, air compressors, power generators and cleaning equipment.

Euroquip's slogan is 'empowering industries,' find out more about the advantage Euroquip brings at **www.euroquip.co.nz**.

Providing exceptional product support is a key component of Euroquip's market leading customer advantage focus. As part of this program, it is required for all products to be registered with Euroquip to qualify for product support. Products not registered with Euroquip are supported by a base 12 month warranty only. Spare parts and technical support will not be available for an unregistered product outside of this base warranty period. If a Euroquip dealer has not already registered your product, please register it online at www.euroquip.co.nz. To request a physical registration form, please contact Euroquip customer service on 0800 387 678.

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EZITIG 200AC/DC

200A - INVERTER AC/DC TIG WELDER

WORKSHOP SERIES

Cutting edge IGBT Inverter Technology produces professional results on workshop or on-site projects!

Powerful - 200A pulsed welding output - welds 10mm steel and 8mm aluminium

Portable - Only 7kg super light weight and portable

Reliable - Cutting edge IGBT technology

- AC/DC function for a wide variety of jobs including mild steel, stainless steel & aluminium
- Pulsed welding output up to 200Hz for ease of use and highly cosmetic finishes
- Super compact (410 x 146 x 278mm) and lightweight at only 7kg ensures great portability
- Factory stress tested to 440v to ensure rugged reliability
- Easy setup and operation control panel with live digital display
- Includes 4m WP26 TIG torch, ARC leads, earth leads and argon regulator for quick setup
- 60% @ 150A duty cycle
- Quick connect gas fitting for quick change gas bottles.



WELDS ALUMINIUM!

200A | WELDS 10MM STEEL | 8MM ALLOY | 18 MONTH * COMMERCIAL WARRANTY

*18 Month Commercial Warranty only valid with online registration at www.weldtech.net.nz

Dimensions: (L x W x H)	410 x 146 x 278
Weight:	7kg
Input Power:	230V, 15A
Max. Input Current:	40.7A
Generator Capacity:	9.3kVA

TIG Output Current:	10 - 200A
Duty Cycle:	60% @ 150A
Electrode Size:	1.6 - 4.0mm
TIG Pulse Frequency:	200Hz
Warranty:	18 Months*



With 15A input power plug - Ideal for workshop projects - cars, boats and light structural steel!

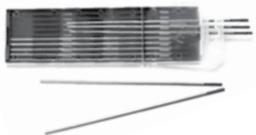
Optional accessories to help you get the job done!

Flip Front Helmet (#AFF1000) 	4 Sensor Auto Helmet with grind function (#DW3000) 	2 Sensor Auto Helmet (#DW2500) 
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Tungsten Electrodes - 150mm

- Thoriated for use on stainless and mild steel
- Zirconiated for use on aluminium.

Thoriated	Zirconiated
1.6 (#TT16-150)	1.6 (#TZ16-150)
2.4 (#TT24-150)	2.4 (#TZ24-150)
3.2 (#TT32-150)	3.2 (#TZ32-150)



Standard Collets

- 1.6 (#TCB10N23)
- 2.4 (#TCB10N24)
- 3.2 (#TCB10N25)



Standard Collet Bodies

- 1.6 (#TCC10N31)
- 2.4 (#TCC10N32)
- 3.2 (#TCC10N28)



Standard Ceramic Cups

- 1/2" (#TCC10N46)
- 7/16" (#TCC10N47)
- 3/8" (#TCC10N48)



Mild Steel TIG Rods - 1m ER70S Grade

- 1.6 (#TR16MS-70S-6)
- 2.4 (#TR24MS-70S-6)
- 3.2 (#TR32MS-70S-6)



Aluminium TIG Rods - 1m 5356 Grade

- 1.6 (#TR16AL-5356)
- 2.4 (#TR24AL-5356)
- 3.2 (#TR32AL-5356)



Stainless Steel TIG Rods - 1m 316 Grade

- 1.6 (#TR16SS-316)
- 2.4 (#TR24SS-316)
- 3.2 (#TR32SS-316)



Know Your Machine

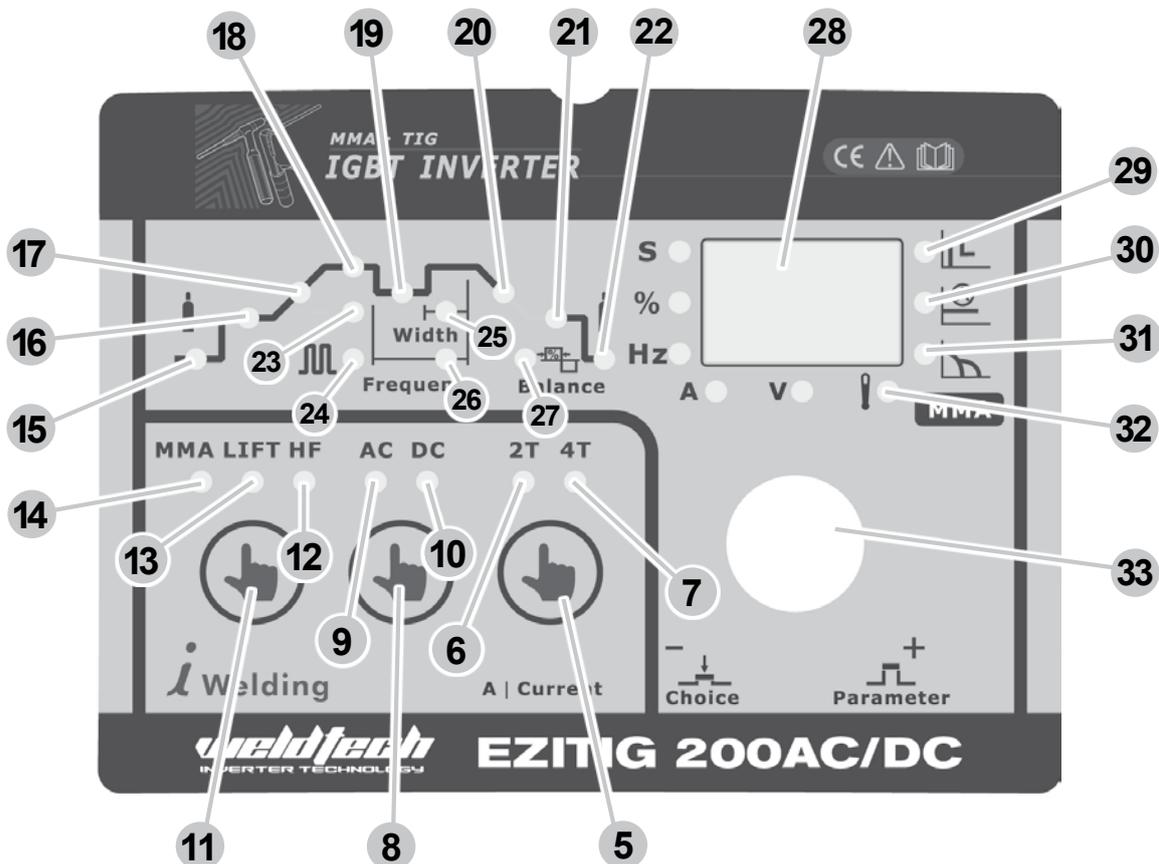
Explanations of control functions on following pages

1. Positive (+) welding power output connection socket
2. TIG torch gas connector
3. Negative (-) welding power output connection socket
4. TIG torch remote connection socket



Control Panel Detail

5. Trigger Mode Selection Button
6. 2T trigger mode indicator
7. 4T trigger mode indicator
8. AC/DC output mode selection button
9. AC output mode indicator
10. DC Output mode indicator
11. Welding mode selection button
12. HF TIG mode indicator
13. Lift TIG mode Indicator
14. MMA Mode Indicator
15. Pre gas flow setting indicator
16. Start current setting indicator
17. Up slope setting indicator
18. TIG peak welding current setting indicator
19. TIG base welding current setting indicator
20. Down slope setting indicator
21. End current setting indicator
22. Post gas flow setting indicator
23. Pulse mode 'off' indicator
24. Pulse mode 'on' indicator
25. Pulse width setting indicator
26. Pulse frequency setting indicator
27. Clean width area/ AC Balance adjustment
28. LCD Multifunction Display
29. MMA hot start setting indicator
30. MMA welding current indicator
31. MMA Arc Force setting indicator
32. Error/ Overload Indicator
33. Parameter select/ adjust knob



Controls Explained

TIG 2T/4T Trigger Control (5 - 7)

In 2T Mode the trigger is pulled and held on to activate the welding circuit, when the trigger is released, the welding circuit stops. 4T is known as 'latching' mode. The trigger is pulled once and released to activate the welding circuit, pulled and released again to stop the welding circuit. This function is useful for longer welds as the trigger is not required to be held on continuously. The EZITIG 200 AC/DC also has more advanced current controls that can be used in 4T mode.

AC/DC Output Modes (8 - 10)

DC (Direct Current) Welding Output is suitable for TIG welding ferrous (iron based) metals such as mild steel and stainless steel, copper and titanium.

TIG welding reactive metals such as Aluminium, Magnesium and Zinc requires AC (alternating current) output. When reactive metals are exposed to air they form an oxide layer that insulates the base metal and prevents welding current flowing, it also contaminates the weld pool. Reverse current flow is required to break through/ clean off this oxide layer so that welding can take place, while the current flow during the positive cycle does the majority of the heating of the weld pool area.

TIG HF/ Lift Ignition Modes (12 - 13)

For TIG welding process, contact of the torch tungsten to the workpiece will cause contamination of the tungsten and the workpiece that will adversely affect the weld quality, especially when the tungsten is electrically energised. HF (high frequency) ignition sends a pulse of high energy electricity through the torch system that is capable of 'jumping' between the tungsten and the workpiece, ensuring arc starting without any contact between the tungsten and workpiece. The disadvantage of HF ignition is that the high energy electrical pulse creates significant electrical and radio signal interference, which limits its use around sensitive electronic equipment such as computers.

Lift TIG ignition is a compromise that minimises tungsten contamination while eliminating the electrical interference of HF start systems. Lift arc starting works by lightly resting the tungsten on the work

piece, activating the torch trigger signal and then lifting the tungsten off. The control circuit will sense when the tungsten is removed from the work piece and send a low powered pulse of electricity through the tungsten that will cause the TIG arc to initiate. Because the tungsten is not 'live' when it is in contact with the work, contamination is minimised.

Pre Flow (15)

Pre flow controls the period shielding gas will flow for when the torch is triggered before the arc starts. This purges the work area of atmospheric gas which could contaminate the weld before the weld starts.

Start Current Setting (16)

Available in 4T trigger mode only, sets a welding current 5-100% of the main welding current activated when the trigger is held on, to 'latch' the trigger before the main weld current is started. Once the trigger is released, the current will go through the upslope (17) period if it is set, to the main welding current (18).

Up Slope (17)

When the trigger is activated, the welding current will increase gradually over the time selected up to the set main welding current (18).

Down Slope (20)

When the trigger is released, the welding current will reduce gradually over the time selected down to 0. This allows the operator to complete the weld without leaving a 'crater' at the end of the weld pool.

End Current Setting (21)

Available in 4T trigger mode only, sets a welding current 5-100% of the main welding current activated when the trigger is held on, to 'unlatch' the trigger before the weld is finished. If downslope (20) is set, the current will go through the downslope period before going to the end current set. When the trigger is released, the arc will stop.

Post Flow Gas (22)

Controls the period of time the shielding gas continues to flow for after the arc is stopped. This protects

the weld area and torch tungsten from contamination while it is still hot enough to react with atmospheric gases, after the weld is finished.

Pulse Settings

Only available when pulse mode (24) is selected.

Base Current (19)

Sets the current of the low/ base pulse.

Pulse Width (25)

Sets the time proportion as a percentage between the peak current and base current when using pulse mode. Neutral setting is 50% and the time period of the peak current and base current pulse is equal. Higher pulse duty setting will give greater heat input, while lower pulse duty will have the opposite effect.

Pulse Frequency (26)

Sets the rate that the welding output alternates between the peak and base current settings.

Clean Width Area / AC Balance Adjustment (27)

Adjusts the balance as a percentage between the forward and reverse current cycles when welding in AC output mode. The reverse part of the AC cycle gives the 'cleaning' effect on the weld material, while the forward cycle melts the weld material. Neutral setting is 0. Increased reverse cycle bias will give greater cleaning effect, less weld penetration and more heat in the torch tungsten. This gives the disadvantage of reducing the output current that can be used for a given tungsten size to prevent the tungsten overheating.

Increased forward cycle bias will give the opposite effect, less cleaning effect, greater weld penetration and less heat in the tungsten. Ideally for maximum effectiveness, the clean width/ AC balance should be set with as much forward cycle bias as possible, while still maintaining a sufficient level of oxidation removal for a contamination free weld pool. The cleaner the non-ferrous metal is before welding, the more effective it is to weld. This effect can also be used to reduce heat in the tungsten, allowing use of a pointed tungsten tip shape for a more defined arc.

LCD Multi-function Display (28)

Before welding displays the setting selected/being adjusted using the control knob (33). During welding, displays welding current. The parameter setting displayed is indicated by the LEDs beside the display; Time (S), percentage (%), Frequency (Hz), Current (A), Voltage (V) If left inactive for several seconds, display will revert back to main welding current setting. Also displays error codes if the protection system (32) is activated.

MMA Settings

Hot start (29)

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

Arc Force (31)

An MMA welding power source is designed to produce constant output current (CC). This means with different types of electrode and arc length; the welding voltage varies to keep the current constant. This can cause instability in some welding conditions as MMA welding electrodes will have a minimum voltage they can operate with and still have a stable arc.

Arc Force 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. 0 is Arc Force off, 10 is maximum Arc Force. This is practically useful for electrode types that have a higher operating voltage requirement or joint types that require a short arc length such as out of position welds.

Error Indicator (32)

Lights when over voltage, over current or electrical overheating (due to exceeding duty cycle) is detected and protection is activated. When protection is activated, welding output will be disabled until the safety system senses the overload has reduced sufficiently and indicator lamp goes out. May also trigger if machine experiences an internal power circuit failure.

Parameter Select/ Adjust Knob (33)

Switch between welding parameter settings by pressing this knob, adjust by turning the knob. Value of the parameter selected will be shown on the LCD display (28).

Tips & Tricks

Pulse Welding

Pulse welding mode switches the welding output between a high and low current output in a cyclical manner. When used correctly this function has substantial benefits in the TIG welding process including greater weld penetration for less work heat input and greater control of the weld pool.

The basic theory for setting the base current using pulse mode is that the base current should be sufficient to maintain the existing molten weld pool, while the peak current is sufficient to melt new metal in order to move/ expand the molten weld pool. Increased pulse frequency will have the effect of making the arc more tightly focused which is useful for fine stainless work and similar.

Pulsing can also be used to help move the weld pool, this technique is useful for welding out of position or with materials that have higher viscosity weld pool. Higher pulse duty setting will give greater heat input, while lower pulse duty will have the opposite effect.

Remote Current Control

The EZITIG 200 AC/DC can accept remote current control from a potentiometer/ analogue signal or a digital up/down button signal. Potentiometer remote control will change the current from the 5A minimum to the maximum set using the machine current control (30). Using an up/ down button remote signal, the current may be increased or decreased in 1A increments, or 'scrolls' up to 30A at a time if the button is held down. This is very useful for precision work. Refer to the accessories section further on in this manual for the options available.

Duty Cycle Rating

Welding duty cycle is the percentage of actual welding time that can occur in a ten minute cycle. E.g. 20% at 160 amps - this means the welder can weld at 160 amps for 2 minutes and then the unit will need

to be rested for 8 minutes. All duty cycle ratings are based on an ambient air temperature of 40°C with 50% humidity, which is the international standard for such a rating. In an environment with temperatures exceeding 40°C, the duty cycle will be less than stated. In ambient temperature less than 40°C, duty cycle performance will be higher.

Quick Start Guide

Electrical Connection

The EZITIG 200AC/DC is designed to operate on a 15A 230V AC power supply. If an extension cord must be used, it should be a heavy duty version with a minimum cable core size of 2.5mm². It is recommended to use the Euroquip industrial duty 15A extension lead, part number; 16895.

Operating Environment

Adequate ventilation is required to provide proper cooling for the EZITIG 200 AC/DC. Ensure that the machine is placed on a stable level surface where clean cool air can easily flow through the unit. The EZITIG200 AC/DC has electrical components and control circuit boards which may be damaged by excessive dust and dirt, so a clean operating environment is important for reliable product life.

Basic Operation - MIG Welding

1. ARC/MMA Welding Operation

- 1.1 Connect the earth cable quick connector to the negative welding power output socket (3) Connect the earth clamp to the work piece. Contact with the work piece must be firm contact with clean, bare metal, with no corrosion, paint or scale at the contact point.
- 1.2 Insert an electrode into the electrode holder and connect the electrode holder and work lead to the positive welding power output socket (1).

NOTE: This polarity connection configuration is valid for most GP (General Purpose) MMA electrodes. There are variations to this. If in doubt, check the electrode specifications or consult the electrode manufacturer.

- 1.3 Connect the machine to suitable mains power using the mains input power lead. Switch the mains

EZITIG200 AC/DC Welding Machine

power switch to 'on' to power up the machine. Set MMA welding mode (14).

- 1.4 Set the welding parameters as required following the instructions in the previous section. You are now ready to weld!

2. TIG Operation

NOTE: TIG operation requires an argon gas supply.

- 2.1 Connect the earth cable quick connector to the positive welding power output socket (1). Connect the earth clamp to the work piece. Contact with the work piece must be firm contact with clean, bare metal, with no corrosion, paint or scale at the contact point.
- 2.2 Insert TIG torch power connection into the negative welding power output socket (3). Connect TIG torch remote plug to remote socket (4) and torch gas connection to the TIG gas outlet (2).
- 2.3 Connect the machine to suitable mains power using the mains input power lead. Switch the mains power switch to 'on' to power up the machine. Set the welding mode to 'Lift TIG' (13) or 'HF TIG' (12).
- 2.4 Assemble the female gas quick connector to the gas line and to the regulator outlet fitting. Connect the gas regulator to a gas cylinder (not included with machine) and connect the female quick connector to the male gas inlet on the rear of the machine. Ensure all connections are tight. Open gas cylinder valve and adjust regulator, flow should be between 5-10 l/min depending on application. Re-check regulator flow pressure with the torch triggered as static gas flow setting may drop once gas is flowing.
- 2.5 Set the welding parameters as required following the instructions in the previous section. You are now ready to weld!

Care & Maintenance

Keep your Welding Machine in Top Condition

The EZITIG 200AC/DC does not require any special

maintenance, however the user should take care of the machine as follows:

- Regularly clean the ventilation slots.
- Keep the casing clean.
- Check all cables before use.
- Check electrode holders, work lead/clamps and welding torches before use.
- Replace worn electrode holders and earth clamps, which do not provide a good connection.
- Replace worn torch consumable parts in a timely manner.
- Replace worn wire drive components in a timely manner
- Use a soft cloth or brush to clean electrical components. Do not use liquid cleaning products, water or especially solvents.
- Do not use compressed air to clean electrical components as this can force dirt and dust further into components, causing electrical short circuits.
- Check for damaged parts. Do not use the welder with damaged parts.

If damaged, before further use, the welder must be carefully checked by a qualified person to determine that it will operate properly. Check for breakage of parts, mountings and other conditions that may affect its operation.

Have your welder repaired by an expert. An authorised service centre should properly repair a damaged part. This appliance is manufactured in accordance with relevant safety standards. Only experts must carry out repairing of electrical appliances, otherwise considerable danger for the user may result. Use only genuine replacement parts. Do not use modified or non-genuine parts.

Storing the Welder

When not in use the welder should be stored in the dry and frost-free environment.



WARNING! Before performing cleaning/maintenance, replacing cables / connections, make sure the welding machine is switched off and disconnected from the power supply.

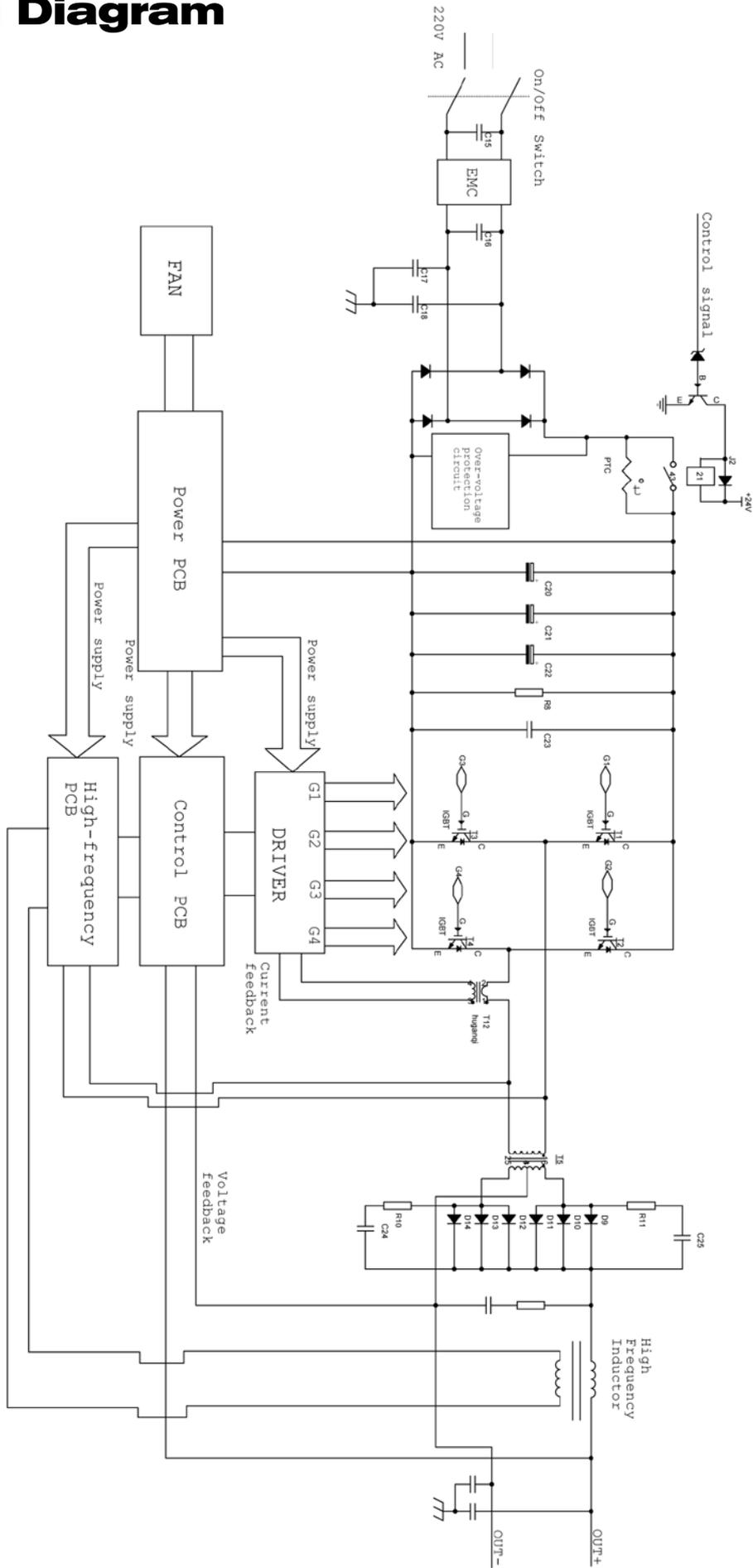
Available Parts & Accessories

EZITIG 200AC/DC:			
17827	Pro-Grip 26 Torch X 12Ft, Tgc End (Large Dinse) M12	TZ24-150	Zirconiated Tungsten Electrode 2.4mm (3pk)
17401	Strata TIG Foot Control	TZ32-150	Zirconiated Tungsten Electrode 3.2mm (3pk)
AAL3550	Arc Lead 16mm ² cable, 35-70mm plug, 4m	ACDCKIT	AC/DC TIG Starter Kit - WP17, WP18, WP26
AEL3550	Earth Lead 16mm ² cable, 35-70mm plug, 3m	TR16MS-70S-6	Mild Steel TIG Rod 1.6mm/ 1kg
17403	Strata Water Cooling Unit 230V	TR24MS-70S-6	Mild Steel TIG Rod 2.4mm/ 1kg
17384	Strata Compact Welding Machine Trolley	TR32MS-70S-6	Mild Steel TIG Rod 3.2mm/ 1kg
ALS3550	MMA Lead Set 300A 3+3m 1/2" Dinse Connectors	TR16SS-316	Stainless Steel TIG Rod 1.6mm
S400EH	400A Screw Type Elect.Holder	TR24SS-316	Stainless Steel TIG Rod 2.4mm
S500EC	Strata 500a Earth Clamp	TR32SS-316	Stainless Steel TIG Rod 3.2mm
CP3550	Cable Plug - 35-50mm ² - Male	TR16AL-5356	Aluminium TIG Rod 1.6mm/ 0.5kg
DW3000	Auto Darkening Helmet, Shade 9-13	TR24AL-5356	Aluminium TIG Rod 2.4mm/ 0.5kg
DW4000	Auto Darkening Helmet, Shade 9-13 w/ Grinding Visor	TR32AL-5356	Aluminium TIG Rod 3.2mm / 0.5kg
DW7000	Auto Darkening Helmet, Shade 9-13 w/ Grinding Visor and PRSL Filtration System.	TZ16-150	Zirconiated Tungsten Electrode 1.6mm (3pk)
		TZ24-150	Zirconiated Tungsten Electrode 2.4mm (3pk)
GR101AR	Argon Twin Gauge Regulator	TZ32-150	Zirconiated Tungsten Electrode 3.2mm (3pk)
GR101ARFL	Argon Gas Regulator c/w Flow Meter	ETCPH4825	Overcord R92 2.5mm Electrodes (350mm)
GR101AR-2FL	Argon Regulator c/w Twin Flow Meter	ETCPH4832	Overcord R92 3.2mm Electrodes (350mm)
16895	15m H/D 15A Extension Lead (3x2.5mm ² wiring)	ETCPH4840	Overcord R92 4.0mm Electrodes (350mm)
TBC57Y02	Long Black Cap	ETCPH6825	Overcord 2.5mm Electrodes (350mm)
TC10N23	Collet 1/16 (1.6mm) (2pk)	ETCPH6832	Overcord 3.2mm Electrodes (350mm)
TC10N24	Collet 3/32 (2.4mm) (2pk)	ETCPH6840	Overcord 4.0mm Electrodes (350mm)
TC10N25	Collet 1/8 3.2mm (2pk)	ETCPH6850	Overcord 5.0mm Electrodes (350mm)
TCB10N31	Collet body 1/16 (1.6mm) (2pk)	ETCPH7725	Supercito 2.5mm Electrodes (350mm)
TCB10N32	Collet body 3/32 (2.4mm) (2pk)	ETCPH7732	Supercito 3.2mm Electrodes (450mm)
TCB10N28	Collet body 1/8 (3.2mm) (2pk)	ETCPH7740	Supercito 4.0mm Electrodes (450mm)
TCC10N48	Std. ceramic cup 3/8 bore #6 (2pk)	ETCPH7750	Supercito 5.0mm Electrodes (450mm)
TCC10N47	Std. ceramic cup 7/16 bore #7 (2pk)	ETCPH56S25	Tenax 56S 2.5mm Electrodes (350mm)
TCC10N46	Std. ceramic cup 1/2 bore #8 (2pk)	ETCPH56S32	Tenax 56S 3.2mm Electrodes (350mm)
TCC10N45	Std. ceramic cup 5/8 bore #10 (2pk)	ETCPH56S40	Tenax 56S 4.0mm Electrodes (450mm)
TT16-150	Thoriated Tungsten Electrode 1.6mm (3pk)	ETCPH56S50	Tenax 56S 5.0mm Electrodes (450mm)
TT24-150	Thoriated Tungsten Electrode 2.4mm (3pk)	PDL15	Plug, 3 Pin 15A 250V - Straight
TT32-150	Thoriated Tungsten Electrode 3.2mm (3pk)	17844	Gas Inlet QC
TZ16-150	Zirconiated Tungsten Electrode 1.6mm (3pk)	17847	12 Pin Strata TIG Remote Connection Plug

These accessories listed are available from your Weldtech Supplier. Refer to the Weldtech Product Brochure, your Weldtech Supplier or look online at www.weldtech.net.nz for other accessories and consumables available.

EZITIG200 AC/DC Welding Machine

Wiring Diagram



MMA (Stick) Basic Welding Guide

Size of Electrodes

The electrode size is determined by the thickness of metals being joined and can also be governed by the type of welding machine available. Small welding machines will only provide current (amperage) to run smaller sized electrodes.

For thin sections, it is necessary to use smaller electrodes otherwise the arc may burn holes through the job. A little practice will soon establish the most suitable electrode for a given application.

Storage of Electrodes

Always store electrodes in a dry place and in their original containers.

Electrode Polarity

Electrodes are generally connected to the electrode holder with the electrode holder connected positive polarity.

The work lead is connected to the negative polarity and is connected to the work piece. If in doubt consult the electrode data sheet.

Effects of MMA(Stick) Welding on Various Materials

High Tensile and Alloy Steels

The two most prominent effects of welding these steels are the formation of a hardened zone in the weld area, and, if suitable precautions are not taken, the occurrence in this zone of under-bead cracks. Hardened zone and underbead cracks in the weld area may be reduced by using the correct electrodes, preheating, using higher current settings, using larger electrodes sizes, short runs for larger electrode deposits or tempering in a furnace.

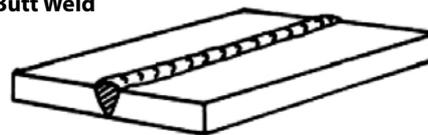
Manganese Steels

The effect on manganese steel of slow cooling from high temperatures causes embrittlement. For this reason it is absolutely essential to keep manganese steel cool during welding by quenching after each weld or skip welding to distribute the heat.

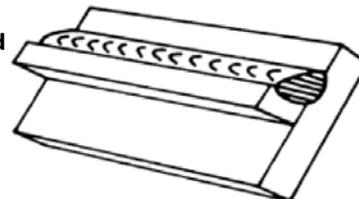
Cast Iron

Most types of cast iron, except white iron, are weldable. White iron, because of its extreme brittleness,

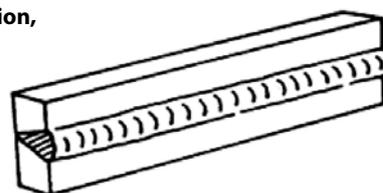
Flat Position, Down Hand Butt Weld (Fig 1-11)



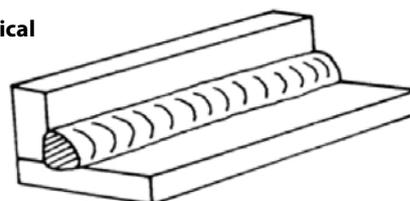
Flat Position, Gravity Fillet Weld (Fig 1-12)



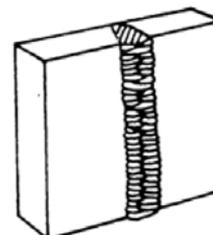
Horizontal Position, Butt Weld (Fig 1-13)



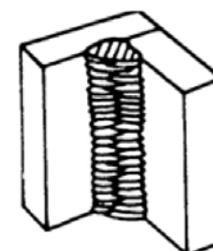
Horizontal-Vertical (HV) Position (Fig 1-14)



Vertical Position, Butt Weld (Fig 1-15)



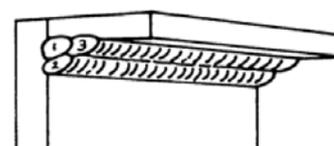
Vertical Position, Fillet Weld (Fig 1-16)



Overhead Position, Butt Weld (Fig 1-17)



Overhead Position, Fillet Weld (Fig 1-18)



generally cracks when attempts are made to weld it. Trouble may also be experienced when welding white-heart malleable, due to the porosity caused by gas held in this type of iron.

Copper and Alloys

The most important factor is the high rate of heat conductivity of copper, making pre-heating of heavy sections necessary to give proper fusion of weld and base metal.

Types of Electrodes

Arc Welding electrodes are classified into a number of groups depending on their applications. There are a great number of electrodes used for specialised industrial purposes which are not of particular interest for everyday general work. These include some low hydrogen types for high tensile steel, cellulose types for welding large diameter pipes, etc. The range of electrodes dealt with in this publication will cover the vast majority of applications likely to be encountered; are all easy to use.

Electrodes for joining different metals:

MILD STEEL :

E6011 - This electrode is used for all-position welding or for welding on rusty, dirty, less-than- new metal. It has a deep, penetrating arc and is often the first choice for repair or maintenance work.

E6013 - This all-position electrode is used for welding clean, new sheet metal. Its soft arc has minimal spatter, moderate penetration and an easy-to-clean slag.

E7014 - All positional, ease to use electrode for use on thicker steel than E6013. Especially suitable for sheet metal lap joints, fillet welds and general purpose plate welding.

E7018 - A low-hydrogen, all-position electrode used when quality is an issue or for hard-to-weld metals. It has the capability of producing more uniform weld metal, which has better impact properties at low temperatures.

CAST IRON:

ENI-CL - Suitable for joining all cast irons except white cast iron.

STAINLESS STEEL:

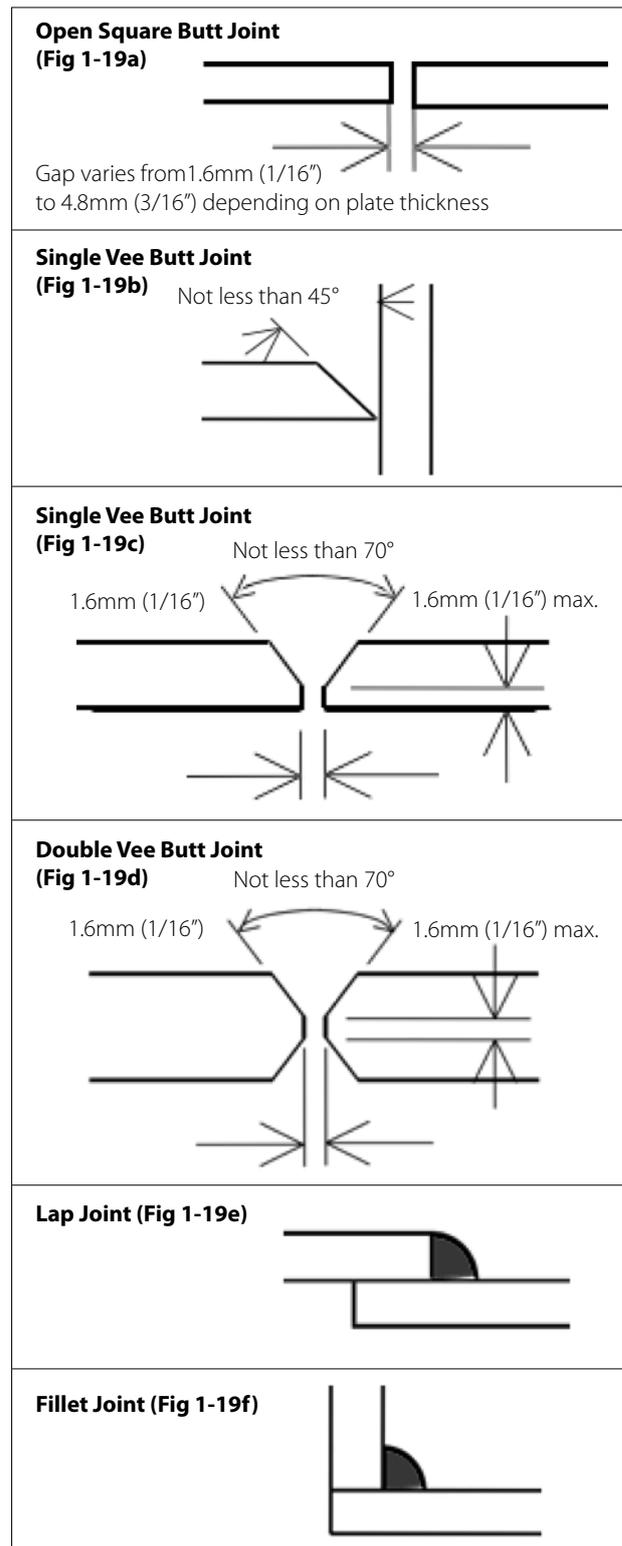
E318L-16 - High corrosion resistances. Ideal for dairy work etc.

Joint Preparations

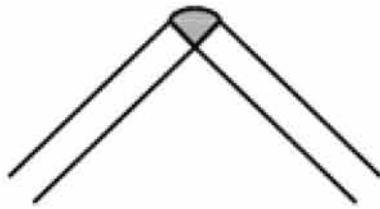
In many cases, it will be possible to weld steel sections without any special preparation. For heavier

sections and for repair work on castings, etc., it will be necessary to cut or grind an angle between the pieces being joined to ensure proper penetration of the weld metal and to produce sound joints.

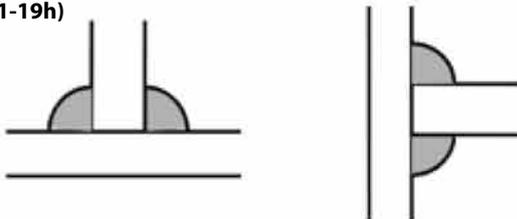
In general, surfaces being welded should be clean and free of rust, scale, dirt, grease, etc. Slag should be removed from oxy-cut surfaces. Typical joint designs are shown in Figure 1-19.



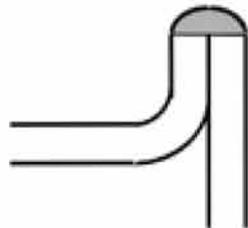
Corner Weld
(Fig 1-19g)



Tee Joints
(Fig 1-19h)



Edge Joint
(Fig 1-19i)



Plug Welds
(Fig 1-19j)



Arc Welding Techniques - A Word for Beginners

For those who have not yet done any welding, the simplest way to commence is to run beads on a piece of scrap plate. Use mild steel plate about 6.0mm thick and a 3.2mm electrode.

Clean any paint, loose scale or grease off the plate and set it firmly on the work bench so that welding can be carried out in the down hand position. Make sure that the Work Lead/Clamp is making good electrical contact with the work, either directly or through the work table. For light gauge material, always clamp the work lead directly to the job, otherwise a poor circuit will probably result.

The Welder

Place yourself in a comfortable position before beginning to weld. Get a seat of suitable height and do as much work as possible sitting down. Don't hold your body tense. A taut attitude of mind and a tensed body will soon make you feel tired. Relax and you will find that the job becomes much easier. You can add much to your peace of mind by wearing a leather apron and gauntlets. You won't be worrying then about being burnt or sparks setting alight to your clothes.

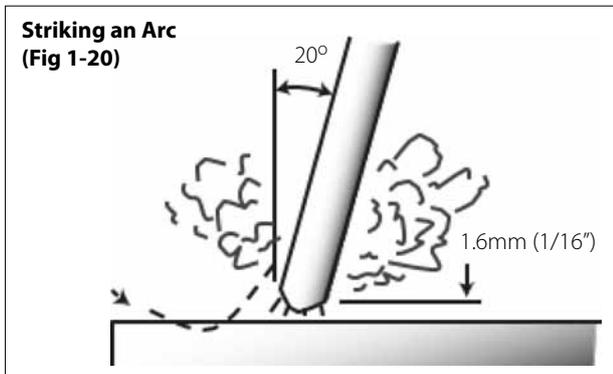
Place the work so that the direction of welding is across, rather than to or from, your body. The electrode holder lead should be clear of any obstruction so that you can move your arm freely along as the electrode burns down. If the lead is slung over your shoulder, it allows greater freedom of movement and takes a lot of weight off your hand. Be sure the insulation on your cable and electrode holder is not faulty; otherwise you are risking an electric shock.

Striking the Arc

Practice this on a piece of scrap plate before going on to more exacting work. You may at first experience difficulty due to the tip of the electrode "sticking" to the work piece. This is caused by making too heavy a contact with the work and failing to withdraw the electrode quickly enough. A low amperage will accentuate it. This freezing-on of the tip may be overcome by scratching the electrode along the plate surface in the same way as a match is struck. As soon as the arc is established, maintain a 1.6mm to 3.2mm gap between the burning electrode end and

the parent metal. Draw the electrode slowly along as it melts down.

Another difficulty you may meet is the tendency, after the arc is struck, to withdraw the electrode so far that the arc is broken again. A little practice will soon remedy both of these faults.



Arc Length

The securing of an arc length necessary to produce a neat weld soon becomes almost automatic. You will find that a long arc produces more heat.

A very long arc produces a crackling or spluttering noise and the weld metal comes across in large, irregular blobs. The weld bead is flattened and spatter increases. A short arc is essential if a high quality weld is to be obtained although if it is too short there is the danger of it being blanketed by slag and the electrode tip being solidified in. If this should happen, give the electrode a quick twist back over the weld to detach it. Contact or "touch-weld" electrodes such as E7014 Stick electrodes do not stick in this way, and make welding much easier.

Rate of Travel

After the arc is struck, your next concern is to maintain it, and this requires moving the electrode tip towards the molten pool at the same rate as it is melting away. At the same time, the electrode has to move along the plate to form a bead.

The electrode is directed at the weld pool at about 20° from the vertical. The rate of travel has to be adjusted so that a well-formed bead is produced.

If the travel is too fast, the bead will be narrow and strung out and may even be broken up into individual globules. If the travel is too slow, the weld metal piles up and the bead will be too large.

Making Welded Joints

Having attained some skill in the handling of an electrode, you will be ready to go on to make up welded joints.

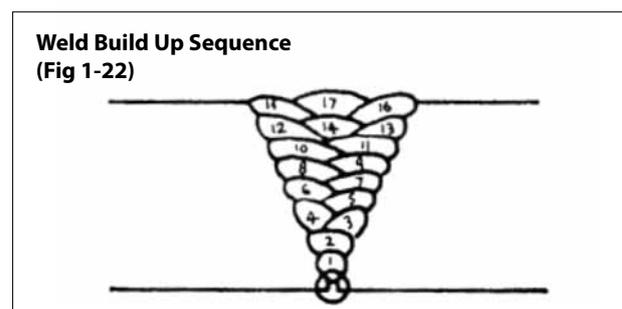
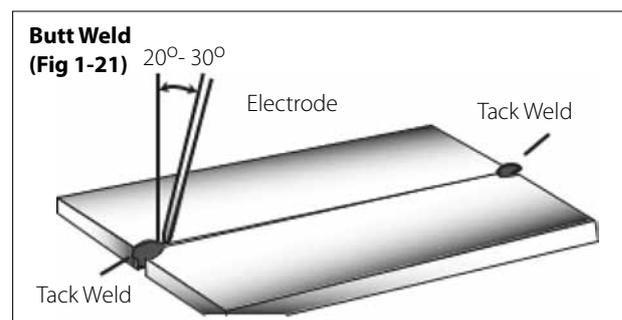
A. Butt Welds

Set up two plates with their edges parallel, as shown in Figure 1-21, allowing 1.6mm to 2.4mm gap between them and tack weld at both ends. This is to prevent contraction stresses from the cooling weld metal pulling the plates out of alignment.

Plates thicker than 6.0mm should have their mating edges bevelled to form a 70° to 90° included angle. This allows full penetration of the weld metal to the root. Using a 3.2mm E7014 Stick electrode at 100 amps, deposit a run of weld metal on the bottom of the joint.

Do not weave the electrode, but maintain a steady rate of travel along the joint sufficient to produce a well-formed bead. At first you may notice a tendency for undercut to form, but keeping the arc length short, the angle of the electrode at about 20° from vertical, and the rate of travel not too fast, will help eliminate this.

The electrode needs to be moved along fast enough to prevent the slag pool from getting ahead of the arc. To complete the joint in thin plate, turn the job over, clean the slag out of the back and deposit a similar weld.

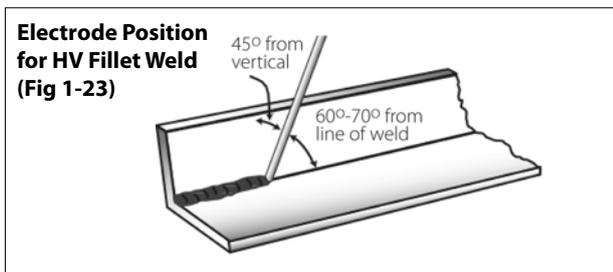


Heavy plate will require several runs to complete the joint. After completing the first run, chip the slag out and clean the weld with a wire brush. It is important to do this to prevent slag being trapped by the second run. Subsequent runs are then deposited using either a weave technique or single beads laid down in the sequence shown in Figure 1-22. The width of weave should not be more than three times the core wire diameter of the electrode.

When the joint is completely filled, the back is either machined, ground or gouged out to remove slag which may be trapped in the root, and to prepare a suitable joint for depositing the backing run. If a backing bar is used, it is not usually necessary to remove this, since it serves a similar purpose to the backing run in securing proper fusion at the root of the weld.

B. Fillet Welds

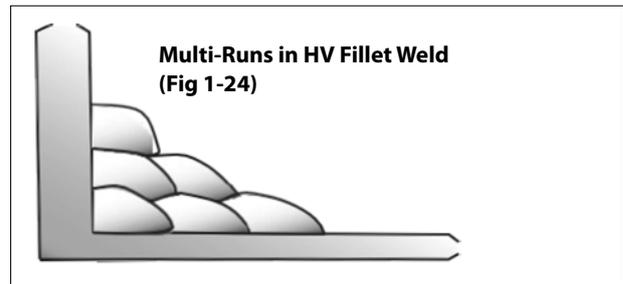
These are welds of approximately triangular cross-section made by depositing metal in the corner of two faces meeting at right angles. Refer to Figure 1-14, 1-23 and 1-24.



A piece of angle iron is a suitable specimen with which to begin, or two lengths of strip steel may be tacked together at right angles. Using a 3.2mm E7014 Stick electrode at 100 amps, position angle iron with one leg horizontal and the other vertical. This is known as a horizontal-vertical (HV) fillet.

Strike the arc and immediately bring the electrode to a position perpendicular to the line of the fillet and about 45° from the vertical. Some electrodes require being sloped about 20° away from the perpendicular position to prevent slag from running ahead of the weld. Refer to Figure 1-23.

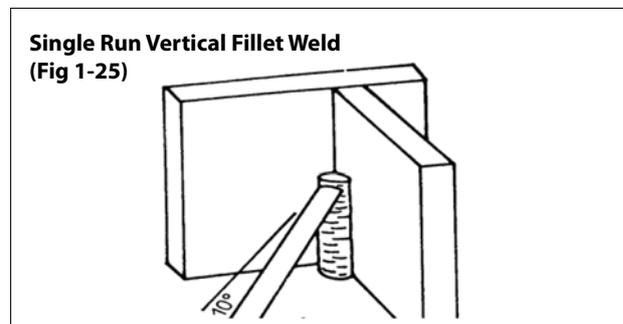
Do not attempt to build up much larger than 6.4mm width with a 3.2mm electrode, otherwise the weld metal tends to sag towards the base, and undercut forms on the vertical leg. Multi-runs can be made as shown in Figure 1-24. Weaving in HV fillet welds is undesirable.



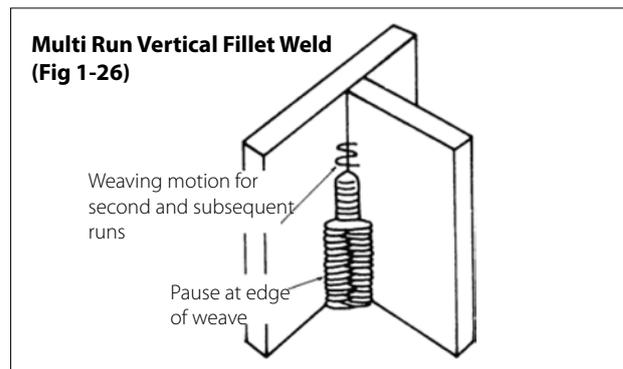
C. Vertical Welds

1. Vertical Up

Tack weld a three feet length of angle iron to your work bench in an upright position. Use a 3.2mm E7014 Stick electrode and set the current at 100 amps. Make yourself comfortable on a seat in front of the job and strike the arc in the corner of the fillet. The electrode needs to be about 10° from the horizontal to enable a good bead to be deposited. Refer Fig. 1-25.

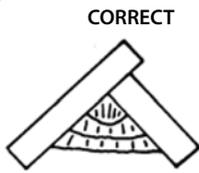


Use a short arc, and do not attempt to weave on the first run. When the first run has been completed de-slag the weld deposit and begin the second run at the bottom. This time a slight weaving motion is necessary to cover the first run and obtain good fusion at the edges.

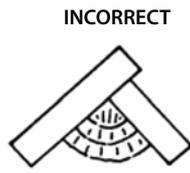


At the completion of each side motion, pause for a moment to allow weld metal to build up at the edges, otherwise undercut will form and too much metal will accumulate in the centre of the weld. Figure 1-26 illustrates multi-run technique and Figure 1-27 shows the effects of pausing at the edge of weave and of weaving too rapidly.

Examples of Vertical Fillet Welds (Fig 1-27)



CORRECT
Pause at edge of weave allows weld metal to build up and eliminates undercut



INCORRECT
Note: Weld contour when insufficient pause at edge of weave

2. Vertical Down

The E7014 Stick electrode makes welding in this position particularly easy. Use a 3.2mm electrode at 100 amps. The tip of the electrode is held in light contact with the work and the speed of downward travel is regulated so that the tip of the electrode just keeps ahead of the slag. The electrode should point upwards at an angle of about 45°.

3. Overhead Welds

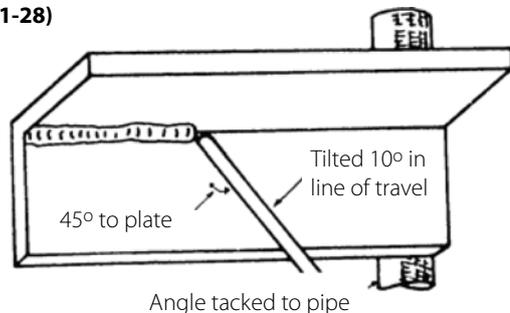
Apart from the rather awkward position necessary, overhead welding is not much more difficult than down hand welding. Set up a specimen for overhead welding by first tacking a length of angle iron at right angles to another piece of angle iron or a length of

waste pipe. Then tack this to the work bench or hold in a vice so that the specimen is positioned in the overhead position as shown in the sketch.

The electrode is held at 45° to the horizontal and tilted 10° in the line of travel (Figure 1-28). The tip of the electrode may be touched lightly on the metal, which helps to give a steady run. A weave technique is not advisable for overhead fillet welds.

Use a 3.2mm E6013 Stick electrode at 100 amps, and deposit the first run by simply drawing the electrode along at a steady rate. You will notice that the weld deposit is rather convex, due to the effect of gravity before the metal freezes.

Overhead Fillet Weld (Fig 1-28)

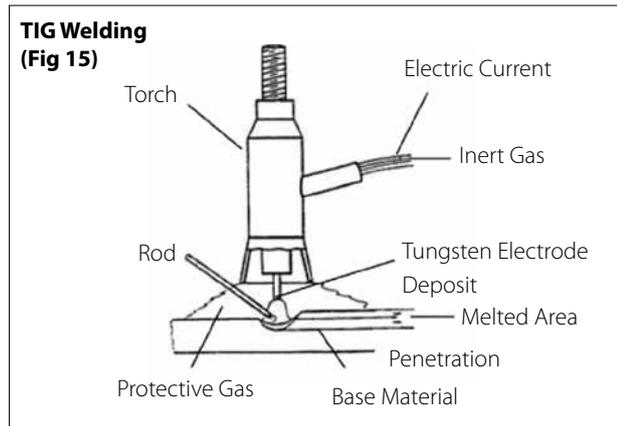


MMA (Stick) Troubleshooting

Fault	Cause	Remedy
A gap is left by failure of the weld metal to fill the root of the weld.	Welding current too low.	Increase welding current.
	Electrode too large for joint.	Use smaller diameter electrode.
	Insufficient gap.	Allow wider gap.
Non-metallic particles are trapped in the weld metal.	Non-metallic particles may be trapped in undercut from previous run.	If a bad undercut is present clean slag bout and cover with a run from a smaller gauge electrode.
	Joint preparation too restricted.	Allow for adequate penetration and room for cleaning out the slag.
	Irregular deposits allow slag to be trapped.	If very bad, chip or grind out irregularities.
	Lack of penetration with slag trapped beneath weld bead.	Use smaller electrode with sufficient current to give adequate penetration. Use suitable tools to remove all slag from comers.
	Rust or mill scale is preventing full fusion.	Clean joint before welding.
	Wrong electrode for position in which welding is done.	Use electrodes designed for position in which welding is done, otherwise proper control of slag is difficult.
<p>Figure 1: Example of insufficient gap or incorrect sequence</p>		
A groove has been formed in the base metal adjacent to the toe of a weld and has not been filled by the weld metal (undercut).	Welding current is too high.	Reduce welding current.
	Welding arc is too long.	Reduce the length of the welding arc.
	Angle of the electrode is incorrect.	Electrode should not be inclined less than 45° to the vertical face.
	Joint preparation does not allow correct electrode angle.	Allow more room in joint for manipulation of the electrode.
	Electrode too large for joint.	Use smaller gauge electrode.
	Insufficient deposit time at edge of weave.	Pause for a moment at edge of weave to allow weld metal build-up.
	Power source is set for MIG (GMAW) welding.	Set power source to STICK (MMA) mode.
Portions of the weld run do not fuse to the surface of the metal or edge of the joint.	Small electrodes used on heavy cold plate.	Use larger electrodes and preheat the plate.
	Welding current is too low.	Increase welding current.
	Wrong electrode angle.	Adjust angle so the welding arc is directed more into the base metal.
	Travel speed of electrode is too high.	Reduce travel speed of electrode.
	Scale or dirt on joint surface.	Clean surface before welding.
<p>Figure 2: Example of Lack of Fusion</p>		
Gas pockets or voids in weld metal (porosity)	High levels of sulphur in steel.	Use an electrode that is designed for high sulphur steels.
	Electrodes are damp.	Dry electrodes before use.
	Welding current is too high.	Reduce welding current.
	Surface impurities such as oil, grease, paint, etc.	Clean joint before welding.
	Welding in a windy environment.	Shield the weld area from the wind.
	Electrode damaged i.e. flux coating incomplete.	Discard damaged electrodes and only use electrodes with a complete flux coating.
Crack occurring in weld metal soon after solidification commences	Rigidity of joint.	Redesign to relieve weld joint of severe stresses or use crack resistance electrodes.
	Insufficient throat thickness.	Travel slightly slower to allow greater build up in throat.
	Weld current is too high.	Decrease welding current.
<p>Figure 3: Example of Slag Inclusion</p>		

TIG Basic Welding Guide

TIG Welding is a fusion procedure that uses an electric ARC created between an infusible tungsten electrode and base material to be welded. For TIG welding an inert gas must be used (Argon) which protects the welding bead. If filling material is used, it is made up of rods suitable to the material to be welded (steel, stainless steel, copper etc).



In TIG mode, welding is possible in all positions: flat, angle, on the edge, vertical and overhead. Furthermore, with respect to other types of welding, the welding joint has greater mechanical resistance, greater corrosion resistance and limited heating in the welded area which limits distortion. Welding can be done even without weld material, guaranteeing a smooth, shiny weld with no impurities or slag.

Tig Electrode Selection and Preparation

Electrode Polarity

Connect the TIG torch to the negative (-) torch terminal and the work lead to the positive (+) work terminal for direct current straight polarity. Direct current straight polarity is the most widely used polarity for DC TIG welding. It allows limited wear of the elec-

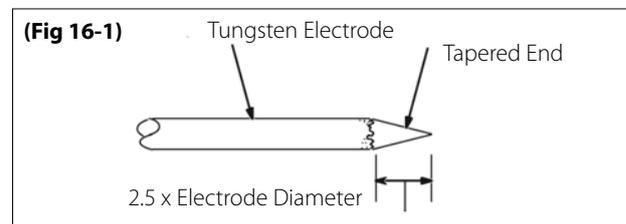
Tungsten Electrode Types			
Electrode Type (Ground Finish)	Application	Features	Colour Code
Thoriated 2%	DC welding of mild steel, stainless steel and copper.	Excellent arc starting; long life; high current capacity.	Red
Ceriated 2%	DC welding of mild steel, stainless steel and copper.	Longer life; more stable arc; easier starting; wider current range; narrower, more concentrated arc.	Grey

trode since 70% of the heat is concentrated at the work piece.

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

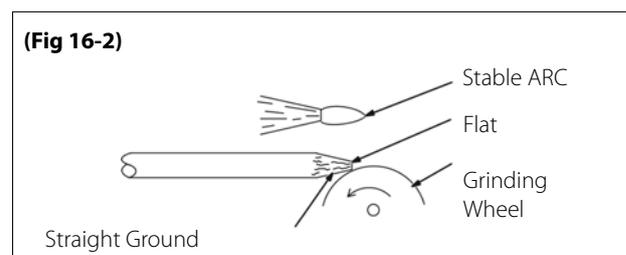
Guide For Selecting Filler Wire Diameter	
Filler Electrode Diameter	DC Current (Amps)
1.6mm (1/16")	20 - 90
2.4mm (3/32")	65 - 115
3.2mm (1/8")	100 - 165
4.8mm (3/16")	200 - 350

Preparing Tungsten for DC Electrode Negative (DCEN) Welding



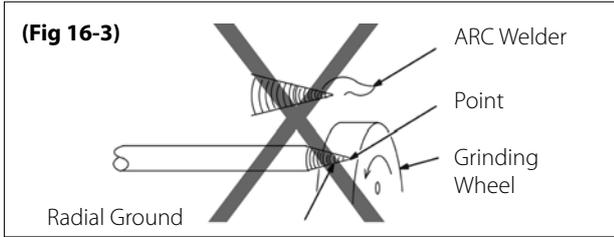
2.5 x Electrode Diameter

Grind end of tungsten on fine grit, hard abrasive wheel before welding. Do not use wheel for other jobs or tungsten can become contaminated causing lower weld quality.

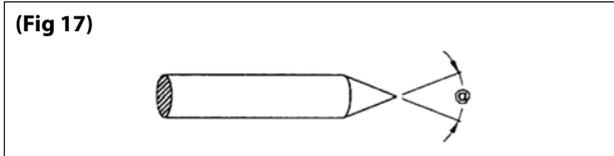


Ideal Tungsten Preparation - Stable ARC

Diameter of the flat determines amperage capacity.



Wrong Tungsten Preparation - Wandering ARC
Diameter of the flat determines amperage capacity.



Pointing the Electrode
The electrode should be pointed according to the welding current.

Shielding Gas Selection	
Aloy	Shielding Gas
Carbon Steel	Welding Argon
Stainless Steel	Welding Argon
Nickel Alloy	Welding Argon
Copper	Welding Argon
Titanium	Welding Argon

Electrode Angles	
Angle @	Range of Current (Amps)
30°	0 - 30
60-90°	30 - 120
90-120°	120 - 250
120°	> 250

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

TIG Welding Troubleshooting

Troubleshooting - TIG Weld Quality		
Fault	Cause	Remedy
Excessive beard build up or poor penetration or poor fusion at edges of weld.	Welding current is too low.	Increase weld current and/or faulty joint preparation.
Weld bead too wide and flat or undercut at edges of weld or excessive burn through.	Welding current is too high.	Decrease weld current.
Weld bead too small or insufficient penetration or ripples in bead are widely spaced apart.	Travel speed too fast.	Decrease weld current.
Weld bead too wide or excessive bead build up or excessive penetration in butt joint.	Travel speed too fast.	Increase travel speed.
Uneven leg length in fillet joint.	Wrong placement of filler rod.	Re-position filler rod.
Electrode melts or oxidises when an arc is struck.	Torch lead connected to positive welding terminal.	Connect torch lead to negative welding terminal.
	No gas flowing to welding region.	Check the gas lines for kinks or breaks and gas cylinder contents.
	Torch is clogged with dust or dirt.	Clean torch.
	Gas hose is cut.	Replace gas hose.
	Gas passage contains impurities.	Disconnect gas hose from the rear of Power Source then raise gas pressure and blow out impurities.
	Gas regulator turned off.	Turn on.
	Torch valve is turned off.	Turn on.
	The electrode is too small for the welding current.	Increase electrode diameter or reduce the welding current.
Dirty weld pool	Electrode contaminated by contact with work piece or filler rod material.	Clean the electrode by grinding off any contaminates.
	Work piece surface has foreign material on it.	Clean surface.
	Gas contaminated with air.	Check gas lines for cuts and loose fitting or change gas cylinder.
Poor weld finish	Inadequate shielding gas.	Increase gas flow or check gas line for gas flow problems.
Arc start is not smooth.	Tungsten electrode is too large for the welding current.	Select the right size electrode.
	The wrong electrode is being used for the welding job.	Select the right electrode type.
	Gas flow rate is too high.	Select the right rate for the welding job.
	Incorrect shielding gas is being used.	Select the right shielding gas.
	Poor Work Lead/Clamp connection to work piece.	Improve connection to work piece.
Arc flutters during TIG welding.	Tungsten electrode is too large for the welding current.	Select the right size electrode.

Knowledge & Resources

Please refer to Euroquip website www.euroquip.co.nz/Downloads.html for knowledgebase articles & operation videos.

Safety

Store and Retain this Manual

Retain this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number into the NOTES section at the rear, and keep this manual and the receipt in a safe and dry place for future reference.

Important Safety Information

Failure to follow the warnings and instructions may result in electric shock, fire, serious injury and/or death. Save all warnings and instructions for future reference.



This is the safety alert symbol to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

 **DANGER!** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING!** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION,** used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTE, used to address practices not related to personal injury.

CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.

GENERAL SAFETY WARNINGS

1. Maintain labels and nameplates on the welder. These carry important information. If unreadable or missing, contact Euroquip for a replacement.

2. Avoid unintentional starting. Make sure the welder is setup correctly and you are prepared to begin work before turning on the welder.

3. Unplug before performing maintenance. Always unplug the welder from its electrical outlet before performing any inspection, maintenance, or cleaning procedures.

4. Never leave the welder unattended while energised. Turn power off before leaving the welder unattended.

5. Do not touch live electrical parts. Wear dry, insulating gloves. Do not touch the electrode or the conductor tong with bare hands. Do not wear wet or damaged gloves.

6. Protect yourself from electric shock. Do not use the welder outdoors. Insulate yourself from the work piece and the ground. Use non-flammable, dry insulating material if possible, or use dry rubber mats, dry wood or plywood, or other dry insulating material large enough to cover the area of contact with the work or the ground.

7. Avoid inhaling dust. Some dust created by power sanding, sawing, grinding, drilling, cutting, welding and other construction activities, contain chemicals known to cause cancer, birth defects or other harm. Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well-ventilated area, and work with approved safety equipment, such as dust masks that are specially designed to filter out microscopic particles.

8. People with pacemakers should consult their physician(s) before using this machine.

 **WARNING!** Electromagnetic fields in close proximity to a heart pacemaker could cause interference, or failure of the pacemaker. The use of a Welder is **NOT RECOMMENDED** for pacemaker wearers. Consult your doctor.

9. Ensure that the unit is placed on a stable location before use.

 **WARNING!** If this unit falls while plugged in, severe injury, electric shock, or fire may result.

10. Transportation Methods Lift unit with the handles provided, or use a handcart or similar device of adequate capacity. If using a fork lift vehicle, secure the unit to a skid before transporting.



CAUTION!

Disconnect input power conductors from de-energized supply line before moving the welding power source.

11. Exercise good work practices. The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be considered by the operator.

Welding Safety Instructions & Warnings



WARNING!

Protect yourself and others from possible serious injury or death. Keep children away. Read the operating/Instruction manual before installing, operating or servicing this equipment. Have all installation, operation, maintenance, and repair work performed by qualified people.

If an operator does not strictly observe all safety rules and take precautionary actions, welding products and welding processes can cause serious injury or death, or damage to other equipment or property. Safe practices have developed from past experience in the use of welding and cutting.

These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the European Standard EN60974-1 entitled: Safety in welding and allied processes.



WARNING!

Only use safety equipment that has been approved by an appropriate standards agency. Unapproved safety equipment may not provide adequate protection. Eye and breathing protection must be AS/NZS compliant for the specific hazards in the work area.



DANGER!

Always wear AS/NZS compliant safety glasses and full face shield fitted with appropriate filter shade number. (Refer Filter Table on page 17.)



CAUTION!

Heavy-duty work gloves, non-skid safety shoes and hearing protection used for appropriate conditions will reduce personal injuries.



CAUTION!

Have the equipment serviced by a qualified repair person using identical replacement parts. This will ensure that the safety of the power tool is maintained.

Personal Safety



CAUTION!

Keep the work area well lit. Make sure there is adequate space surrounding the work area. Always keep the work area free of obstructions, grease, oil, trash, and other debris. Do not use equipment in areas near flammable chemicals, dust, and vapours. Do not use this product in a damp or wet location.

1. Stay alert, watch what you are doing and use common sense when operating equipment. Do not use a tool while you are tired or under the influence of drugs, alcohol or medication. A moment of distraction when operating equipment may result in serious personal injury.
2. Do not overreach. Keep proper footing and balance at all times. This enables better control of the power tool in unexpected situations.

Arc Rays can Burn Eyes and Skin



DANGER!

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin.

1. Use a Welding Helmet or Welding Face Shield fitted with a proper shade filter (refer AS 60974-1, AS/NZS 1337.1 and AS/NZS 1338.1 Safety Standards) to protect your face and eyes when welding or watching. (See Filter Table on Page 17).
2. Wear approved safety glasses. Side shields are recommended.

3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot safety protection.
5. Never wear contact lenses while welding.

Noise Can Damage Hearing



CAUTION!

Noise from some processes can damage hearing. Use AS/NZS compliant ear plugs or ear muffs if the noise level is high.

Work Environment Safety



DANGER!

Remove any combustible material from the work area.

1. When possible, move the work to a location well away from combustible materials. If relocation is not possible, protect the combustibles with a cover made of fire resistant material.
2. Remove or make safe all combustible materials for a radius of 10 metres around the work area. Use a fire resistant material to cover or block all doorways, windows, cracks, and other openings.
3. Enclose the work area with portable fire resistant screens. Protect combustible walls, ceilings, floors, etc., from sparks and heat with fire resistant covers.
4. If working on a metal wall, ceiling, etc., prevent ignition of combustibles on the other side by moving the combustibles to a safe location. If relocation of combustibles is not possible, designate someone to serve as a fire watch, equipped with a fire extinguisher, during the welding process and well after the welding is completed.
5. Do not weld or cut on materials having a combustible coating or combustible internal structure, as in walls or ceilings, without an approved method for eliminating the hazard.
6. After welding, make a thorough examination for evidence of fire. Be aware that visible smoke or flame may not be present for some time after the fire has started. Do not weld or cut in atmospheres containing dangerously reactive or flammable gases, vapours, liquids, and dust. Provide

adequate ventilation in work areas to prevent accumulation of flammable gases, vapours, and dust.

7. Do not apply heat to a container that has held an unknown substance or a combustible material whose contents, when heated, can produce flammable or explosive vapours. Clean and purge containers before applying heat. Vent closed containers, including castings, before pre-heating, welding, or cutting.

Electricity Can Kill



DANGER!

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on.

The input power circuit and machine internal circuits are also live when power is on. In semi-automatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from the work and the ground using dry insulating mats or covers.
4. Disconnect input power before installing or servicing this equipment. Lock input power, disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.
7. Use fully insulated electrode holders. Never dip the holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Connect work piece to a good electrical ground.

EZITIG200 AC/DC Welding Machine

11. Do not touch the electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts as soon as practical.
13. In confined spaces or damp locations, do not use a welder with AC output unless equipped with a voltage reducer.

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Use the following table to select the appropriate shade number for a Welding Helmet or Welding Face Shield.

1. Use a Welding Helmet or Welding Face Shield fitted with a proper shade of filter (see AS 60974-1, AS/NZS 1337.1 and AS/NZS 1338.1 Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields are recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Never wear contact lenses while welding.

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

Refer to standard AS/NZS 1338.1 for comprehensive information regarding the above table.

Fumes And Gases



WARNING!

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breathe the fumes.
2. If inside, ventilate the area and/or use an exhaust at the arc to remove welding fumes and gases.

3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Safety Data Sheets (SDS) and the manufacturer's instruction for the metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapours to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.
8. Connect the work lead/clamp to the job as close to the welding area as practical to prevent welding current from travelling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use a welder to thaw frozen pipes.
10. Remove the stick electrode from the holder or cut off the welding wire at the contact tip when not in use.

Fire & Explosive Risks



WARNING!

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, work piece, and hot equipment can cause fires and burns.

Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 10m of the welding site.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.

Sparks & Hot Metal



WARNING!

Chipping and grinding causes flying metal, and as welds cool they can throw off slag.

1. Wear an AS/NZS approved face shield or safety goggles. Side shields are recommended.
2. Wear appropriate safety equipment to protect the skin and body.

Cylinders



WARNING!

Gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use appropriate shielding gas, regulators, hoses, and fittings designed for the specific application; maintain them and their associated parts in good condition.
6. Turn your face away from the valve outlet when opening the cylinder valve.

Warranty

As part of an on-going commitment to excellence in product support, Euroquip offers a comprehensive product warranty program.

In order to qualify for full warranty support, your product must be registered.

Product not registered with Euroquip is supported by a base 12 month warranty only. Spare parts and technical support will not be available for an unregistered product outside of this base warranty period.

If a Euroquip dealer has not already registered your product, please register it online at www.euroquip.co.nz. Under 'Contact Us' link. To request a physical registration form, please contact Euroquip customer service on 0800 387 678.

EZITIG 200AC/DC:
Registered Standard Warranty Period: 12 Months
Registration Online: 18 Months

Warranty covers failure caused by manufacturing and material defects in the product, during the warranty period specified. The warranty period begins when the product is purchased by the end user. Warranty is not transferrable and is only claimable by the original purchaser.

Warranty does not cover parts that are subject to wear and tear from usage.

Warranty covers failure of a product caused by defective materials and/or manufacturing for the period given and the usage specified by Euroquip. The warranty period begins when the product is purchased by the end user. Warranty is not transferrable and is only claimable by the original purchaser.

Warranty also does not cover failure caused by the untimely replacement or service of the above wearing parts. Evidence must be provided that the product has been maintained and serviced suitably for a claim to be considered under warranty.

Failure caused by incorrect operation of the product, lack of proper care and maintenance of the product, external damage, external circumstances such as contaminated fuel or poor water supply, modifica-

tions to the product, attempted repair/ service by a party other than an Approved Service Agent, is not covered under warranty.

Warranty does not cover pre delivery service and adjustment, or failure that may occur as a result of lack of/ incorrect pre delivery service and adjustment.

Warranty does not cover any incidental, indirect or consequential loss, damage or expense that may result from any defect, failure or malfunction of a product.

Should any issue be found to be a combination of a warranty failure and a non-warranty issue, the repair cost component to rectify and repair the non-warranty failure is the customers' full responsibility.

The decision that an issue with a product qualifies as a warranty claim is made at the sole jurisdiction of Euroquip.

No costs incurred will be considered under warranty if repairs are carried out by a party other than a Euroquip Approved Service Agent, unless with prior consent in writing from Euroquip.

It is the responsibility of the purchaser to deliver a product under warranty to the nearest relevant service agent or product reseller. Warranty does not cover call outs, mileage and freight costs.

If a product is repaired under warranty, parts and labour required for the repair will be supplied at no charge. Warranty assessment and repair will be scheduled and executed according to the normal work flow at the service location and depending on the availability of suitable replacement parts.

This warranty policy is an additional benefit and does not affect the legal rights of any end user, reseller or service agent.



To qualify for your 18 month Commercial Warranty - scan here to register your product.



Congratulations on your new WELDTECH product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency visit www.weldtech.net.nz, or email us at info@euroquip.co.nz.

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