ADVANCEMULTI205P

4-IN-1 MIG/MMA/AC TIG/DC TIG WELDER

OPERATING INSTRUCTIONS

36 MONTH WARRANTY

AC/DC ALTERNATING/ DIRECT CURRENT

IP23 CORROSION RESISTANT

SPIKE/ GENERATOR SAFE

IGBT INVERTER TECHNOLOGY IGBT INVERTER TECHNOLOGY

IPS INTELLIGENT PROTECTION SYSTEM

1PH 230V 230V 50HZ SINGLE PHASE

PULSE WELDING OUTPUT

POWER FACTOR PFC CORRECTION POWER FACTOR CORRECTION

HF START HF START TIG

SPOOL GUN READY

LCD LCD COLOUR SCREEN

www.strata.co.nz

Congratulations on your new Strata product!

The Strata 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. Strata product is subject to stringent quality control and designed and manufactured to NZ & Australian standards.

Common use of Strata products include:

- Light Engineering
- Automotive
- Home / Hobby Engineering
- Farming
- Industrial 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 download one at www.euroquip.co.nz under the 'Contact Us' tab.

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4-IN-1 MIG/MMA/AC TIG/DC TIG WELDER

• ADVANCEMULTI205P •

Featuring the latest in welding technology the ADVANCEMULTI205P is one machine for every job. Capable of AC TIG, DC TIG, MMA, MIG, and Pulse MIG functions this is the ultimate 4-in-1 machine. Designed tough for NZ conditions the ADVANCEMULTI205P will become your new go-to welder.

- One machine for every job with Advanced Multi Process Technology - AC/DC TIG, MMA, MIG, Pulse MIG functions
- 5" Full Colour LCD Display
- Active PFC Technology, reduced power consumption
- Advanced TIG Functions Mix AC/DC Waveforms, Advanced Waveform Control, Advanced Spot Welding and Synergic Smart TIG Operation.
- Lift TIG and HF Start
- 2T/4T Plus Smart 4T Programmability and Spot Trigger Modes
- Electronic HF Tig Arc Ignition System for low EMF interference
- Pulse MIG Function, Manual MIG Function, Smart Synergic MIG Function and Spool Gun Connection
- Suitable for MIG brazing with bronze wires.
- Advanced MMA Features Pulse, AC or DC, Adjustable hot start and arc force controls
- Multi Voltage Input, great for running off Generators and long extension leads.
- Switchable Smart Cooling Fan Control
- Externally upgradeable software via USB Connection (input only)
- Accessories Include: Strata Professional PRO26 25ft TIG torch with thumbwheel remote control, Strata Professional MT250-40ER MIG Torch, 4m MMA lead with heavy duty twist lock electrode holder, 3m Earth Lead with heavy duty earth clamp, Strata 2 Stage Flowmeter Argon Gas Regulator, Argon Regulator/CO2 Cylinder Adaptor, 4m Gas Hose, MIG Wire Drive Roller 0.6/0.8mm 'v' groove, MIG Wire Drive Roller 0.9/1.0mm 'v' groove , MIG Wire Drive Roller 0.8/0.9mm knurled' groove.

36 MONTH WARRANTY *

ADVANCEMULTI205P

DIMENSIONS (LxWxH)	WEIGHT	INPUT POWER SUPPLY	INPUT POWER SUPPLY TOLERANCE	MAXIMUM INPUT CURRENT	GENERATOR CAPACITY	MIG CURRENT OUTPUT	MMA, AC/DC TIG CURRENT OUTPUT	MOG O/C VOLTAGE	MMA O/C VOLTAGE	MMA DUTY CYCLE	AC/DC TIG DUTY CYCLE	MIG DUTY CYCLE
675x220 x430mm	21kg	230V AC 15A 50/60Hz	90 - 275V AC	34A	10kVA	30A-200A	10-200A	10V-27V	75V	200A@20% 130A@60% 100A@100%	200A@25% 130A@60% 100A@100%	200A@25% 130A@60% 100A@100%

TIG GAS POST FLOW/PRE-FLOW ADJUSTMENT	TIG PULSE FREQUENCY	TIG PULSE WIDTH RANGE	AC TIG WAVEFORM	AC FREQUENCY ADJUSTMENT	INSULATION CLASS	POWER EFFICIENCY	POWER FACTOR	STANDARDS	MMA ROD SIZE	WARRANTY
0-20s	0.5 - 999Hz	5 - 95%	Square wave Sine wave Triangular wave Mix	50-250Hz	IP23	80%	0.99	EN60974-1: 2012	1.6 - 5.0mm	36 months* with registration

* 36 Month Warranty only with online registration of product - www.strata.co.nz

ALTERNATING/ DIRECT CURRENT

CORROSION RESISTANT

SPIKE/ GENERATOR SAFE

IGBT INVERTER TECHNOLOGY

INTELLIGENT PROTECTION SYSTEM

230V 50HZ SINGLE PHASE

PULSE WELDING OUTPUT

POWER FACTOR CORRECTION

HF START TIG

SPOOL GUN READY

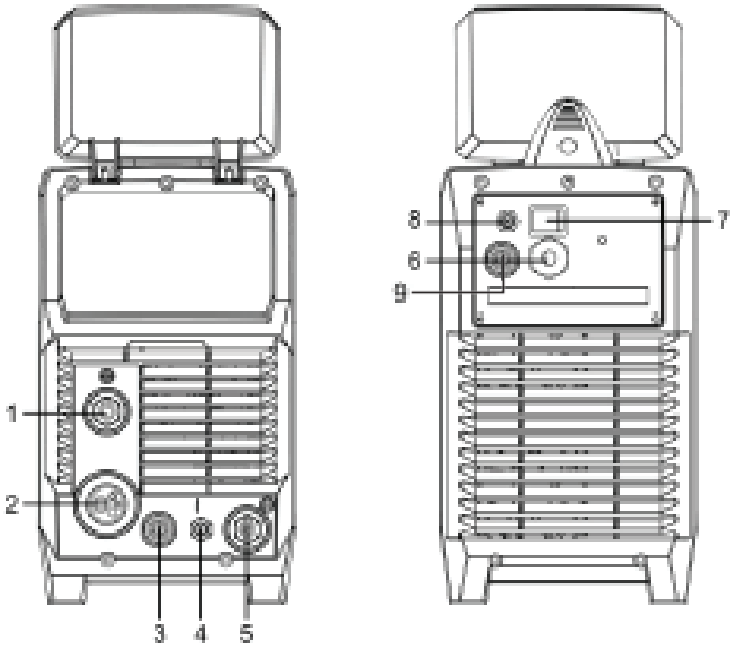
LCD COLOUR SCREEN

ADVANCEMULTI205P Related Parts

Part number	Description
MIG Torch & Consumables	
MT250-4E	MB25 Mig Torch 4m (Euro)
MB25KIT	MIG Consummables Starter Kit - MB25
MCN2571	Nozzle cylindrical (2 pk
MCN2570	Nozzle conical (2 pk)
MCN2572	Nozzle - Tapered (2 pk)
MMT2406	Mig tip 0.6mm (5 pk)
MMT2408	Mig tip 0.8mm/0.35 (5pk)
MMT2409	Mig tip 0.9mm/035 (5pk)
MMT2410	Contact Tip 1.0mm/040 (5 pk)
MMT2410AL	Contact Tip 1.0mm/040 ALI (5 pk)
MMT2412AL	Contact Tip 1.2mm/045 ALI (5pk)
MTA2481	Tip Adaptor
MSS2557	Shroud spring (2 pk)
Drive Rollers	
SW17831	30mm OD x 22mm ID Wire Feeder Drive Roller 0.6/0.8mm 'v' groove
SW17832	30mm OD x 22mm ID Wire Feeder Drive Roller 0.9/1.0mm 'v' groove
SW17833	30mm OD x 22mm ID Wire Feeder Drive Roller 0.8/0.9mm 'k' groove flux cored
SW17834	30mm OD x 22mm ID Wire Feeder Drive Roller 0.8/1.0mm 'u' groove
Liner	
MSL1549	Steel liner 0.6 - 0.9mm 4m
MSL2442	Steel liner 1.0 - 1.2mm x 4m
MTL2442T	Steel liner 1.0 - 1.2mm x 4m
MTL2442T	Teflon liner 1.0 - 1.2mm x 4m
TIG Torch	
17374	TIG Torch Pro-Grip 26 X 25Ft, Tgc End (Large Dinse) M12,(needs correct plug to be fitted)
Spool Gun	
SP240P	Spool Gun MB24 8m 9 Pin Remote Plug C/W Carry Case
MMA Consumables	
AAL3550	Arc Lead 25mm2 cable, 35-70mm plug, 4m 300A Twist-lock Electrode holder
AEL3550	Earth Lead 25mm2 cable, 35-70mm plug, 3m 300A Heavy duty earth clamp
Regulators	
GR101AR	Argon Twin Gauge Regulator
GADC02	C02 Cylinder to Argon Regulator Ardaptor inc. nylon washer

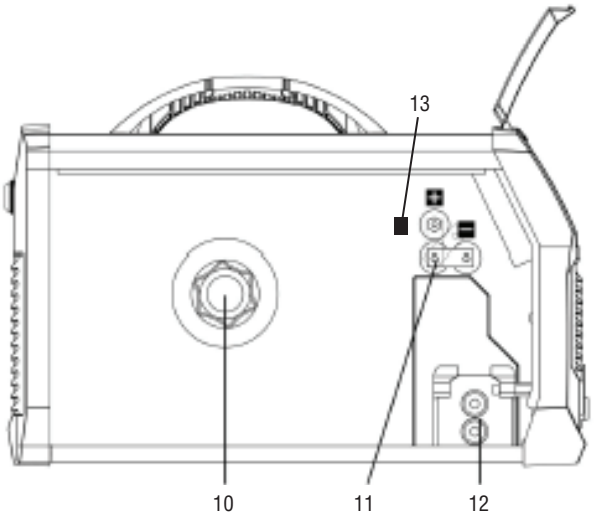
Know Your Machine

Front and rear layout of welding machine



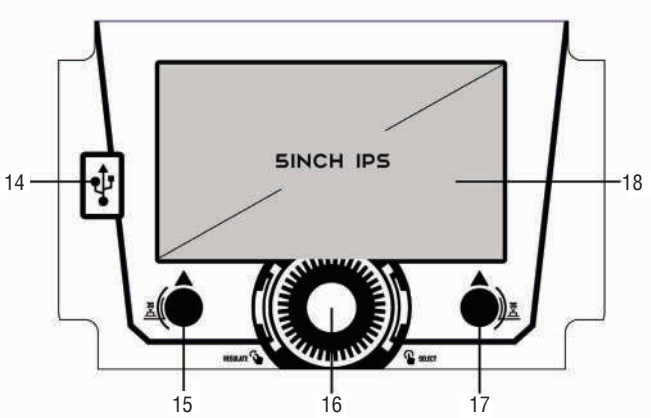
1. Positive (+) welding power output connection socket.
2. MIG torch euro connector.
3. 12 pin remote connection socket.
4. TIG torch gas connector.
5. Negative (-) welding power output connection socket
6. Input power cable.
7. Power switch.
8. Gas inlet connector.
9. 9 pin remote connection socket.

Wire Feeder of welding machine



10. Spool holder.
11. MIG Torch Polarity Change Power Connection.
12. Wire feeder.
13. Spool gun switch.

Control Panel of welding machine



14. USB connector
15. Left button
16. Main knob
17. Right button
18. 5 INCH IPS screen

1 Installation and Adjustment

1.1 Parameters

Model / Parameters	ADVANCEMULTI205P
Input Voltage（V）	1~220/230/240±10%
Input Current（A）	28 MIG 32 MMA 22 TIG
Input Power（KW）	6.2 MIG 7.3 MMA 4.9 TIG
Welding Current（A）	30-200 (MIG) 10~200(MMA/TIG)
Welding Voltage（V）	10-27 (MIG)
No-load Voltage（V）	67 (MIG) 14 (TIG/MMA)
Power Factor	0.99
Duty cycle （40℃）	25%200A 60%165A 100%130A
Diameter(mm)	Fe ：0.6,0.9,1.0 Ss: 0.8, 0.9, 1.0 Flux-Cored: 0.6, 0.8, 0.9, 1.0
Protection class	IP23
Insulation class	H
Cooling	continuous/on demand
Dimensions（mm）	675x220x430mm
Weight（Kg）	21KG

Note: The above parameters are subject to change with the improvement of machines.

2 Overview

2.1 Brief Introduction

The MIG series of welding machines adopts the latest Pulse Width Modulation (PWM) technology and the Insulated Gate Bipolar Transistor (IGBT) power modules. It uses switching frequencies in the 20KHz-50KHz range so as to replace the traditional line-frequency transformer type welding machines. These machines are characterized with excellent dynamic response, portability, compact size, light weight, low energy consumption, etc.

The MIG series of welding machines uses mixed gases as shielding gas to achieve gas shielded welding, active gas（Ar+O2, Ar+CO2）as shielded gas to realize MAG welding and inactive gas (Ar) as shielded gas to realize MIG welding.

MIG series of welding machines has built-in automatic protection functions to protect the machines from over-voltage, over-current and over-heat. If any one of the above problems happens, the alarm lamp on the front panel will be lit and output current will be shut off automatically for the machine to protect itself and prolong the equipment using life.

MIG series Features:

1. Digital control system, real-time display the welding parameters.
2. High performance multifunction power source (MIG/MAG, MMA &TIG ACDC).
3. Waveform control, stable welding arc.
4. IGBT technology, for low power consumption.
5. Rated MIG Duty Cycle：

ADVANCEMULTI205P = 200A @25%(40°C)

MIG series of welding machine is suitable for all positions welding for various plates made of stainless steel, carbon steel, alloyed steel, copper, titanium, etc, which is also applied to pipe instalment, mould mend, petrochemical, architecture decoration, car repair, bicycle, handicraft, and common manufacture.

MAG = Metal Active Gas Welding
MIG = Metal Inert Gas Welding

2.2 Working Principle

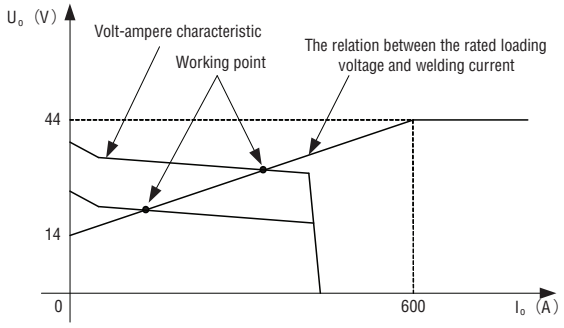
The working principle of MIG SERIES arc welding machine is shown as the following figure. Single-phase 110V/220V work frequency AC is rectified into DC, then is converted to medium frequency AC by inverter device (IGBT), after reducing voltage by medium transformer (the main transformer) and rectifying by medium frequency rectifier (fast recovery diodes) and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stably when MMA or TIG. And adopts v oltage feedback control technology to insure voltage output stably when MIG. Meanwhile, the welding current parameter can be adjusted continuously and infinitely to meet with the requirements of welding craft.

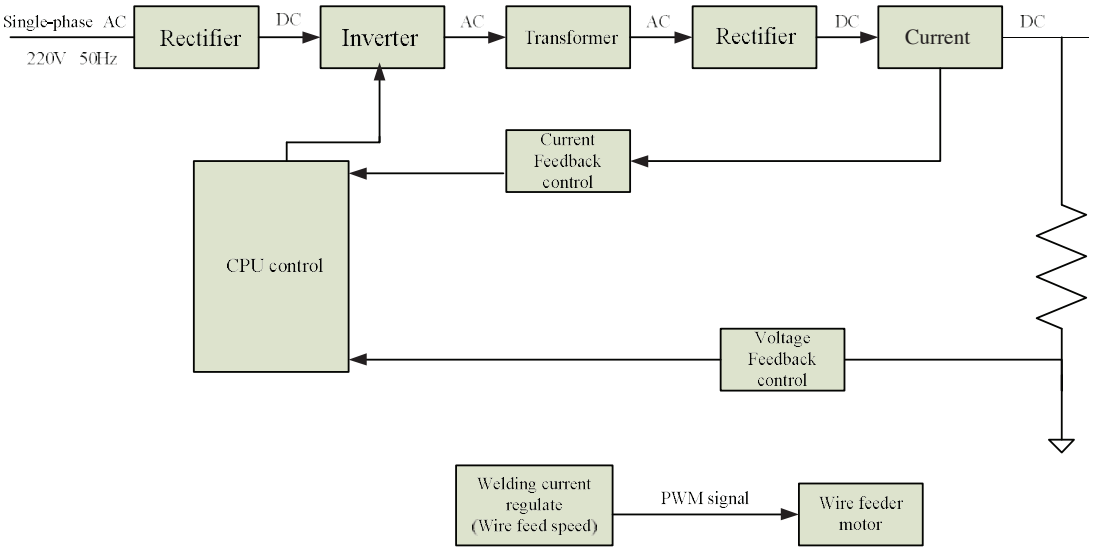
2.3 Characteristic Volt-Ampere

MIG series welding machine has an excellent volt-ampere characteristic, whose graph is shown as the following figure.

The relation between the rated loading voltage U2 and welding current I2 is as follows:

U2=14+0.05I2(V)





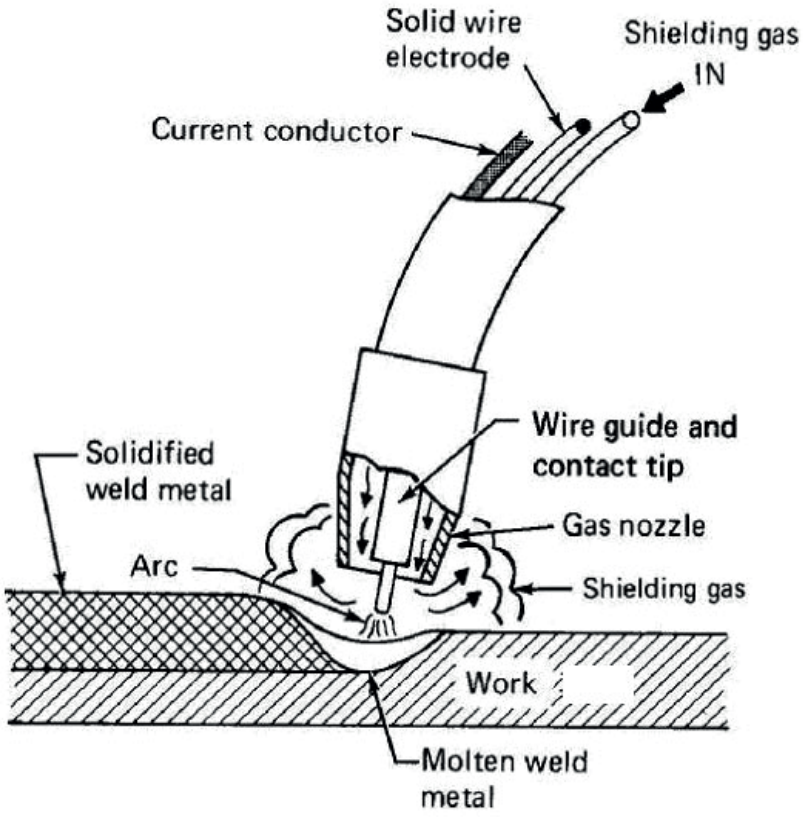
2.3 MIG Welding

Definition of MIG Welding

MIG (metal inert gas) welding also known as GMAW (gas metal arc welding) or MAG (metal active gas welding), is a semi-automatic or automatic arc welding process in which a continuous and consumable wire electrode and a shielding gas are fed through a welding gun. A constant voltage, direct current power source is most commonly used with MIG welding. There are four primary methods of metal transfer in MIG welding, called short circuit (also known as dip transfer) globular transfer, spray transfer and pulsed-spray, each of which has distinct properties and corresponding advantages and limitations. To perform MIG welding, the basic necessary equipment is a welding gun, a wire feed unit, a welding power supply, an electrode wire, and a shielding gas supply. Short circuit transfer is the most common used method whereby the wire electrode is fed continuously down the welding torch through to and exiting the contact tip.

The wire touches the work piece and causes a short circuit the wire heats up and begins to form a molten bead, the bead separates from the end of the wire and forms a droplet that is transferred into the weld pool. This process is repeated about 100 times per second, making the arc appear constant to the human eye.

Principles of welding



Short Circuit Transfer - Short circuit transfer is the most common used method whereby the wire electrode is fed continuously down the welding torch through to and exiting the contact tip. The wire touches the work piece and causes a short circuit the wire heats up and begins to form a molten bead, the bead separates from the end of the wire and forms a droplet that is transferred into the weld pool.

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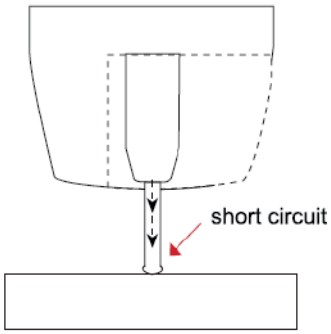
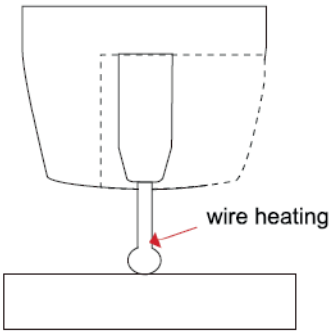
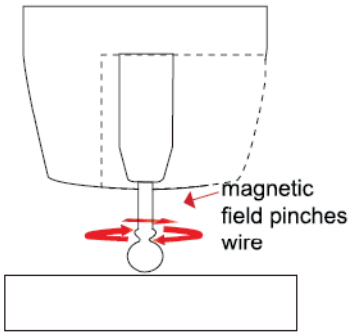


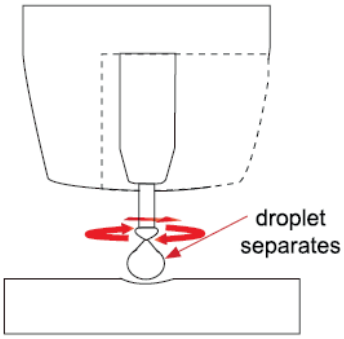
The wire approaches the work piece and touches the work creating a short circuit between the wire and the base metal, because there is no space between the wire and the base metal there is no arc and current flows through the wire.



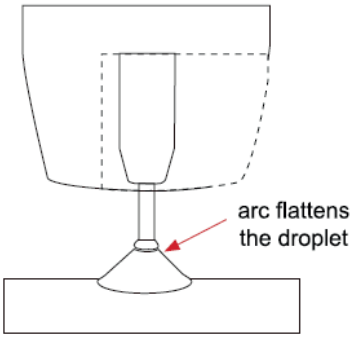
The wire cannot support all the current flow, resistance builds up and the wire becomes hot and weak and begins to melt.



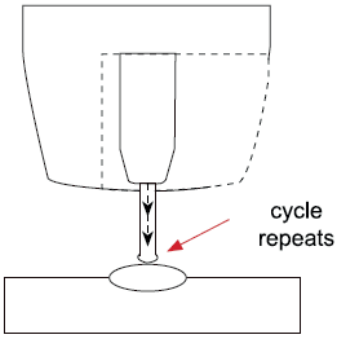
The current flow creates a magnetic field that begins to pinch the melting wire forming it into droplet.



The pinch causes the forming droplet to separate and fall towards the now creating weld pool.



An arc is created at the separation of the droplet and the heat and force of the arc flattens out the droplet into the weld pool. The heat of the arc melts the end of the wire slightly as it feeds towards the base metal.



The wire feed speed overcomes the heat of the arc and the wire again approaches the work to short circuit and repeat the cycle.

ADVANCEMULTI205P

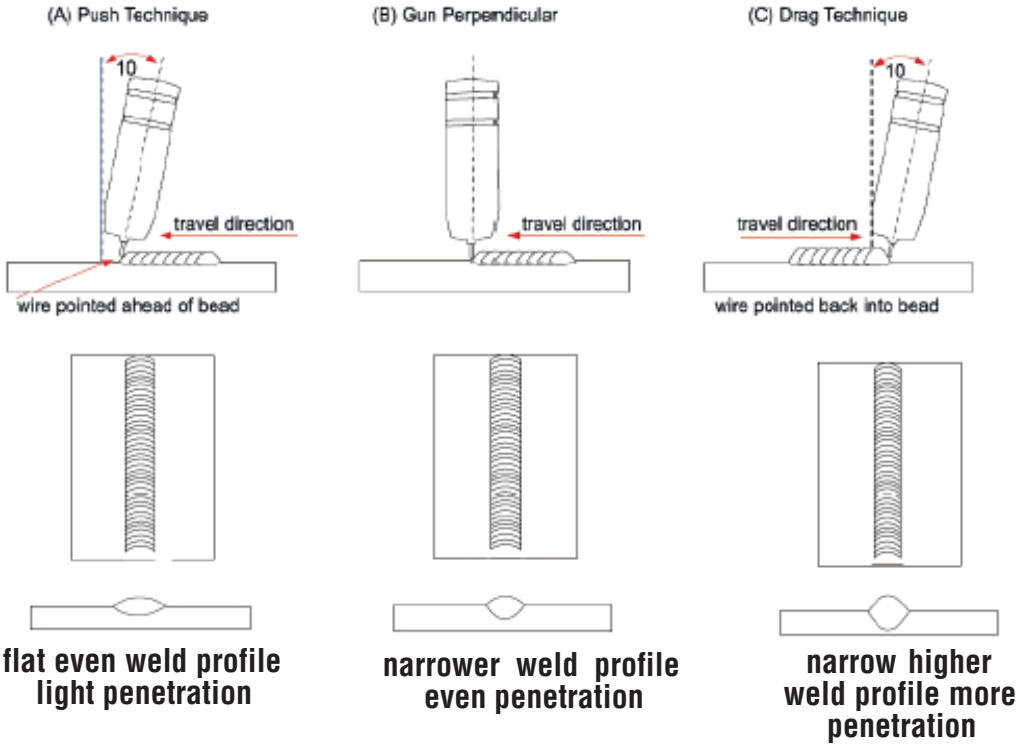
Basic MIG Welding Good weld quality and weld profile depends on gun angle, direction of travel, electrode extension (stick out), travel speed, thickness of base metal, wire feed speed and arc voltage. To follow are some basic guides to assist with your setup.

Gun Position - Travel Direction, Work Angle: Gun position or technique usually refers to how the wire is directed at the base metal, the angle and travel direction chosen. Travel speed and work angle will determine the characteristic of the weld bead profile and degree of weld penetration Push Technique - The wire is located at the leading edge of the weld pool and pushed towards the un-melted work surface. This technique offers a better view of the weld joint and direction of the wire into the weld joint.

Push technique directs the heat away from the weld puddle allowing faster travel speeds providing a flatter weld profile with light penetration - useful for welding thin materials. The welds are wider and flatter allowing for minimal clean up / grinding time.

Perpendicular Technique - The wire is fed directly into the weld, this technique is used primarly for automated situations or when conditions make it necessary. The weld profile is generally higher and a deeper penetration is achieved.

Drag Technique - The gun and wire is dragged away from the weld bead. The arc and heat is concentrated on the weld pool, the base metal receives more heat, deeper melting, more penetration and the weld profile is higher with more build up.



flat even weld profile light penetration

narrower weld profile even penetration

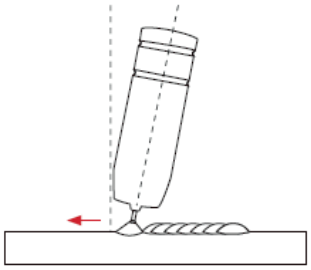
narrow higher weld profile more penetration

Travel Angle - Travel angle is the right to left angle relative to the direction of welding. A travel angle of 5°- 15° is ideal and produces a good level of control over the weld pool. A travel angle greater that 20° will give an unstable arc condition with poor weld metal transfer, less penetration, high levels of spatter, poor gas shield and poor quality finished weld.

Angle to Work - The work angle is the forward back angle of the gun relative to the work piece. The correct work angle provides good bead shape, prevents undercut, uneven penetration, poor gas shield and poor quality finished weld.

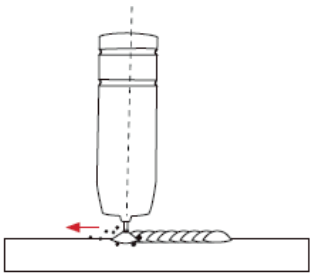
Stick Out - Stick out is the length of the unmelted wire protruding from the end of the contact tip. A constant even stick out of 5-10mm will produce a stable arc, and an even current flow providing good penetration and even fusion. Too short stick out will cause an unstable weld pool, produce spatter and over heat the contact tip. Too long stick out will cause an unstable arc, lack of penetration, lack of fusion and increase spatter.

Angle 5°- 15°



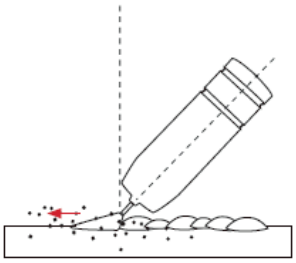
good level of control over the weld pool, even flat weld.

Not enough angle



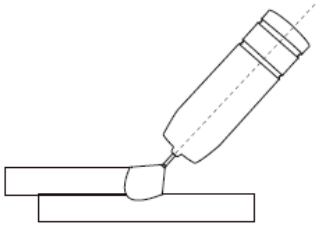
less control over the weld pool more spatter.

Angle more than 20°



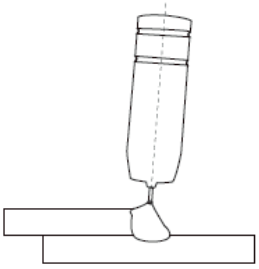
poor control, unstable arc, less penetration, lots of spatter.

Correct angle



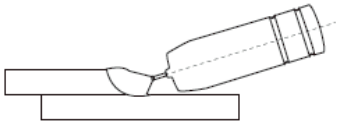
good level of control over the weld pool, even flat weld.

Not enough angle

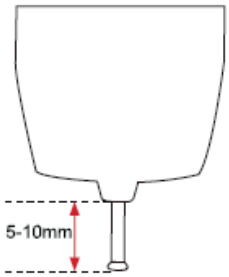


less control over the weld pool more spatter.

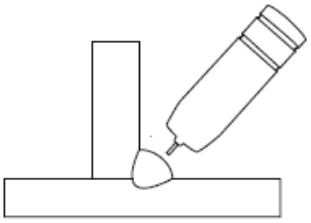
Too much angle



poor control, unstable arc, less penetration, lots of spatter.

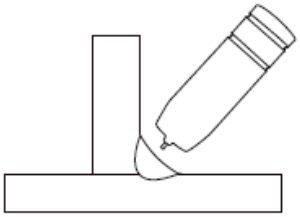


Normal stick out



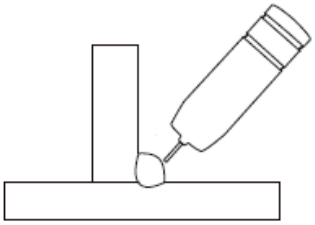
Even arc, good penetration even fusion, good finish.

Too short



Unstable arc, spatter, over heat contact tip.

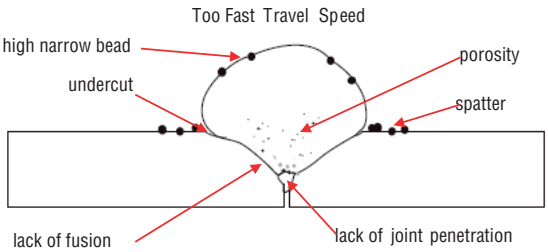
Too long



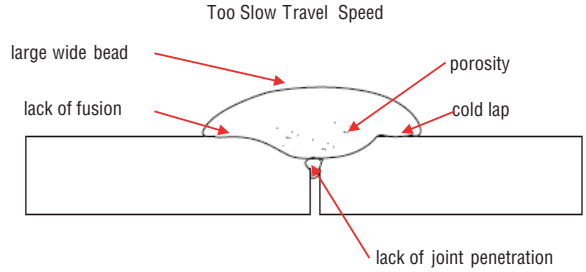
Unstable arc, poor spatter, and penetration fusion.

Travel Speed - Travel speed is the rate that the gun is moved along the weld joint and is usually measured in mm per minute. Travel speeds can vary depending on conditions and the welders skill and is limited to the welders ability to control the weld pool. Push technique allows faster travel speeds than Drag technique. Gas flow must also correspond with the travel speed, increasing with faster travel speed and decreasing with slower speed. Travel speed needs to match the amperage and will decrease as the material thickness and amperage increase.

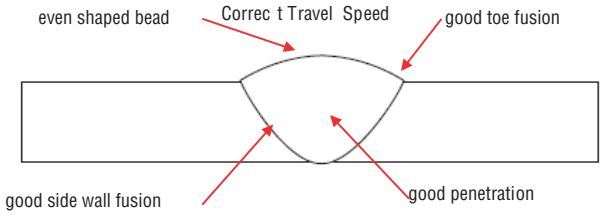
Too Fast Travel Speed - A too fast travel speed produces too little heat per mm of travel resulting in less penetration and reduced weld fusion, the weld bead solidifies very quickly trapping gases inside the weld metal causing porosity. Undercutting of the base metal can also occur and an unfilled groove in the base metal is created when the travel speed is too fast to allow molten metal to flow into the weld crater created by the arc heat.



Too Slow Travel Speed - A too slow travel speed produces a large weld with lack of penetration and fusion. The energy from the arc dwells on top of the weld pool rather than penetrating the base metal. This produces a wider weld bead with more deposited weld metal per mm than is required resulting in a weld deposit of poor quality.



Correct Travel Speed - The correct travel speed keeps the arc at the leading edge of the weld pool allowing the base metal to melt sufficiently to create good penetration, fusion and wetting out of the weld pool producing a weld deposit of good quality.



Wire types and sizes - Use the correct wire type for the base metal being welded. Use stainless steel wire for stainless steel, aluminium wires for aluminium and steel wires for steel.

Use a smaller diameter wire for thin base metals. For thicker materials use a larger wire diameter and larger machine, check the recommended welding capability of you machine. As a guide refer to the “Welding Wire Thickness Chart” on the following page.

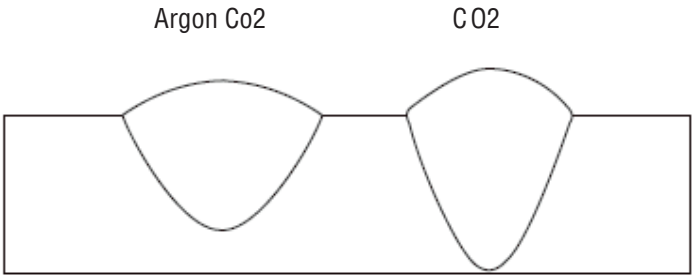
WELDING WIRE DIAMETER CHART					
MATERIALTHICKNESS	**RECOMMENDED WIRE DIAMETERS**				
	0.8	0.9	1.0	1.2	1.6
0.8mm					
0.9mm					
1.0mm					
1.2mm					
1.6mm					
2.0mm					
2.5mm					
3.0mm					
4.0mm					
5.0mm					
6.0mm					
8.0mm					
10mm					
14mm					
18mm					
22mm					

For material thickness of 5.0mm and greater, multi-pass runs or a beveled joint design may be required depending on the amperage capability of your machine.

Gas selection - The purpose of the gas in the MIG process is to protect / shield the wire, the arc and the molten weld metal from the atmosphere. Most metals when heated to a molten state will react with the air in the atmosphere, without the protection of the shielding gas the weld produced would contain defects like porosity, lack of fusion and slag inclusions. Additionally some of the gas becomes ionised (electrically charged) and helps the current flow smoothly.

The correct gas flow is also very important in protecting the welding zone from the atmosphere.

Too low flow will give inadequate coverage and result in weld defects and unstable arc conditions. Too high flow can cause air to be drawn into the gas column and contaminate the weld zone. Use the correct shielding gas. CO2 is good for steel and offers good penetration characteristics, the weld profile is narrower and slightly more raised than the weld profile obtained from Argon Co2 mixed gas. Argon CO2 mix gas offers better weld ability for thin metals and has a wider range of setting tolerance on the machine. Argon 80% CO2 20% is a good all round mix suitable for most applications.

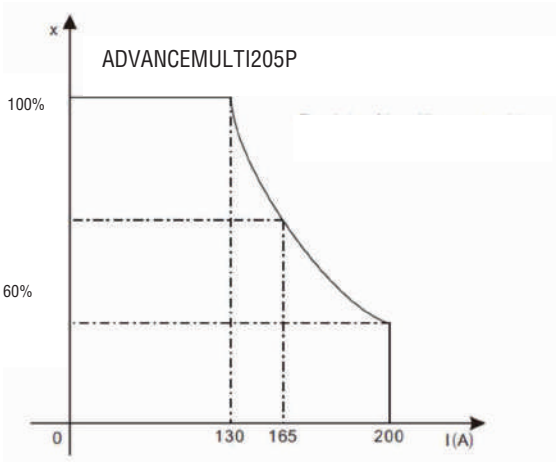


Penetration Pattern for Steel

2.4 Duty cycle and Over-heat

The letter “X” stands for Duty Cycle,=which is defined as the portion of the time a welding machine can weld continuously with its rated output current within a certain time cycle (10 minutes).

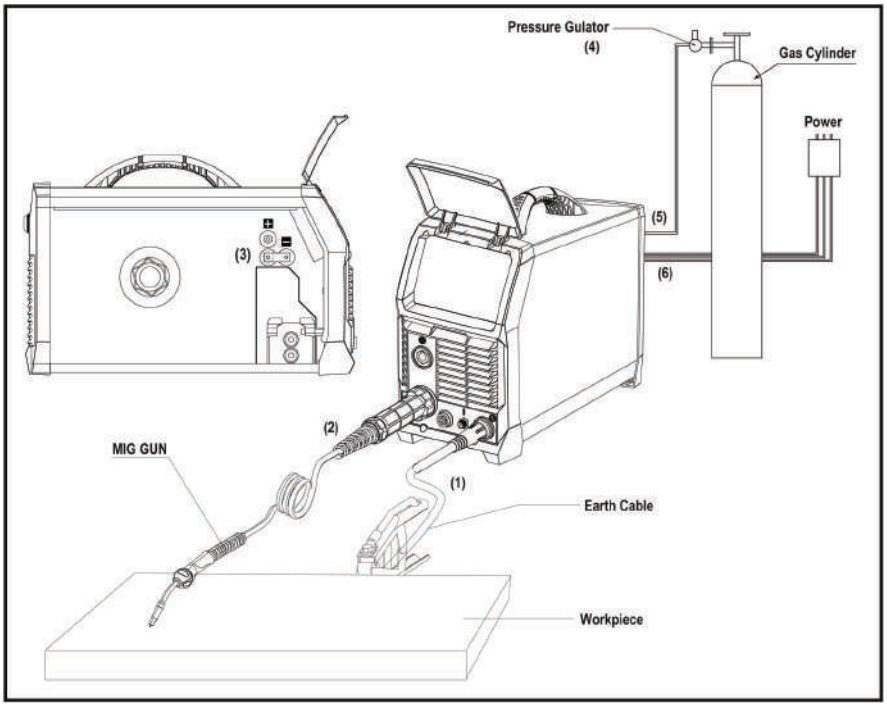
The relation between the duty cycle “X” and the output welding current “I” is shown as the right figure.



If the welding machine is overheating, the IGBT over-heat protection sensing will send a signal to the welding machine control unit to cut the output welding current OFF and light the over-heat pilot lamp on the front panel. In that case, the machine 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.

2.5 Equipment Connection

2.5.1 Set up installation for MIG Welding- Gas shielded wire



(1) Insert the earth cable plug into the negative socket on the front of the machine and tighten it.

(2) Plug the welding torch into the MIG torch connection socket on the front panel and tighten it.

IMPORTANT: When connecting the torch be sure to tighten the connection. A loose connection can result in the connector arcing and damaging the machine and gun connector.

(3) Connect the MIG power connection lead to the positive welding power output socket.

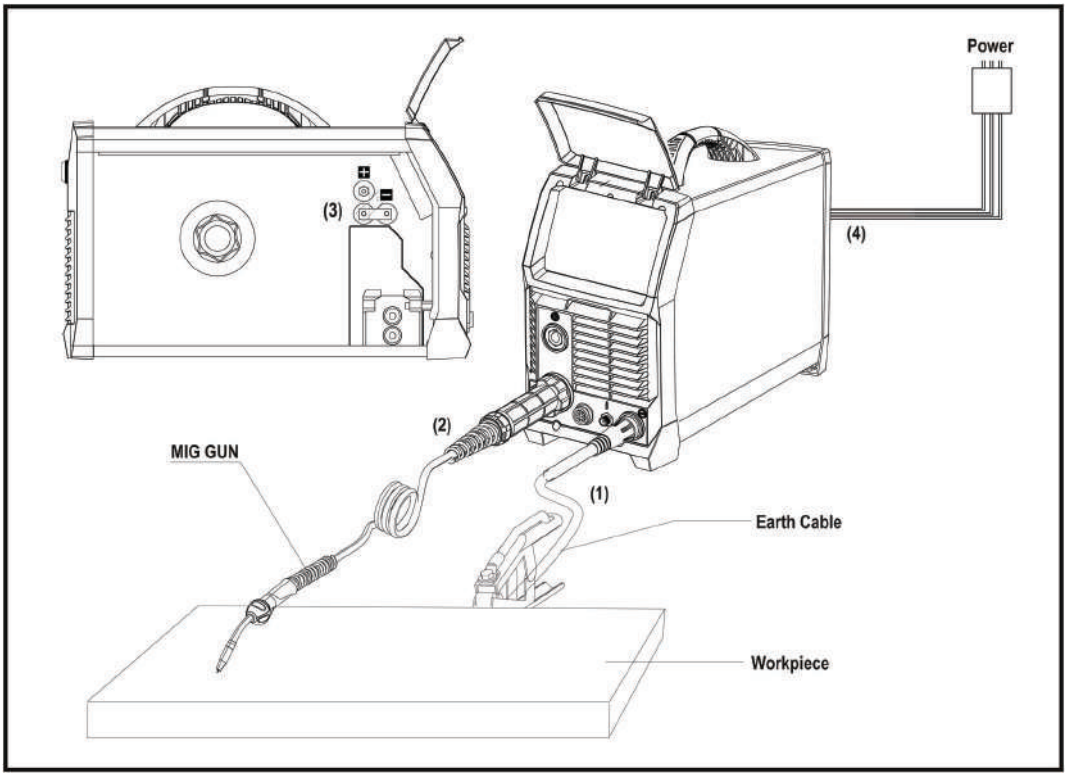
Note if this connection is not made, there will be no electrical connection to the welding torch!

(4) Connect the gas regulator to the Gas= Cylinder and connect the gas line to the Gas Regulator. Check for Leaks!

(5) Connect the gas line to gas connector on= the rear panel. Check for Leaks!

(6) Connect the power cable of welding machine with the output switch in electric box on site.

2.5.2 Set up installation for MIG Welding- Gasless wire



Switch the ON/OFF Switch
(located on the rear panel) to OFF.
(1) Insert the earth cable plug into the positive socket on the front of the machine and tighten it.
(2) Plug the welding torch into the MIG torch connection socket on the front panel and tighten it.
IMPORTANT: When connecting the torch be sure to tighten the connection. A loose connection can result in the connector arcing and damaging the machine and gun connector.

(3) Connect the MIG power connection lead to the negative welding power output socket.
Note if this connection is not made, there will be no electrical connection to the welding torch!
(4)Connect the power cable of welding machine with the output switch in electric box on site.

2.5.3 Operation of MIG Synergic/MIG Pulse welding method

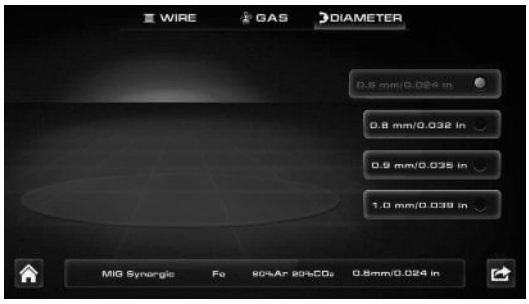
1. Selection of the welding method:

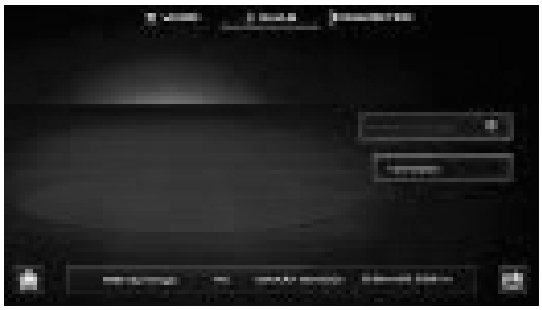
1) In the function selection interface, rotate the knob to select the welding method, shown below:

2. Selection of synergic parameters:

1) In the main interface, press the main knob to enter the synergic parameter selection interface.

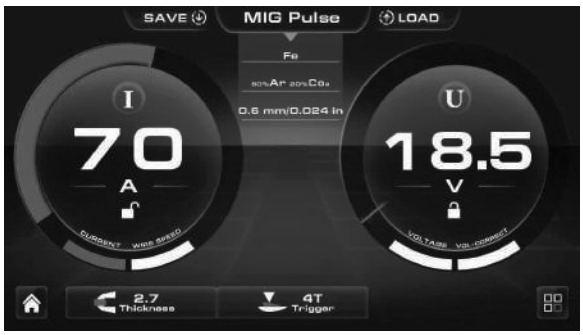
2) In the synergic parameter selection interface, rotate L Knob to select the required synergic parameters and press it for confirmation in the interface shown below:





3. Setting the welding current:

2) In the function selection interface, rotate the the knob to select MIG Pulse welding method, shown below:



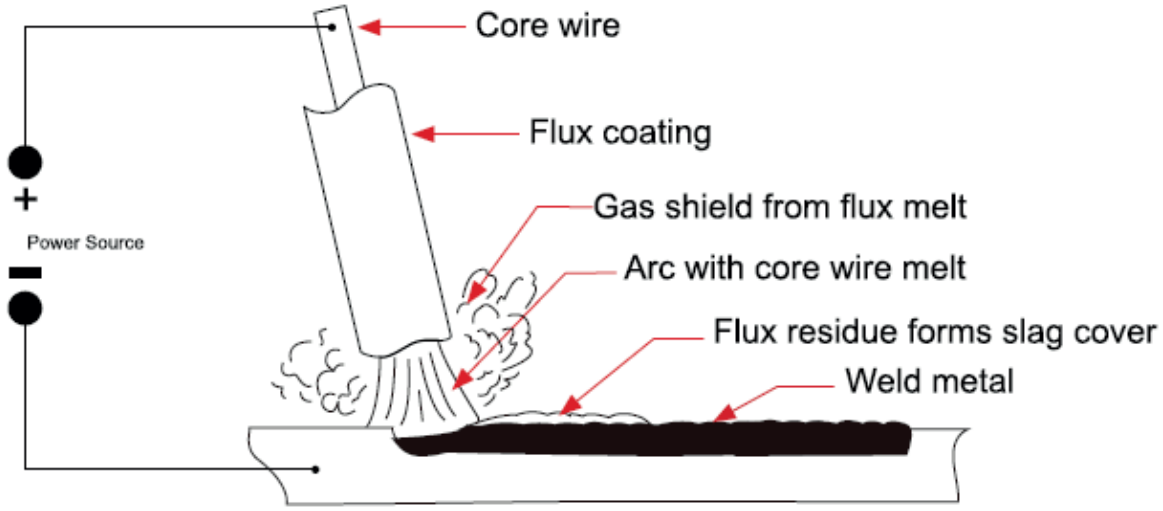
4. Selection and setting of welding parameters:

1) In the welding interface, press the right button to enter the welding parameter setting interface.

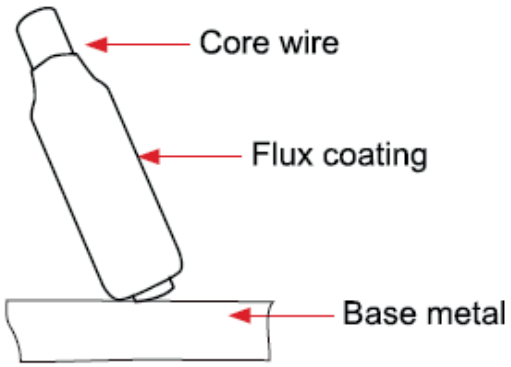
2) In the welding parameter setting interface, press the knob to select the parameter as required and rotate the knob to set a value for the parameter.

Welding parameters available by press the knob	Welding parameters available by rotating the knob
Pre-flow	0.0-20.0(S)
Slow feed	0-10
Start Amp(current) P(percentage)	1-200 （%）
Start Amp(current) AL (arclength)	-10~10 (only for pulse mode)
Up Slope	0.0-20.0(S)
Welding Amp (current)	25-110 (110V)/25-200 （230V）
Down Slope	0.0-20.0(S)
End Amp(current) P(percentage)	1-200 （%）
End Amp(current) AL (arclength)	-10~10 (only for pulse mode)
Burn Back	0-10
Post-flow	0.0-20.0(S)

2.6 Stick (MMA) Welding



One of the most common types of arc welding is manual metal arc welding (MMA) or stick welding. An electric current is used to strike an arc between the base material and a consumable electrode rod or 'stick'. The electrode rod is made of a material that is compatible with the base material being welded and is covered with a flux that gives off gaseous vapours that serve as a shielding gas and providing a layer of slag, both of which protect the weld area from atmospheric contamination.

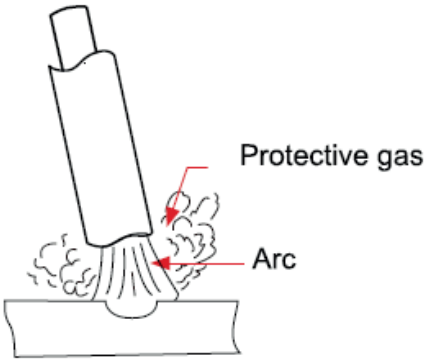


The electrode core itself acts as filler material the residue from the flux that forms slag covering over the weld metal must be chipped away after welding.

- The arc is initiated by momentarily touching the electrode to the base metal.
- The heat of the arc melts the surface of the base metal to form a molten pool at the end of the electrode.
- The melted electrode metal is transferred across the arc into the molten pool and becomes the deposited weld metal.
- The deposit is covered and protected by a slag which comes from the electrode coating.
- The arc and the immediate area are enveloped by an atmosphere of protective gas.

Manual metal arc (stick) electrodes have a solid metal wire core and a flux coating. These electrodes are identified by the wire diameter and by a series of letters and numbers. The letters and numbers identify the metal alloy and the intended use of the electrode.

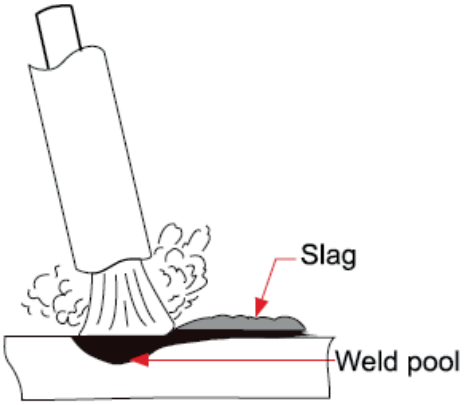
The **Metal Wire Core** works as conductor of the current that maintains the arc. The core wire melts and is deposited into the welding pool.



The covering on a shielded metal arc welding electrode is called **Flux**. The flux on the electrode performs many diferent functions.

These include:

- producing a protective gas around the weld area
- providing fluxing elements and deoxidizer
- creating a protective slag coating over the weld as it cools
- establishing arc characteristics
- adding alloying elements.



Covered electrodes serve many purposes in addition to filler metal to the molten pool. These additional functions are provided mainly by the covering on the electrode.

2.7 Stick (MMA) Welding Fundamentals

Electrode Selection

As a general rule, the selection of an electrode is straight forward,in that it is only a matter of selecting an electrode of similar composition to the parent metal. However, for some metals there is a choice of several electrodes, each of which has particular properties to suit specific classes of work. It is recommend to consult your welding supplier for the correct selection of electrode.

Electrode Size

The size of the electrode generally depends on the thickness of the section being welded, and the thicker the section the larger the electrode required. The table gives the maximum size of electrodes that maybe used for various thicknesses of section base on using a general purpose type 6013 electrode.

AverageThickness of Material	Maximum Recommended Electrode Diameter
1.0-2.0 mm	2.5 mm
2.0-5.0 mm	3.2 mm
5.0-8.0 mm	4.0 mm
> 8.0 mm	5.0 mm

Welding Current (Amperage)

Correct current selection for a particular job is an important factor in arc welding. With the current set too low, difficulty is experienced in striking and maintaining a stable arc. The electrode tends to stick to the work,penetration is poor and beads with a distinct rounded profile will be deposited. Too high current is accompanied by overheating of the electrode resulting undercut and burning through of the base metal and producing excessive spatter.

Electrode Size ø mm	Current Range (Amps)
2.5 mm	60-95
3.2 mm	100-130
4.0 mm	130-165
5.0 mm	165-260

Normal current for a particular job may be considered as the maximum, which can be used without burning through the work, over-heating the electrode or producing a rough spattered surface.The table shows current ranges generally recommended for a general purpose type 6013 electrode.

Arc Length

To strike the arc, the electrode should be gently scraped on the work until the arc is established. There is a simple rule for the proper arc length; it should be the shortest arc that gives a good surface to the weld. An arc too long reduces penetration, produces spatter and gives a rough surface finish to the weld. An excessively short arc will cause sticking of the electrode and result in poor quality welds. General rule of thumb for down hand welding is to have an arc length no greater than the diameter of the core wire.

Electrode Angle

The angle that the electrode makes with the work is important to ensure a smooth, even transfer of metal. When welding in down hand, fillet, horizontal or overhead the angle of the electrode is generally between 5and 15 degrees towards the direction of travel. When vertical up welding the angle of the electrode should be between 80 and 90 degrees to the work piece.

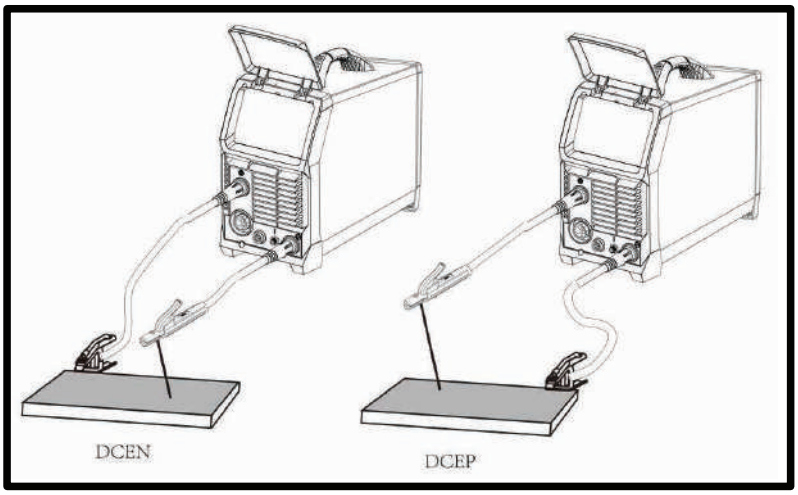
Travel Speed

The electrode should be moved along in the direction of the joint being welded at a speed that will give the size of run required. At the same time, the electrode is fed downwards to keep the correct arc length at all times. Excessive travel speeds lead to poor fusion, lack of penetration etc, while too slow a rate of travel will frequently lead to arc instability,slag inclusions and poor mechanical properties.

Material and Joint Preparation

The material to be welded should be clean and free of any moisture, paint, oil, grease, mill scale, rust or any other material that will hinder the arc and contaminate the weld material. Joint preparation will depend on the method used include sawing, punching, shearing, machining, flame cutting and others. In all cases edges should be clean and free of any contaminates. The type of joint will be determined by the chosen application.

3. Set up installation for MMA Welding



Connection of Output Cables Two sockets are available on this welding machine. For MMA welding the electrode holder is shown be connected to the positive socket, while the earth lead (work piece) is connected to the negative socket, this is known as DCEP. However various electrodes require a different polarity for optimum results and careful attention should be paid to the polarity, refer to the electrode manufacturers information for the correct polarity.

DCEP: Electrode connected to "+" output socket.

DCEN: Electrode connected to "-" output socket.

Switch the ON/OFF Switch (located on the rear panel) to OFF.

(1) connect the earth lead to "-", tighten clockwise.

(2)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.

(3)Connect the electrode lead to "+", tighten clockwise.

(4) Each machine is equipped with a power cable should be based on the input voltage welding power cable connected to the appropriate position, not to pick the wrong voltage.

(5) With the corresponding input power supply terminal or socket good contact and prevent oxidation.

(6) With a multi meter measure the input voltage is within the fluctuation range.

(7) The power ground is well grounded.

4. Operation of MMA welding method

1. Selection of the welding method:

2) In the function selection interface, rotate the knob to select the MMA welding method, shown below:

2. Setting the welding current:

1) In the main interface, press the key to enter the welding interface.

In the welding interface, rotate the knob to select the welding current shown below:

Explain: the welding parameters ,such as hot start /arcforce/ duty and frequency, have been set in the factory. You can go to the third step to adjust.

3. Selection and setting of welding parameters:

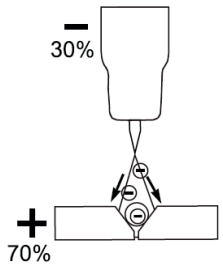
1) In the welding interface, press the right button to enter the welding parameter setting interface.

2) In the welding parameter setting interface, press the knob to select the parameter as required and rotate the knob to set a value for the parameter.

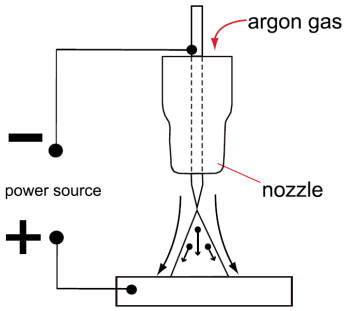
Welding parameters available by press the knob	Welding parameters available by rotating the knob
Hot start	0-100(%)
Hot start time	0.5-5.0(S)
Arc force （MMA ）	0-100
Duty	5-95 (%)
Frequency	0.5-400(Hz)
Peak Amp	10-110/10-200(A)
Base Amp	10-110/10-200(A)

4.1 DC TIG Welding

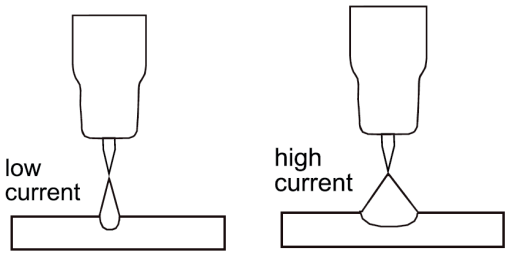
The DC power source uses what is known as DC (direct current) in which the main electrical component known as electrons flowing only one direction from the negative pole (terminal) to the positive pole (terminal). In the DC electrical circuit there is an electrical principle at work which should always be taken into account when using any DC circuit. With a DC circuit 70% of the energy (heat) is always on the positive side. This needs to be understood because it determines what terminal the TIG torch will be connected to (this rule applies to all the other forms of DC welding as well).



DC TIG welding is a process in which an arc is struck between a TUNGSTEN electrode and the metal work piece. The weld area is shielded by an inert gas flow to prevent contamination of the tungsten, molten pool and weld area. When the TIG arc is struck the inert gas is ionized and superheated changing it's molecular structure which converts



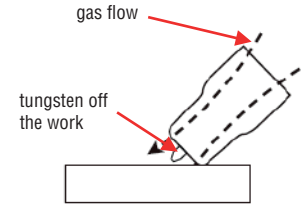
it into a plasma stream. This plasma stream flowing between the tungsten and the work piece is the TIG arc and can be as hot as 19,000°C. It is a very pure and concentrated arc which provides the controlled melting of most metals into a weld pool. TIG welding offers the user the greatest amount of flexibility to weld the widest range of material and thickness and types. DC TIG welding is also the cleanest weld with no



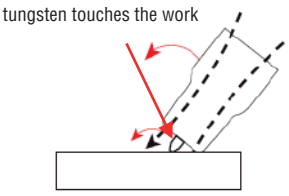
The intensity of the arc is proportional to the current that flows from the tungsten. The welder regulates the welding current to adjust the power of the arc. Typically thin material requires a less powerful arc with less heat to melt the material so less current (amps) is required, thicker material requires a more powerful arc with more heat so more current (amps) are necessary to melt the material.

LIFT ARC IGNITION for TIG (tungsten inert gas) Welding

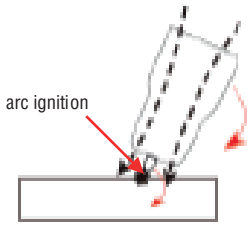
Lift Arc is a form of arc ignition where the machines has low voltage on the electrode to only a few volts, with a current limit of one or two amps (well below the limit that causes metal to transfer and contamination of the weld or electrode). When the machine detects that the tungsten has left the surface and a spark is present, it immediately (within microseconds) increases power, converting the spark to a full arc. It is a simple, safe lower cost alternative arc ignition process to HF (high frequency) and a superior arc start process to scratch start.



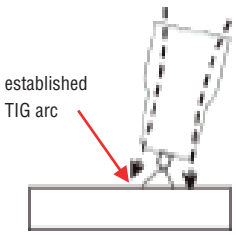
Lay the nozzle on the job without the tungsten touching the work.



Rock the torch sideways so that the tungsten touches the work & hold



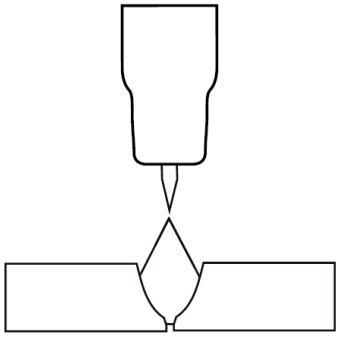
Rock the torch back in the opposite direction, the arc will ignite as the tungsten lifts off the work.



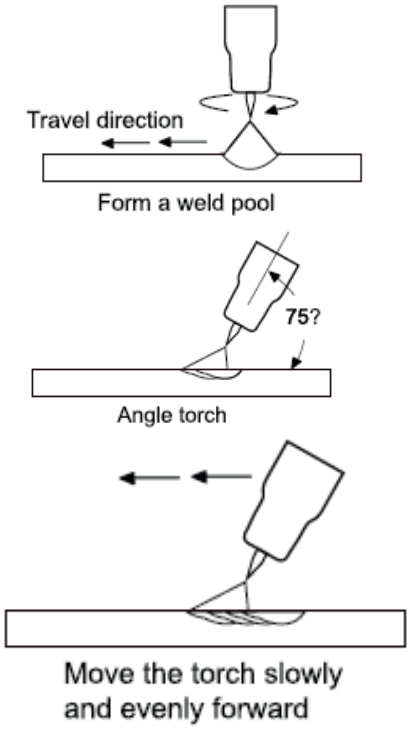
Lift the torch to maintain the arc.

4.2 TIG Welding Fusion Technique

Manual TIG welding is often considered the most difficult of all the welding processes. Because the welder must maintain a short arc length, great care and skill are required to prevent contact between the electrode and the work piece. Similar to Oxygen Acetylene torch welding, Tig welding normally requires two hands and in most instances requires the welder to manually feed a filler wire into the weld pool with one hand while manipulating the welding torch in the other. However, some welds combining thin materials can be accomplished without filler metal like edge, corner, and butt joints.



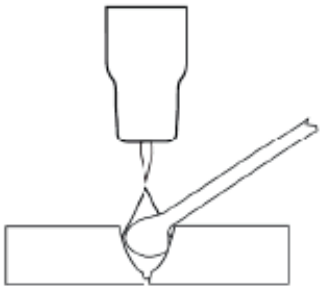
This is known as Fusion welding where the edges of the metal pieces are melted together using only the heat and arc force generated by the TIG arc. Once the arc is started the torch tungsten is held in place until a weld pool is created, a circular movement of the tungsten will assist is creating a weld pool of the desired size. Once the weld pool is established tilt the torch at about a 75° angle and move smoothly and evenly along the joint while fusing the materials together.

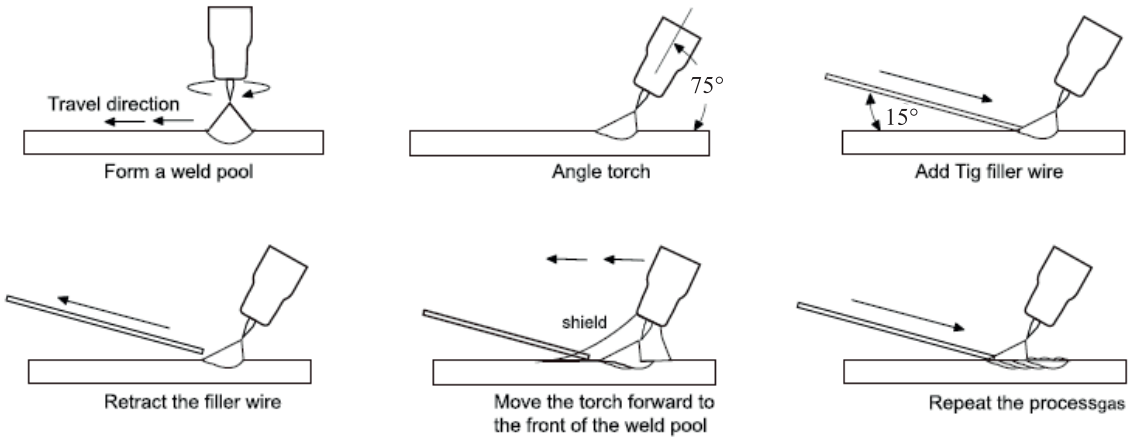


TIG Welding with Filler Wire Technique It is necessary in many situations with TIG welding to add a filler wire into the weld pool to build up weld reinforcement and create a strong weld.

Once the arc is started the torch tungsten is held in place until a weld pool is created, a circular movement of the tungsten will assist is creating a weld pool of the desired size. Once the weld pool is established tilt the torch at about a 75° angle and move smoothly and evenly along the joint.

The filler metal is introduced to the leading edge of the weld pool. The filler wire is usually held at about a 15° angle and fed into the leading edge of the molten pool, the arc will melt the filler wire into the weld pool as the torch is moved forward. Also a dabbing technique can be used to control the amount of filler wire added, the wire is fed into the molten pool and retracted in a repeating sequence as the torch is moved slowly and evenly forward. It is important during the welding to keep the molten end of the filler wire inside the gas shield as this protects the end of the wire from being oxidised and contaminating the weld pool.





4.3 Tungsten Electrodes

Tungsten is a rare metallic element used for manufacturing TIG welding electrodes. The TIG process relies on tungsten's hardness and high-temperature resistance to carry the welding current to the arc. Tungsten has the highest melting point of any metal, 3,410 degrees Celsius. Tungsten electrodes are non-consumable and come in a variety of sizes, they are made from pure tungsten or an alloy of tungsten and other rare earth elements. Choosing the correct tungsten depends on the material being welded, amps required and whether you are using AC or DC welding current.

Tungsten electrodes are colour-coded at the end for easy identification. Below are the most commonly used tungsten electrodes found in the New Zealand and Australian market.

Thoriated (Colour Code: Red)

Thoriated tungsten electrodes (AWS classification EWTh-2) contain a minimum of 97.30 percent tungsten and 1.70 to 2.20percent thorium and are called 2 percent thoriated. They are the most commonly used electrodes today and are preferred for their longevity and ease of use.

Thoriated tungsten should not get in contact with open cuts or wounds. The more significant danger to welders can occur when thorium oxide gets into the lungs. This can happen from the exposure to vapours during welding or from ingestion of material/dust in the grinding of the tungsten. Follow the manufacturer's warnings, instructions, and the Material Safety Data Sheet (MSDS) for its use.

E3 (Color Code: Purple)

E3 tungsten electrodes (AWS classification EWG) contain a minimum of 98% percent tungsten and up to 1.5 percent Lanthanum and small percentages of Zirconium and Yttrium they are called E3 Tungsten. E3 Tungsten Electrodes provide conductivity similar to that of thoriated electrodes. Typically, this means that E3 Tungsten Electrodes are exchangeable with thoriated electrodes without requiring significant welding process changes.

E3 deliver superior arc starting, electrode lifetime, and overall cost-effectivenes. When E3 Tungsten Electrodes are compared with 2% thoriated tungsten, E3 requires fewer re-grinds and provides a longer overall lifetime. Tests have shown that ignition delay with E3 Tungsten Electrodes actually improves over time, while 2% thoriated tungsten starts to deteriorate after only 25 starts. At equivalent energy output, E3 Tungsten Electrodes run cooler than 2% thoriated tungsten, thereby extending overall tip lifetime. E3 Tungsten Electrodes work well on AC or DC. They can be used DC electrode positive or negative with a pointed end, or balled for use with AC power sources.

ADVANCEMULTI205P

Ceriated (Color Code: Orange)

Ceriated tungsten electrodes (AWS classification EWCe-2) contain a minimum of 97.30 percent tungsten and 1.80 to 2.20percent cerium and are referred to as 2 percent ceriated. Ceriated tungstens perform best in DC welding at low current settings.

They have excellent arc starts at low amperages and become popular in such applications as orbital tube welding, thin sheet metal work. They are best used to weld carbon steel, stainless steel, nickel alloys, and titanium, and in some cases it can replace 2 percent thoriated electrodes. Ceriated tungsten is best suited for lower amperages it should last longer than Thoriated tungsten higher amperage applications are best left to Thoriated or Lanthanated tungsten.

Lanthanated (Color Code: Gold)

Lanthanated tungsten electrodes (AWS classification EWLa-1.5) contain a minimum of 97.80 percent tungsten and 1.30percent to 1.70 percent lanthanum, and are known as 1.5 percent lanthanated. These electrodes have excellent arc starting, a low burn off rate, good arc stability, and excellent re-ignition characteristics. Lanthanated tungstens also share the conductivity characteristics of 2 percent thoriated tungsten. Lanthanated tungsten electrodes are ideal if you want to your welding capabilities. They work well on AC or DC electrode negative with a pointed end, or they can be balled for use with AC sine wave power sources. Lanthanated tungsten maintains a sharpened point well, which is an advantage for welding steel and stainless steel on DC or AC from square wave power sources.

Zirconiated (Color Code: White)

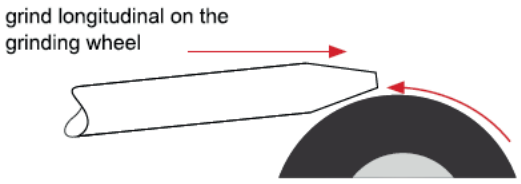
Zirconiated tungsten electrodes (AWS classification EWZr-1) contain a minimum of 99.10 percent tungsten and 0.15 to 0.40percent zirconium. Most commonly used for AC welding Zirconiated tungsten produces a very stable arc and is resistant to tungsten spitting. It is ideal for AC welding because it retains a balled tip and has a high resistance to contamination. Its current-carrying capacity is equal to or greater than that of thoriated tungsten. Zirconiated tungsten is not recommended for DC welding.

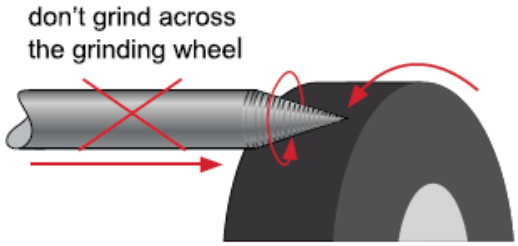
Tungsten Electrodes Rating for Welding Currents

Tungsten Diameter mm	DC Current Amps Torch Negative 2% Thoriated	AC Current Amps Un-Balanced Wave 0.8% Zirconiated	AC Current Amps Balanced Wave 0.8% Zirconiated
1.0mm	15-80	15-80	20-60
1.6mm	70-150	70-150	60-120
2.4mm	150-250	140-235	100-180
3.2mm	250-400	225-325	160-250
4.0mm	400-500	300-400	200-320

4.4 Tungsten Preparation

Always use **DIAMOND** wheels when grinding and cutting. While tungsten is a very hard material, the surface of a diamond wheel is harder, and this makes for smooth grinding. Grinding without diamond wheels, such as aluminium oxide wheels, can lead to jagged edges, imperfections, or poor surface finishes not visible to the eye that will contribute to weld inconsistency and weld defects. Always ensure to grind the tungsten in a longitudinal direction on the grinding wheel. Tungsten electrodes are manufactured with the molecular structure of the grain running lengthwise and thus grinding crosswise is “grinding against the grain.”

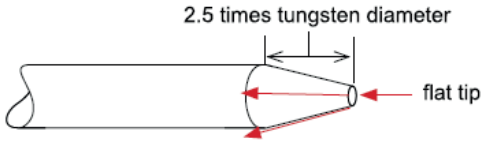




If electrodes are ground crosswise, the electrons have to jump across the grinding marks and the arc can start before the tip and wander. Grinding longitudinally with the grain, the electrons flow steadily and easily to the end of the tungsten tip. The arc starts straight and remains narrow, concentrated, and stable.

Electrode Tip/Flat

The shape of the tungsten electrode tip is an important process variable in precision arc welding. A good selection of tip/flat size will balance the need for several advantages. The bigger the flat, the more likely arc wander will occur and the more difficult it will be to arc start. However, increasing the flat to the maximum level that still allows arc start and eliminates arc wonder will improve the weld penetration and increase the electrode life. Some welders still grind electrodes to a sharp point, which makes arc starting easier. However, they risk decreased welding performance from melting at the tip and the possibility of the point falling off into the weld pool.



Electrode Included Angle/Taper - DC Welding

Tungsten electrodes for DC welding should be ground longitudinally and concentrically with diamond wheels to a specific included angle in conjunction with the tip/flat preparation. Different angles produce different arc shapes and offer different weld penetration capabilities. In general, blunter electrodes that have a larger included angle provide the following benefits：

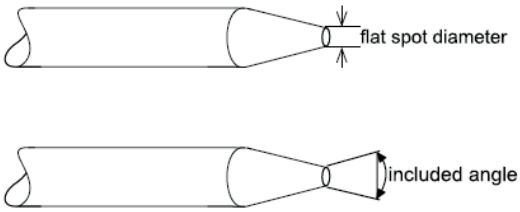
- Last Longer
- Have better weld penetration
- Have a narrower arc shape
- Can handle more amperage without eroding.

Sharper electrodes with smaller included angle

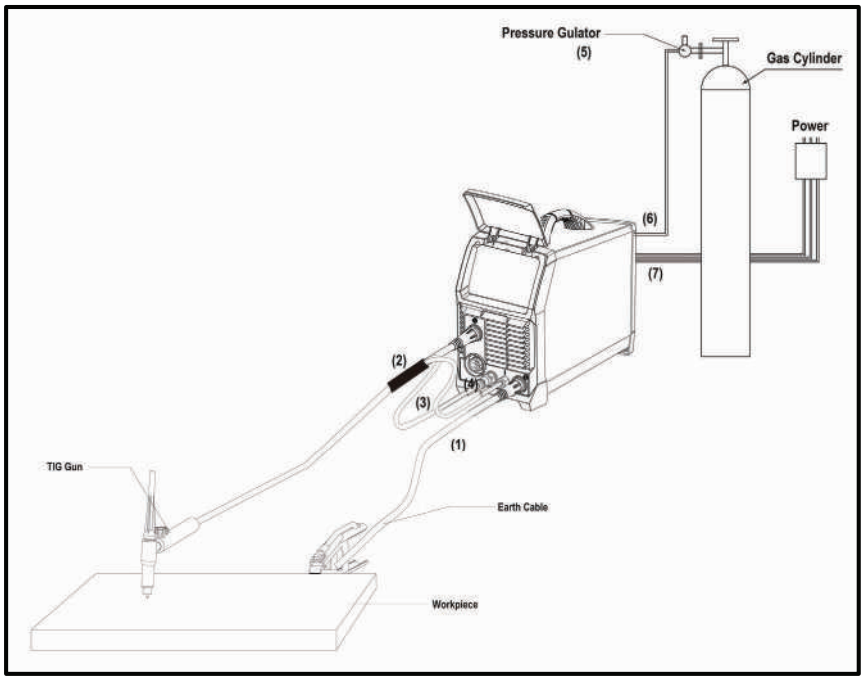
provide:

- Offer less arc weld
- Have a wider arc
- Have a more consistent arc

The included angle determines weld bead shape and size. Generally, as the included angle increases, penetration increases and bead width decreases.



Tungsten Diameter	Diameter at the Tip - mm	Constant Included Angle - Degrees	Current Range Amps	Current Range Pulsed Amps
1.0mm	.250	20	05 - 30	05 - 60
1.6mm	.500	25	08 - 50	05 - 100
1.6mm	.800	30	10 - 70	10 - 140
2.4mm	.800	35	12 - 90	12 - 180
2.4mm	1.100	45	15 - 150	15 - 250
3.2mm	1.100	60	20 - 200	20 - 300
3.2mm	1.500	90	25 - 250	25 - 350



Switch the ON/OFF Switch (located on the rear panel) to OFF.

(1) Connect the earth lead to "+", tighten clockwise; 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) Connect the TIG torch cable to "-", tighten clockwise.

(3) Connect TIG torch remote plug to remote socket, ensuring all connections are tight

(4) Connect TIG torch gas connection to the TIG gas outlet, ensuring all connections are tight. Set the remote switch to 'on' /'off ' position as required.

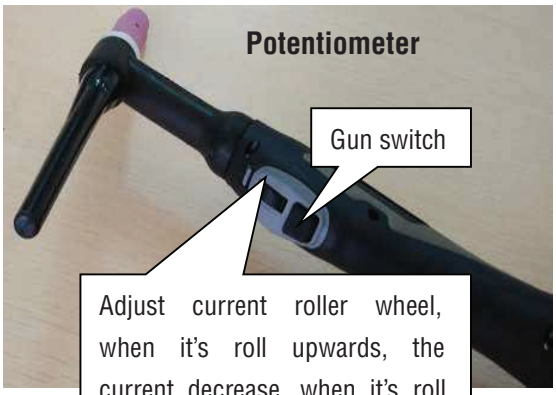
(5) Connect the gas regulator to the Gas Cylinder and connect the gas line to the Gas Regulator.

(6) Connect the gas line to the machine inlet gas connector via the quick push lock connector located on the rear panel. **Check for Leaks**

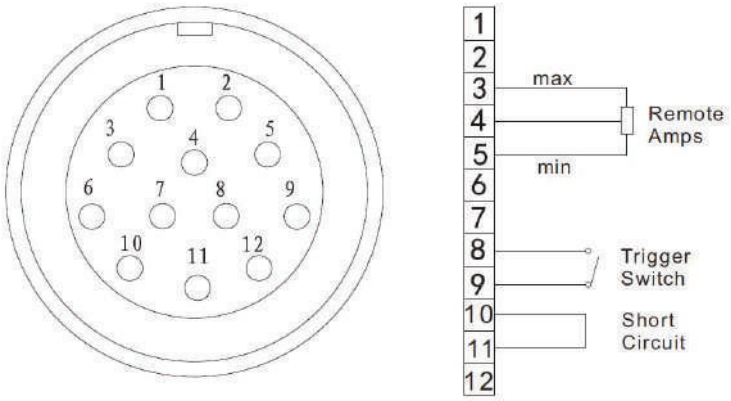
(7) Connect the power cable of welding machine with the output switch in electric box on site.

4.5 Remote current control

TIG series of welding machines 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 10A minimum to the maximum set using the machine current control . This is very useful for precision work.



12 Pin Remote Plug Connection



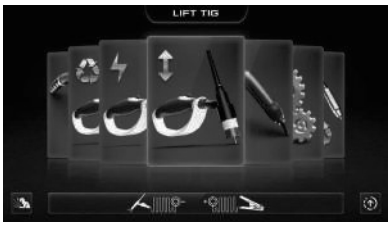
Potentiometer

Socket Pin	Function
	Potentiometer
1	Not connected
2	Not connected
3	10k ohm (maximum) connection to 10k ohm remote control potentiometer
4	Wiper arm connection to 10k ohm remote control potentiometer
5	Zero ohm (minimum) connection to 10k ohm remote control potentiometer
6	Not connected
7	Not connected
8	Trigger Switch Input
9	Trigger Switch Input
10	Be shorted with 11
11	Be shorted with 10
12	Not connected

4.6 Operation of LIFT TIG/HF TIG/Smart TIG welding method

1. Selection of the welding method:

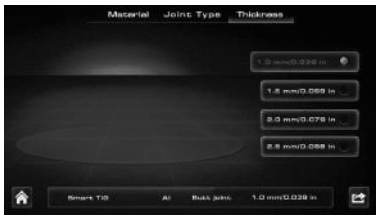
2) In the function selection interface, rotate the knob to select the welding method, shown below:



2. Selection of synergic parameters (only for smart TIG, LIFT TIG and HF TIG go to the step 3):

1) In the main interface, press the main knob to enter the synergic parameter selection interface.

2) In the synergic parameter selection interface, rotate L Knob to select the required synergic parameters and press it for confirmation in the interface shown below:



3. Setting the welding current:

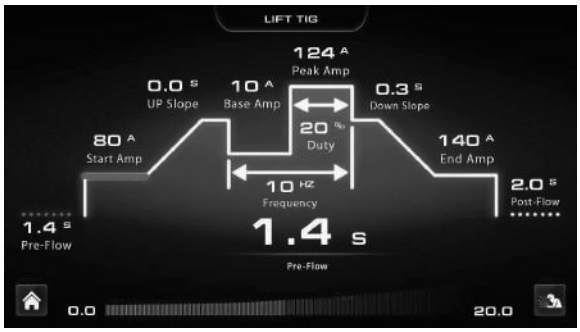
1) In the main interface, press the key to enter the welding interface.

2) In the welding interface, rotate the knob to select the welding current and then start to welding, the interface shown below:

4. Selection and setting of welding parameters:

1) In the welding interface, press the right button to enter the welding parameter setting interface.

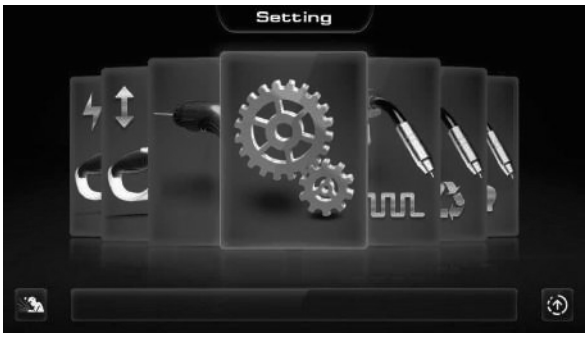
2) In the welding parameter setting interface, press the knob to select the parameter as required and rotate the knob to set a value for the parameter.



Welding parameters available by press the knob	Welding parameters available by rotating the knob
Pre-flow	0.0-20.0(S)
Start Amp(current)	10-200(A)
Up Slope	0.0-20.0(S)
Down Slope	0.0-20.0(S)
End Amp(current)	10-200(A)
Post-flow	0.0-20.0(S)
Duty	5-95(%)
Frequency	0.5-999(Hz)
Balance	-5~+5
AC Frequency	50-250(Hz)

4.7 Operation of Setting

1. In the function selection interface, rotate the knob to select the setting, then press to enter the setting interface, shown below:



2. In the setting interface, press the knob to select the parameter as required and rotate the knob to set a value for the parameter. press left button to back function interface, press to right button to switch between general and machine.

Welding parameters available by press the knob		Welding parameters available by rotating the knob
Machine	Languages	English/ 中文/Deutsch/Polski and so on
	Brightness	1-10
	Beeper	ON/OFF
	Unit	Metric/Inch
General	VRD	ON/OFF
	FAN	Normal/Smart
	Reset	YES/NO
	Run Time	Welding time/Up Time

4.8 Operation of SAVE/LOAD

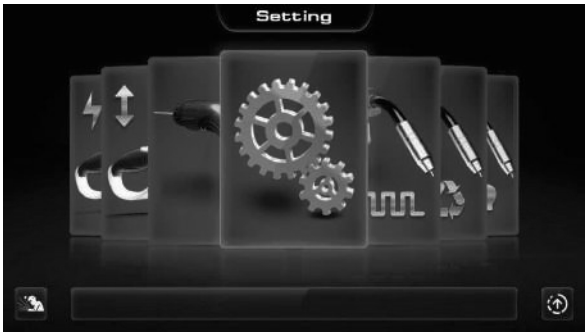
SAVE

1.In the welding interface, long press the left button to enter the SAVE interface, shown below:

In the SAVE interface, press the left button to back, rotate the knob to select the unstored parameter group, press the right button to save the parameters.

LOAD

1. In the function selection interface, press the right button to enter the LOAD interface, shown below:



In the LOAD interface, press the left button to back, rotate the knob to select and view the stored parameter group, press the right button to enter the welding interface,

2. In the welding interface, long press the right button to enter the LOAD interface, shown below:

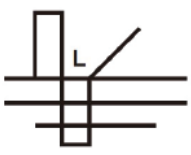
In the LOAD interface, press the left button to back, rotate the knob to select and view the stored parameter group, press the right button to enter the welding interface,

4.9 Welding parameters

Process reference for CO2 butt welding of low carbon steel solid welding wire

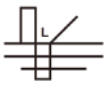
	Material thickness (MM)	Root gap G (MM)	Wire diameter (MM)	Welding current (A)	Welding voltage (V)	Welding speed (CM/MIN)	Gas-flow rate (L/MIN)
Butt-joint 	0.8	0	0.8	60-70	16-16.5	50-60	10
	1.0	0	0.8	75-85	17-17.5	50-60	10-15
	1.2	0	0.8	80-90	17-18	50-60	10-15
	2.0	0-0.5	1.0/1.2	110-120	19-19.5	45-50	10-15
	3.2	0-1.5	1.2	130-150	20-23	30-40	10-20
	4.5	0-1.5	1.2	150-180	21-23	30-35	10-20
	6	0	1.2	270-300	27-30	60-70	10-20
	6	1.2-1.5	1.2	230-260	24-26	40-50	15-20
	8	0-1.2	1.2	300-350	30-35	30-40	15-20
	8	0-0.8	1.6	380-420	37-38	40-50	15-20
	12	0-1.2	1.6	420-480	38-41	50-60	15-20

Process reference for CO2 corner welding of low carbon steel solid welding wire

	Material thickness (MM)	Wire diameter (MM)	Welding current (A)	Welding voltage (V)	Welding speed (CM/MIN)	Gas-flow rate (L/MIN)
Corner joint 	1.0	0.8	70-80	17-18	50-60	10-15
	1.2	1.0	85-90	18-19	50-60	10-15
	1.6	1.0/1.2	100-110	18-19.5	50-60	10-15
	1.6	1.2	120-130	19-20	40-50	10-20
	2.0	1.0/1.2	115-125	19.5-20	50-60	10-15
	3.2	1.0/1.2	150-170	21-22	45-50	15-20
	3.2	1.2	200-250	24-26	45-60	10-20

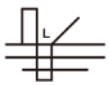
	4.5	1.0/1.2	180-200	23-24	40-45	15-20
	4.5	1.2	200-250	24-26	40-50	15-20
	6	1.2	220-250	25-27	35-45	15-20
	6	1.2	270-300	28-31	60-70	15-20
	8	1.2	270-300	28-31	60-70	15-20
	8	1.2	260-300	26-32	25-35	15-20
	8	1.6	300-330	25-26	30-35	15-20
	12	1.2	260-300	26-32	25-35	15-20
	12	1.6	300-330	25-26	30-35	15-20
	16	1.6	340-350	27-28	35-40	15-20
	19	1.6	360-370	27-28	30-35	15-20

Low carbon steel, stainless steel pulse MAG welding process reference

Welding position	Material thickness (MM)	Wire diameter (MM)	Welding current (A)	Welding voltage (V)	Welding speed (CM/MIN)	Nozzle and workpiece spacing (MM)	Gas-flow rate (L/MIN)
Butt-join  t	1.6	1.0	80-100	19-21	40-50	12-15	10-15
	2.0	1.0	90-100	19-21	40-50	13-16	13-15
	3.2	1.2	150-170	22-25	40-50	14-17	15-17
	4.5	1.2	150-180	24-26	30-40	14-17	15-17
	6.0	1.2	270-300	28-31	60-70	17-22	18-22
	8.0	1.6	300-350	39-34	35-45	20-24	18-22
	10.0	1.6	330-380	30-36	35-45	20-24	18-22
Corner  joint	1.6	1.0	90-130	21-25	40-50	13-16	10-15
	2.0	1.0	100-150	22-26	35-45	13-16	13-15
	3.2	1.2	160-200	23-26	40-50	13-17	13-15
	4.5	1.2	200-240	24-28	45-55	15-20	15-17

	6.0	1.2	270-300	28-31	60-70	18-22	18-22
	8.0	1.6	280-320	27-31	45-60	18-22	18-22
	10.0	1.6	330-380	30-36	40-55	20-24	18-22

Welding process of aluminium alloy pulse MIG

Welding position	Material thickness (MM)	Wire diameter (MM)	Welding current (A)	Welding voltage (V)	Welding speed (CM/MIN)	Nozzle and workpiece spacing (MM)	Gas-flow rate (L/MIN)
 Butt-joint	1.5	1.0	60-80	16-18	60-80	12-15	15-20
	2.0	1.0	70-80	17-18	40-50	15	15-20
	3.0	1.2	80-100	17-20	40-50	14-17	15-20
	4.0	1.2	90-120	18-21	40-50	14-17	15-20
	6.0	1.2	150-180	20-23	40-50	17-22	18-22
	4.0	1.2	160-210	22-25	60-90	15-20	19-20
	4.0	1.6	170-200	20-21	60-90	15-20	19-20
	6.0	1.2	200-230	24-27	40-50	17-22	20-24
	6.0	1.6	200-240	21-23	40-50	17-22	20-24
	8.0	1.6	240-270	24-27	45-55	17-22	20-24
	12.0	1.6	270-330	27-35	55-60	17-22	20-24
	16.0	1.6	330-400	27-35	55-60	17-22	20-24
Corner  joint	1.5	1.0	60-80	16-18	60-80	13-16	15-20
	2.0	1.0	100-150	22-26	35-45	13-16	15-20
	3.0	1.2	100-120	19-21	40-60	13-17	15-20
	4.0	1.2	120-150	20-22	50-70	15-20	15-20
	6.0	1.2	150-180	20-23	50-70	18-22	18-22
	4.0	1.2	180-210	21-24	35-50	18-22	16-18

	4.0	1.6	180-210	18-20	35-45	18-22	18-22
	6.0	1.2	220-250	24-25	50-60	18-22	16-24
	6.0	1.6	220-240	20-24	37-50	18-22	16-24
	8.0	1.6	250-300	25-26	60-65	18-22	16-24
	12.0	1.6	300-400	26-28	65-75	18-22	16-24

4.10 Operation environment

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

4.11 Operation Notices

- Read Section 1 carefully before starting to use this equipment.
- Connect the ground wire with the machine directly.
- Ensure that the input is single-phase: 50/60Hz, 110V/220V ±10%.
- Before operation, none concerned people should not be around the working area and especially children. Do not watch the arc in unprotected eyes.
- Ensure good ventilation of the machine to improve Duty Cycle.
- Turn off the engine when the operation finished for energy consumption efficiency.
- When power switch shuts off protectively because of failure. Don't restart it until problem is resolved. Otherwise, the range of problem will be extended.
- In case of problems, contact your local dealer if no authorized maintenance staff is available!

Care & Maintenance

Keep your Welding Machine in Top Condition

The ADVANCEMULTI205P 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 consumable parts 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.
- A damaged 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. An authorised service centre should properly repair a damaged part. Have your welder repaired by an expert.

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.

Electrodes

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.

5.2 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:

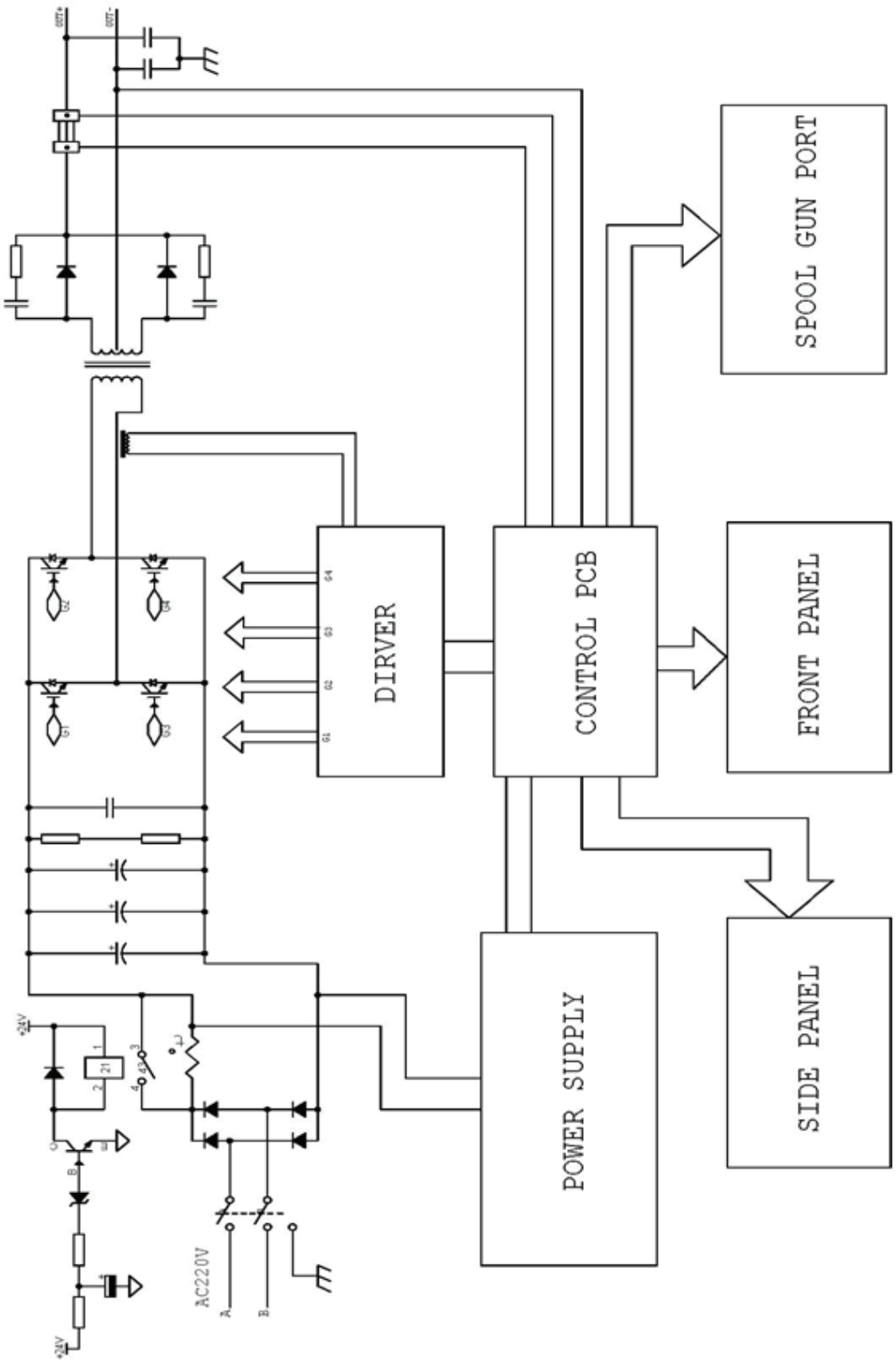
NO.	Troubles		Reasons	Solution
1	Close the breaker, but the power light isn't on		Breaker damaged	Change it
			Fuse damaged	Change it
			Input power damaged	Change it
2	After welding machine is over-heat, the fan doesn't work		Fan damaged	Change it
			The cable is loose	Screw the cable tight
3	Press the gun switch, no output shielded gas	No output gas when test gas	No gas in the gas cylinder	Change it
			Gas hose leaks gas	Change it
			Electromagnetic valve damaged	Change it
		Output gas when test gas	Control switch damaged	Repair the switch
			Control circuit damaged	Check the PCB
4	Wire-feed er doesn't work	Wire reel doesn't work	Motor damaged	Check and change it
			Control circuit damaged	Check the PCB
		Wire reel works	The press wheel is loosened 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

5	No striking arc and no output voltage	Output cable is connected incorrectly or loosen	Screw it down or change it
		Control circuit damaged	Check the circuit
6	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
7	Welding current is run away and can be not controlled	The potentiometer damaged	Check or change it
		The control circuit damaged	Check the circuit
8	The crater current can be not adjusted	The PCB damaged	Check it
9	No post-gas	The PCB damaged	Check it

5.3 List of error code

Error Type	Error code	Description	Lamp status
Thermal relay	E01	Over-heating (1st thermal relay)	Yellow lamp (thermal protection) always on
	E02	Over-heating (2nd thermal relay)	Yellow lamp (thermal protection) always on
	E03	Over-heating (3rd thermal relay)	Yellow lamp (thermal protection) always on
	E04	Over-heating (4th thermal relay)	Yellow lamp (thermal protection) always on
	E09	Over-heating (Program in default)	Yellow lamp (thermal protection) always on
Welding machine	E10	Phase loss	Yellow lamp (thermal protection) always on
	E11	No water	Yellow lamp (lack water) always on
	E12	No gas	Red lamp always on
	E13	Under voltage	Yellow lamp (thermal protection) always on

	E14	Over voltage	Yellow lamp (thermal protection) always on
	E15	Over current	Yellow lamp (thermal protection) always on
	E16	Wire feeder overload	
Switch	E20	Button fault on operating panel when switch on the machine	Yellow lamp (thermal protection) always on
	E21	Other faults on operating panel when switch on the machine	Yellow lamp (thermal protection) always on
	E22	Torch fault when switch on the machine	Yellow lamp (thermal protection) always on
	E23	Torch fault during normal working process	Yellow lamp (thermal protection) always on
Accessory	E30	Cutting torch disconnection	Red lamp blink
	E31	Water cooler disconnection	Yellow lamp (lack water) always on
Communication	E40	Connection problem between wire feeder and power source	
	E41	Communication error	


SPOOL GUN PORT
FRONT PANEL
SIDE PANEL
CONTROL PCB
DIRVER
POWER SUPPLY
AC220V

ADVANCEMULTI205P

Available Parts & Accessories

These accessories listed are available from your Strata Supplier. Refer to the Strata Catalogue, your Strata Supplier or look online at www.strata.co.nz for other accessories and consumables available.

ADVANCEMULTI205P:

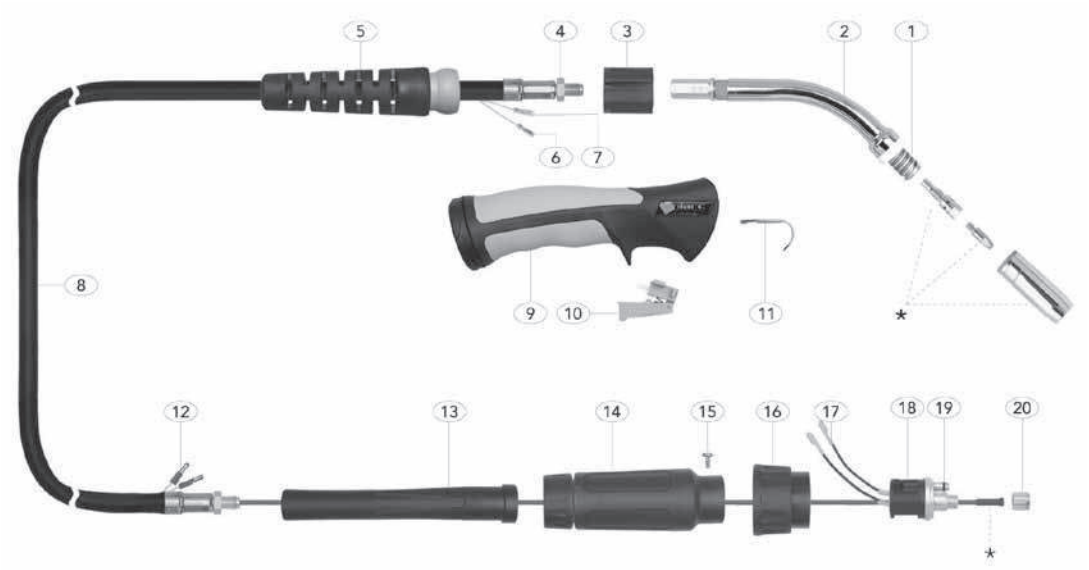
7371	Pro-Grip 26 Torch x 25Ft, Tgc End (Large Dinse) M12, 10K Pot and 12 Pin Hizone Plug	TT24-150	Thoriated Tungsten Electrode 2.4mm (3pk)
		TT32-150	Thoriated Tungsten Electrode 3.2mm (3pk)
31088	Strata TIG Foot Control	TZ16-150	Zirconiated Tungsten Electrode 1.6mm (3pk)
AAL3550	Arc Lead 16mm2 cable, 35-70mm Plug, 4m	TZ24-150	Zirconiated Tungsten Electrode 2.4mm (3pk)
AEL3550	Earth Lead 16mm2 cable, 35-70mm Plug, 3m	TZ32-150	Zirconiated Tungsten Electrode 3.2mm (3pk)
17403	Strata Water Cooling Unit 230V	ACDCKIT	ACDC Tig Starter Kit - WP17, WP18, WP26
ALS3550	MMA Lead Set 300A 3+3m 1/2" Dinse Connectors	TR16MS-70S-6	Mild Steel Tig Rod 1.6mm/ 1kg
S400EH	400A Screw Type Elect.Holder	TR24MS-70S-6	Mild Steel Tig Rod 2.4mm/ 1kg
S500EC	Strata 500A Earth Clamp	TR32MS-70S-6	Mild Steel Tig Rod 3.2mm/ 1kg
CP3550	Cable Plug - 35-50mmÂ³ - Male	TR16SS-316	Stainless Steel Tig Rod 1.6mm
SV3000	Elite 4 Sensor Welding Helmet	TR24SS-316	Stainless Steel Tig Rod 2.4mm
SV4000	Auto Darkening Helmet, Shade level 4-13, One-touch external GRIND mode selection.	TR32SS-316	Stainless Steel Tig Rod 3.2mm
		TR16AL-5356	Aluminium Tig Rod 1.6mm/ 0.5kg
DW7000	Auto Darkening Helmet, Shade 9-13 with Grinding Visor and PRSL Filtration System.	TR24AL-5356	Aluminium Tig Rod 2.4mm/ 0.5kg
		TR32AL-5356	Aluminium Tig Rod 3.2mm / 0.5kg
GR101AR	Argon Twin Gauge Regulator	TZ16-150	Zirconiated Tungsten Electrode 1.6mm (3pk)
GR101ARFL	Argon Gas Regulator c/w Flow Meter	TZ24-150	Zirconiated Tungsten Electrode 2.4mm (3pk)
GR101AR-2FL	Argon Regulator c/w Twin Flow Meter	TZ32-150	Zirconiated Tungsten Electrode 3.2mm (3pk)
16895	15m H/D 15A Extension Lead (3x2.5mm2 wiring)	HY26GP5KG	GP electrodes 5kg 2.6mm 6013
TBC57Y02	Long Black Cap	HY32GP5KG	GP electrodes 5kg 3.2mm 6013
TC10N23	Collet 1/16" (1.6mm) (2 pk)	HY40GP5KG	GP electrodes 5kg 4.0mm 6013
TC10N24	Collet 3/32" (2.4mm) (2 pk)	HY26LH5KG	Low hydrogen electrodes 5kg 2.6mm 7018
TC10N25	Collet 1/8" 3.2mm (Pkt 2)	HY32LH5KG	Low hydrogen electrodes 5kg 3.2mm 7018
TCB10N31	Collet Body 1/16" (1.6mm) (2pk)	HY40LH5KG	Low hydrogen electrodes 5kg 4.0mm 7018
TCB10N32	Collet Body 3/32" (2.4mm) (2pk)	PDL15	Plug, 3 Pin 15A 250V - Straight
TCB10N28	Collet Body 1/8" (3.2mm) (2 pk)	17844	Gas Inlet QC
TCC10N48	Std. Ceramic Cup 3/8" Bore #6 (2pk)	17847	12 Pin Strata TIG Remote Connection Plug
TCC10N47	Std. Ceramic Cup 7/16" Bore #7 (2pk)		
TCC10N46	Std. Ceramic Cup 1/2" Bore #8 (2pk)		
TCC10N45	Std. Ceramic Cup 5/8" Bore #10 (2pk)		
TT16-150	Thoriated Tungsten Electrode 1.6mm (3pk)		

5.4 MIG Torch /Spool Gun control

Binzel MT250 MIG Torch Range Parts

1.	MSS2557	Shroud Spring
2.	MSN2554	Swan Neck Assembly
5.	UG8015	Handle Cable Support C/W Ball Joint
9.	B2514	Ergo Handle Kit C/W Lock Nut
10.	UG2516	Medium / Large Ergo Trigger
19.	MOR1596	Gun Plug 'O' Ring
20.	MLN1597	Liner Nut

All products conform to EN60974-7 and are RoHS, REACH and WEEE compliant



5.5 SP240P Spool Gun Parts

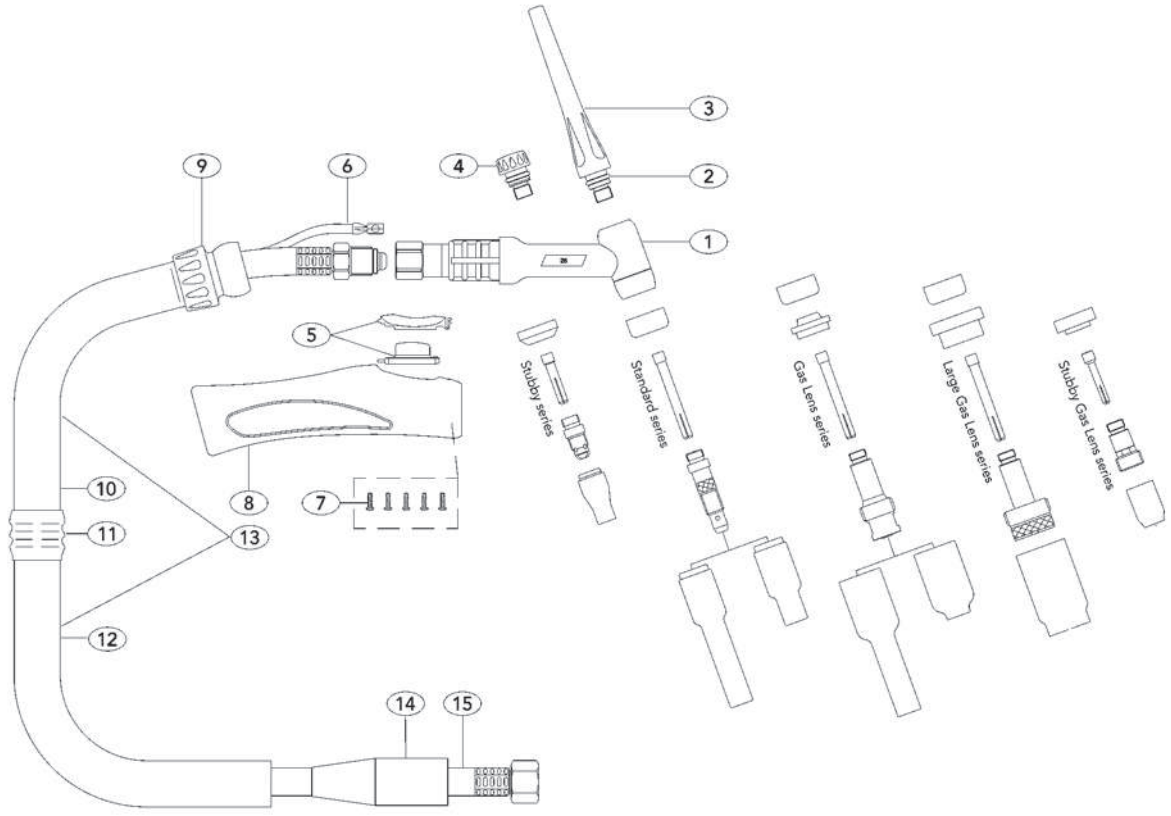
SPARE TIPS & NOZZLES:

TIPS:	0.6		MMT2406
	0.8		MMT2408
	0.9		MMT2409
	1.0		MMT2410
	1.0	AL	MMT2412
NOZZLES:	Conical		MCN2470
	Straight		MCN2471

5.6 Suregrip™ Series WP26 Torch Parts

3.	TCB57Y02	Back Cap Long
4.	TCB57Y04	Back Cap Short
5.	TER1MS	Momentary Kit
6.	UERSWL8	Trigger Lead 25ft
8.	TERH200	Large Ergo Tig Handle
9.	UERKJ200	Large Knuckle Joint
11.	UERJK200	Jointing Repair Kit
13.	UERCO200-40	Sheath x 12.5ft Inc Leather Cover
	UERCO200-80	Sheath x 25ft Inc Leather Cover
15.	46V28	Power Cable x 12.5ft Rubber
	46V30	Power Cable x 25ft Rubber

All products conform to EN60974-7 and are RoHS, REACH and WEEE compliant



Effects of MMA Welding 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, pre-heating, 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 steelcool 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, 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 :

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.

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.

Other 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 serial number at the rear of this manual 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.

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 in this safety section)

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 later in this section)
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 preheating, 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.
11. Do not touch the electrode while in contact with the work (ground) circuit.

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.

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.

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 ga es 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.

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.
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.

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 or download a physical registration form at www.euroquip.co.nz.

Registered warranty period for ADVANCEMULTI205P:

Commercial Use: 36 Months

Domestic Use: 36 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, modifications 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.

Scan here to register your product

http://www.euroquip.co.nz/Contact+Us/Product+Registration+Form.html

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Congratulations on your new STRATA 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. To locate your nearest distributor or service agency visit www.strata.co.nz, or email us at CustomerService@euroquip.co.nz

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