JASIC®

EVO2.0


# Operator Manual

# ET-320PACDC

CE UKCA RoHS Intertek

# Your new product

Jasic.co.uk

Thank you for selecting this Jasic EVO 2.0 product.

This product manual has been designed to ensure that you get the most from your new product. Please ensure that you are fully conversant with the information provided paying particular attention to the safety precautions. The information will help protect yourself and others against the potential hazards that you may come across.

Please ensure that you carry out daily and periodic maintenance checks to ensure years of reliable and trouble free operation.

Please call your Jasic distributor in the unlikely event of a problem occurring.
Please record below the details from your product as these will be required for warranty purposes and to ensure you get the correct information should you require assistance or spare parts.

Date purchased _____

From where _____

Serial number _____

(The serial number is normally located on the top or underside of the machine and will begin with AA)

For further information on your Jasic product warranty registration please visit:
**www.jasic-warranty.co.uk**

**Disclaimer**
Whilst every effort has been made to ensure that the information contained within this manual is complete and accurate, no liability can be accepted for any errors or omissions.

**Please Note:**
Products are subject to continual development and may be subject to change without notice. Regularly check our product pages at www.jasic.co.uk for revision updated operating manuals.

# CONTENTS


| Index | Page |
|---|---|
| Your New Product | 2 |
| Index | 3 |
| Safety Instruction | 4 |
| General electrical safety | 4 |
| General operating safety | 4 |
| PPE | 5 |
| Welding processes lens shade selector guide | 5 |
| Fume and welding gases | 6 |
| Fire risks | 6 |
| The working environment | 7 |
| Protection from moving parts | 7 |
| Magnetic fields | 7 |
| Compressed gas cylinders and regulators | 7 |
| RF declaration | 8 |
| LF declaration | 8 |
| Materials and their disposal | 9 |
| Package Contents | 9 |
| Description of Symbols | 10 |
| Product Overview | 11 |
| Technical Specifications | 12 |
| Description of Controls | 14 |
| Optional LC-40 Water Cooler Information | 15 |
| Installation | 16 |
| Control Panel | 19 |
| Remote Control Option (wired and wireless) | 30 |
| MMA Setup | 31 |
| Operation MMA | 32 |
| Guide to MMA Welding | 35 |
| MMA Welding Troubleshooting | 38 |
| TIG Setup | 40 |
| Operation TIG | 41 |
| Guide to TIG Welding | 57 |
| TIG Torch Spare Parts List | 68 |
| TIG Welding Troubleshooting | 70 |
| Maintenance | 73 |
| Machine Troubleshooting (including error codes) | 73 |
| WEEE Disposal | 76 |
| RoHS Compliance Declaration | 76 |
| EC Declaration of Conformity | 77 |
| Statement of Warranty | 78 |
| Schematic | 79 |
| Options and Accessories | 80 |
| Notes | 81 |
| Jasic Contact Details | 84 |

# SAFETY INSTRUCTIONS

These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted. The user is responsible for installing and operating the equipment in accordance with the enclosed instructions.
It is important that users of this equipment protect themselves and others from harm, or even death.
The equipment must only be used for the purpose it was designed for. Using it in any other way could result in damage or injury and in breach of the safety rules.
Only suitably trained and competent persons should operate the equipment.
Pacemaker wearers should consult their doctor prior to using this equipment.
PPE and workplace safety equipment must be compatible for the application of the work involved.

**Always carry out a risk assessment before carrying out any welding or cutting activity.**

### General electrical safety


The equipment should be installed by a qualified person and in accordance with current standards in operation.
It is the users responsibility to ensure that the equipment is connected to a suitable power supply. Consult your utility supplier if required.
Do not use the equipment with the covers removed. Do not touch live electrical parts or parts which are electrically charged. Turn off all equipment when not in use.
In the case of abnormal behaviour of the equipment, the equipment should be checked by a suitably qualified service engineer.
If earth bonding of the work piece is required, bond it directly with a separate cable with a current carrying capacity capable of carrying the maximum capacity of the machine current.
Cables (both primary supply and welding) should be regularly checked for damage and overheating.
Never use worn, damaged, under sized or poorly jointed cables.
Insulate yourself from work and earth using dry insulating mats or covers big enough to prevent any physical contact.
Never touch the electrode if you are in contact with the work piece return.
Do not wrap cables over your body.
Ensure that you take additional safety precautions when you are welding in electrically hazardous conditions such as damp environments, wearing wet clothing and metal structures.
Try to avoid welding in cramped or restricted positions.
Ensure that the equipment is well maintained. Repair or replace damaged or defective parts immediately.
Carry out any regular maintenance in accordance with the manufacturers instructions.
The EMC classification of this product is class A in accordance with electromagnetic compatibility standards CISPR 11 and IEC 60974-10 and therefore the product is designed to be used in industrial environments only.
**WARNING:** This class A equipment is not intended for use in residential locations where the electrical power is provided by a public low-voltage supply system. In those locations it may be difficult to ensure the electromagnetic compatibility due to conducted and radiated disturbances.

### General operating safety

Never carry the equipment or suspend it by the carrying strap or handles during welding.
Never pull or lift the machine by the welding torch or other cables.
Always use the correct lift points or handles. Always use the transport under gear as recommended by the manufacturer.
Never lift a machine with the gas cylinder mounted on it.
If the operating environment is classified as dangerous, only use S-marked welding equipment with a safe idle voltage level. Such environments may be for example: humid, hot or restricted accessibility spaces.

# SAFETY INSTRUCTION


**Use of Personal Protective Equipment (PPE)**

Welding arc rays from all welding and cutting processes can produce intense, visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

- Wear an approved welding helmet fitted with an appropriate shade of filter lens to protect your face and eyes when welding, cutting or watching.
- Wear approved safety glasses with side shields under your helmet.
- Never use any equipment that is damaged, broken or faulty.
- Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the welding and cutting area.
- Ensure that there are adequate warnings that welding or cutting is taking place.
- Wear suitable protective flame resistant clothing, gloves and footwear.
- Ensure adequate extraction and ventilation is in place prior to welding and cutting to protect users and all workers nearby.
- Check and be sure the area is safe and clear of flammable material before carrying out any welding or cutting.

Some welding and cutting operations may produce noise. Wear safety ear protection to protect your hearing if the ambient noise level exceeds the local allowable limit (e.g: 85 dB).

**Welding and Cutting Lens Shade Selector Guide**

<table>
<tr><th>WELDING CURRENT</th><th>MMA ELECTRODES</th><th>MIG LIGHT ALLOY</th><th>MIG HEAVY METALS</th><th>MAG</th><th>TIG ALL METALS</th><th>PLASMA CUTTING</th><th>PLASMA WELDING</th><th>GOUGING ARC/AIR</th></tr>
<tr><td>10</td><td rowspan="2">8</td><td rowspan="6">10</td><td rowspan="7">10</td><td rowspan="8">10</td><td rowspan="3">9</td><td rowspan="9">11</td><td rowspan="3">10</td><td rowspan="10">10</td></tr>
<tr><td>15</td></tr>
<tr><td>20</td><td rowspan="3">9</td></tr>
<tr><td>30</td><td rowspan="2">10</td><td rowspan="3">11</td></tr>
<tr><td>40</td></tr>
<tr><td>60</td><td rowspan="2">10</td><td rowspan="3">11</td></tr>
<tr><td>80</td><td rowspan="3">12</td></tr>
<tr><td>100</td><td rowspan="4">11</td><td rowspan="4">11</td><td rowspan="2">11</td></tr>
<tr><td>125</td><td rowspan="3">11</td><td rowspan="3">12</td></tr>
<tr><td>150</td><td rowspan="2">12</td><td rowspan="5">13</td></tr>
<tr><td>175</td><td rowspan="6">12</td></tr>
<tr><td>200</td><td rowspan="4">12</td><td rowspan="4">12</td><td rowspan="4">13</td><td rowspan="3">13</td><td rowspan="2">11</td></tr>
<tr><td>225</td></tr>
<tr><td>250</td><td rowspan="2">12</td></tr>
<tr><td>275</td><td rowspan="2">13</td><td rowspan="6">14</td><td rowspan="6">14</td></tr>
<tr><td>300</td><td></td><td></td><td rowspan="3">13</td><td rowspan="2">13</td></tr>
<tr><td>350</td><td rowspan="3">13</td><td rowspan="3">14</td><td rowspan="3">13</td><td rowspan="3">14</td></tr>
<tr><td>400</td><td rowspan="2">14</td></tr>
<tr><td>450</td></tr>
<tr><td>500</td><td>14</td><td>15</td><td>14</td><td>15</td><td>15</td></tr>
</table>

# SAFETY INSTRUCTION

**Safety against fumes and welding gases**


The HSE have identified welders as being an 'at risk' group for occupational diseases arising from exposure to dusts, gases, vapours and welding fumes. The main identified health effects are pneumonia, asthma, chronic obstructive pulmonary disease (COPD), lung and kidney cancer, metal fume fever (MFF) and lung function changes.

During welding and hot cutting 'hot work' operations, fumes are produced which are collectively known as welding fume. Depending upon the type of welding process being performed, the resultant fume generated is a complex and highly variable mixture of gases and particulates.

Regardless of the length of welding being carried out, all welding fume, including mild steel welding requires suitable engineering controls to be in place which is usually Local Exhaust Ventilation (LEV) extraction to reduce the exposure to welding fume indoors and where LEV does not adequately control exposure it should also be enhanced by using suitable respiratory protective equipment (RPE) to assist with protecting against residual fume.

When welding outdoors appropriate RPE should be used.

An example of personal fume protection

Prior to undertaking any welding tasks an appropriate risk assessment should be carried out to ensure expected control measures are in place.

Locate the equipment in a well-ventilated position and keep your head out of the welding fume.

Do not breathe in the welding fume.

Ensure the welding zone is well-ventilated and provision should be made for suitable local fume extraction system to be in place.

If ventilation is poor, wear an approved airfed welding helmet or respirator.

Read and understand the Material Safety Data Sheets (MSDS's) and the manufacturer's instructions for metals, consumable, coatings, cleaners and de-greasers.

Do not weld in locations near any de-greasing, cleaning or spraying operations.

Be aware that heat and rays of the arc can react with vapours to form highly toxic and irritating gases.

**<u>For further information please refer to the HSE website www.hse.gov.uk for related documentation.</u>**

**Precautions against fire and explosion**


Avoid causing fires due to sparks and hot waste or molten metal.

Ensure that appropriate fire safety devices are available near the welding and cutting area.

Remove all flammable and combustible materials from the welding, cutting and surrounding areas.

Do not weld or cut fuel and lubricant containers, even if empty. These must be carefully cleaned before they can be welded or cut.

Always allow the welded or cut material to cool before touching it or placing it in contact with combustible or flammable material.

Do not work in atmospheres with high concentrations of combustible fumes, flammable gases and dust.

Always check the work area half an hour after cutting to make sure that no fires have begun.

Take care to avoid accidental contact of the torch electrode to metal objects, as this could cause arcs, explosion, overheating or fire.


**<u>Know and understand your fire extinguishers</u>**

# SAFETY INSTRUCTION

**The working environment**

Ensure the machine is mounted in a safe and stable position allowing for cooling air circulation.
Do not operate equipment in an environment outside the laid down operating parameters.
The welding power source is not suitable for use in rain or snow.
Always store the machine in a clean, dry space.
Ensure the equipment is kept clean from dust build up.
Always use the machine in an upright position.

**Protection from moving parts**

When the machine is in operation keep away from moving parts such as motors and fans.
Moving parts, such as the fan, may cut fingers and hands and snag garments.
Protections and coverings may be removed for maintenance and managed only by qualified personnel after first disconnecting the power supply cable.
Replace the coverings and protections and close all doors when the intervention is finished and before starting the equipment.
Take care to avoid getting fingers trapped when loading and feeding wire during set up and operation.
When feeding wire be careful to avoid pointing it at other people or towards your body.
Always ensure machine covers and protective devices are in operation.

**Risks due to magnetic fields**


The magnetic fields created by high currents may affect the operation of pacemakers or electronically controlled medical equipment.
Wearers of vital electronic equipment should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.
Do not go near welding equipment with any sensitive electronic equipment as the magnetic fields may cause damage.
Keep the torch cable and work return cable as close to each other as possible throughout their length.
This can help minimise your exposure to harmful magnetic fields.
Do not wrap the cables around the body.

**Handling of compressed gas cylinders and regulators**


Mishandling gas cylinders can lead to rupture and the release of high pressure gas.
Always check the gas cylinder is the correct type for the welding to be carried out.
Always store and use cylinders in an upright and secure position.
All cylinders and pressure regulators used in welding operations should be handled with care.
Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
Always secure the cylinder safely and never move with regulator and hoses connected.
Use a suitable trolley for moving cylinders.
Regularly check all connections and joints for leaks.
Full and empty cylinders should be stored separately.

**Never deface or alter any cylinder**

# SAFETY INSTRUCTIONS

**Fire awareness**


The cutting and welding process can cause serious risks of fire or explosion.
Cutting or welding sealed containers, tanks, drums or pipes can cause explosions.
Sparks from the welding or cutting process can cause fires and burns.
Check and risk assess the area is safe before doing any cutting or welding.
Ventilate all flammable or explosive vapour from the workplace.
Remove any and all flammable materials away from the working area. If necessary, cover flammable materials or containers with approved covers (following manufacturers instructions) if unable to remove from the immediate area.
Do not cut or weld where the atmosphere may contain flammable dust, gas or liquid vapour.
Always have the appropriate fire extinguisher nearby and know how to use it.

**Hot parts**


Always be aware that material being cut or welded will get very hot and hold that heat for a considerably long time which will cause severe burns if the appropriate PPE is not worn.
Do not touch hot material or parts with bare hands.
Always allow for a cooling down period before working on material recently cut or welded.
Use the appropriate insulated welding gloves and clothing to handle hot parts to prevent burns.

**Noise awareness**

The cutting and welding process can generate noise that can cause permanent damage to your hearing. Noise from cutting and welding equipment can damage hearing.
Always protect your ears from noise and wear approved and appropriate ear protection if noise levels are high.
Consult with your local specialist if you are unsure how to test for noise levels.

**RF Declaration**

Equipment that complies with directive 2014/30/EU concerning electromagnetic compatibility (EMC) and the technical requirements of EN60974-10 is designed for use in industrial buildings and not for domestic use where electricity is provided via the low voltage public distribution system.
Difficulties may arise in assuring class A electromagnetic compatibility for systems installed in domestic locations due to conducted and radiated emissions.
In the case of electromagnetic problems, it is the responsibility of the user to resolve the situation.
It may be necessary to shield the equipment and fit suitable filters on the mains supply.

**LF Declaration**

Consult the data plate on the equipment for the power supply requirements.
Due to the elevated absorbance of the primary current from the power supply network, high power systems affect the quality of power provided by the network. Consequently, connection restrictions or maximum impedance requirements permitted by the network at the public network connection point must be applied to these systems.
In this case, the installer or the user is responsible for ensuring the equipment can be connected, consulting the electricity provider if necessary.

# SAFETY INSTRUCTION

**Materials and their disposal**

Welding equipment is manufactured with BSI published standards meeting CE requirements for materials which do not contain any toxic or poisonous materials dangerous to the operator.
Do not dispose of the equipment with normal waste.

The European Directive 2012/19/EU on Waste Electrical and Electronic Equipment states that electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility for disposal.

**For more detailed information please refer to the HSE website www.hse.gov.uk**

# PACKAGE CONTENTS AND UNPACKING

Supplied within your new Jasic EVO product package will be the following items with each model.
Use care when unpacking the contents and ensure all items are present and not damaged.
If damage is noted or items are missing, please contact the supplier in the first instance and before installing or using the product.
Record the product model, serial numbers and purchase date in the information section found on the inside front page of this operating manual.

## Jasic 320P ACDC Air Cooled Package

- ET-320P ACDC Power Source
- Air cooled TIG Torch
- Work Return Lead
- Gas Regulator
- 2m Gas Hose c/w fittings
- USB Stick with Operating Manual

## Jasic 320P ACDC Water Cooled Package

- ET-320P ACDC Power Source
- LC-40 Water Cooler
- Water cooled TIG Torch
- Work Return Lead
- Gas regulator
- 2m Gas Hose c/w fittings
- Trolley
- USB Stick with Operating Manual

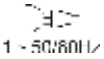
**Please Note:** Package contents may very depending on country location and package part number purchased.

# DESCRIPTION OF SYMBOLS


Read this operation manual carefully before use.


Warning in operation.


Single-phase static frequency converter-transformer rectifier.


Symbol of single-phase AC power supply and rated frequency.


Can be used in the environment which has high risk of electric shock.

**IP** Degree of protection, such as IP23S.

**$U_1$** Rated AC input voltage (with tolerance ±15%).

**$I_{1max}$** Rated maximum input current.

**$I_{1eff}$** Maximum effective input current.

**X** Duty cycle, ratio of duration time/the full-cycle time.

**$U_0$** No-load voltage, Open circuit voltage.

**$U_2$** Load voltage.

**H** Insulation class.


Don’t dispose of electric waste with ordinary waste.


Electric shock risk warning.


Current unit "A"


Overheat protection indicator.


Overcurrent protection indicator.


VRD function indicator.


MMA mode.


LIFT TIG mode.


Selection of welding electrode diameter for MMA.


MMA current.


Hot start current of MMA.


Arc force of MMA.


Welding mode switching.


Other function switching.


Wireless indication.


Remote control.


Pairing of wireless remote controller.


Pre-flow


Initial current


Up-slope time


Peak current


Base current


Down-slope time


Finish current


Post-flow time


Spot welding time


Pulse frequency


Pulse duty cycle


DC TIG mode


DC pulse TIG mode


AC TIG Mode


AC Mixed TIG Mode

Hz Pulse frequency unit "Hz"


HF arc starting mode


Lift arc starting mode


Smart gas


Program recall


Program save


Easy set

# PRODUCT OVERVIEW

This digital TIG 320P ACDC inverter welding machine feature advanced technology that provides excellent welding performance along with user experience. They provide a stable arc that is ideal for AC HF TIG, DC HF TIG, DC Lift TIG, pulse TIG and MMA welding modes which can weld carbon steel, low alloy steel, stainless steel, aluminium and other materials.
Moreover, they offer many adjustable TIG and MMA functions and features that makes these machines very durable and robust for a wide range of welding applications.


The unique electrical structure and air passage design inside the machine increases the dissipation of heat generated by power devices, thus improving the duty cycle of the machine.
Benefitting from the unique air passage, the equipment can effectively prevent damage to power devices and control circuits from dust drawn in by the fan, thus greatly improving the reliability of the equipment.

The unique ClearVision display offers the operator clear and informative data for the welding processes offered.

**Features and functions that include:**

- Welding processes that include: AC/DC HF TIG, Lift TIG and MMA.
- Multiple AC output waveforms, with mixed wave frequency and duty cycle including AC wave balance.
- ClearVision digital control user panel technology.
- The EVO range offers a robust, ergonomic design that includes Active Balancing Air Passage (ABAP).
- Enhanced TIG features that include, dash-arc, pre/post gas timers, up/down slope control, 2T/4T and smart gas control for optimising shielding gas consumption.
- Inbuilt HF stabilising technology.
- The ET-320P ACDC comes with full TIG pulse controls in AC and DC TIG modes.
- The ET-320P comes with an air TIG torch, gas hose and regulator.
- The ET-320P-WC comes with the optional LC-40 water cooler, water cooled TIG torch, gas hose, gas regulator and trolley.
- Features such as, quick factory reset function, auto sleep mode and Voltage Reduction Device (VRD).
- Fan on-demand technology, prolongs the life of the internal fan but more importantly reduces the accumulation of grinding dust drawn into the machine.
- Overcurrent and overheat protection.
- MMA features that include, arc force, hot start current and anti-stick that offers easy arc starting, low spatter, stable current which offers good weld bead shape making this machine ideal for a wide range of welding electrodes.
- Ability to save up to 10 setup welding programs in each welding process and reload when required.
- Parameters are automatically saved on shutdown and are restored automatically upon restarting the machine.
- Bluetooth wireless interface now fitted as standard.
- Wired remote control fitted as standard via front panel 9 pin socket.
- Various optional wired and wireless remote control devices available.
- Optional mobile app compatible.
- Heavy duty 35-50mm dinse sockets
- High quality finish to mouldings.

# TECHNICAL SPECIFICATIONS

| Parameter | Unit | Jasic TIG ET-320P ACDC (E2S32) | Jasic TIG ET-320P ACDC -WC |
|---|---|---|---|
| Rated input (U1) | V | AC 400V (50/60 Hz) | AC 400V (50/60 Hz) |
| Rated input current (Ieff) * | A | MMA 8.7<br>TIG 8.2 | MMA 8.7<br>TIG 8.4 |
| Rated input current (Imax) | A | MMA 15.8<br>TIG 15.0 | MMA 15.8<br>TIG 15.4 |
| Rated input power | kVA | MMA 11.5<br>TIG 10.1 | MMA 11.5<br>TIG 10.2 |
| Welding current range | A | MMA 10 ~ 270<br>DC TIG 10 ~ 320<br>AC TIG 20 ~ 320 | MMA 10 ~ 270<br>DC TIG 10 ~ 320<br>AC TIG 20 ~ 320 |
| Rated welding voltage (U2) | V | MMA 30.8<br>TIG 22.8 | MMA 30.8<br>TIG 22.8 |
| Rated duty cycle (X) (rated at 40°C) | % | 270A @ 30%<br>MMA 190A @ 60%.<br>148A @ 100% | 270A @ 30%<br>MMA 190A @ 60%.<br>148A @ 100% |
| | | 320A @ 30%<br>TIG 226A @ 60%<br>175A @ 100% | 320A @ 30%<br>TIG 226A @ 60%<br>175A @ 100% |
| Arc force current range | A | 0 ~ 100 | 0 ~ 100 |
| Hot start current range | A | 0 ~ 80 | 0 ~ 80 |
| Pre-flow time | S | 0 ~ 10 | 0 ~ 10 |
| Post-flow time | S | 0 ~ 50 | 0 ~ 50 |
| Initial and final current | A | DC 10 ~ 320<br>AC 20 ~ 320 | DC 10 ~ 320<br>AC 20 ~ 320 |
| Base current | A | DC 10 ~ 320<br>AC 20 ~ 320 | DC 10 ~ 320<br>AC 20 ~ 320 |
| Up/down slope time | S | 0 ~ 15 | 0 ~ 15 |
| Pulse Frequency DC | Hz | 0.5 ~ 200 | 0.5 ~ 200 |
| Pulse Duty Factor | % | 5 ~ 95 | 5 ~ 95 |
| AC Output Frequency | Hz | 50 ~ 200 | 50 ~ 200 |
| AC Pulse Frequency | Hz | AC Frequency 50Hz<br>Pulse Frequency 0.5 ~ 5Hz<br>AC Frequency 200Hz<br>Pulse Frequency 0.5 ~ 20Hz | AC Frequency 50Hz<br>Pulse Frequency 0.5 ~ 5Hz<br>AC Frequency 200Hz<br>Pulse Frequency 0.5 ~ 20Hz |
| AC Balance | % | 20 ~ 60 | 20 ~ 60 |
| Mixed Pulse Frequency (Mixed Mode) | Hz | AC Frequency 50Hz<br>Pulse Frequency 1 ~ 5Hz<br>AC Frequency 200Hz<br>Pulse Frequency 1 ~ 20Hz | AC Frequency 50Hz<br>Pulse Frequency 1 ~ 5Hz<br>AC Frequency 200Hz<br>Pulse Frequency 1 ~ 20Hz |
| Mixed Duty Ratio | % | 5 ~ 30 | 5 ~ 30 |
| Spot Welding Time | S | Arcing Time (Tspot) 0.01 ~ 10<br>Arc Extinguishing Time (Ttakt) 0.1 ~ 10 | Arcing Time (Tspot) 0.01 ~ 10<br>Arc Extinguishing Time (Ttakt) 0.1 ~ 10 |
| No load voltage (U0) | V | 71 | 71 |
| VRD 'no load' voltage (Ur) | V | 9.5 | 9.5 |

# TECHNICAL SPECIFICATIONS (continued)

| Parameter | Unit | Jasic TIG ET-320P ACDC (E2S32) | Jasic TIG ET-320P ACDC -WC |
|---|---|---|---|
| TIG arc start mode | - | HF / Lift TIG | HF / Lift TIG |
| Remote controller | - | Digital remote torch, analog remote torch, wired/wireless pedal controller, wired/wireless handheld remote controller, wireless welding helmet, and mobile APP | Digital remote torch, analog remote torch, wired/wireless pedal controller, wired/wireless handheld remote controller, wireless welding helmet, and mobile APP |
| Efficiency | % | ≥80 | ≥80 |
| Standby Power | W | ≤10 | ≤10 |
| Power factor | cosϕ | 0.94 | 0.94 |
| Standard | - | EN60974-1 & EN IEC 60974-1 | EN60974-1 & EN IEC 60974-1 |
| Protection class | IP | IP23S | IP23S |
| Insulation class | - | H | H |
| Noise | Db | < 70 | < 70 |
| Pollution Level | - | Level 3 | Level 3 |
| Operating Temperature range | ˚C | -10 ~ +40 | -10~+40 (using anti-freezing solution) |
| Storage temperature | ˚C | -20 ~ +55 | -20~+55 (using anti-freezing solution) |
| Size | mm | 568 x 230 x 416 | 558 x 230 x 416 (LC-40 600x217x283) |
| Package Size | mm | 680 x 320 x 565 | 680 x 320 x 565 (LC-40 630x255x315) |
| Net weight | Kg | 23.8 | c/w LC-40 = 32.2 |
| Overall weight | Kg | 26.5 | c/w LC-40 = 42.7 |

***** Minimum main plug size recommendation would be a 400V 16amp with a Type C breaker fitted.

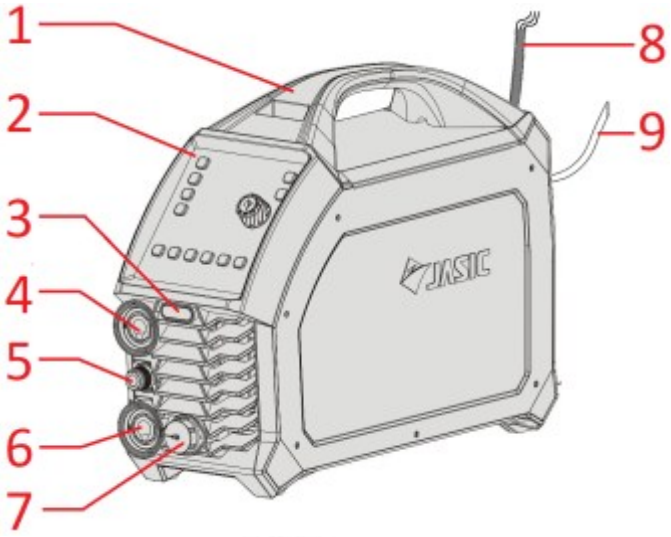
**Please Note**

Due to variations in manufactured products all claimed performance ratings, capacities, measurements, dimensions and weights quoted are approximate only.

Achievable performance and ratings when in use can depend upon correct installation, applications and use along with regular maintenance and service.

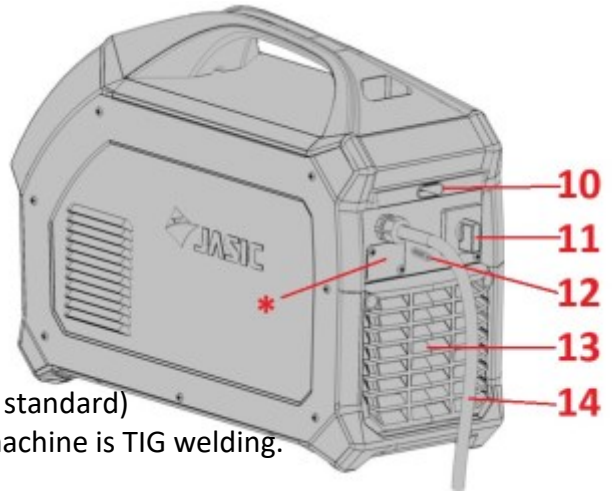
# DESCRIPTION OF CONTROLS - JASIC TIG ET-320P ACDC

**Front view Jasic TIG ET-320P ACDC**




1. Machine carry handle
2. Digital user control panel (see lower down for further information)
3. Wireless remote control (optional)
4. "+" Output terminal, the connection for the work clamp in TIG mode socket size is 35/50mm
5. Shielding gas outlet connector
6. "-" Output terminal, The connection for the TIG torch in TIG mode, socket size is 35/50mm
7. Wired remote control 9 pin socket
8. Input power cable
9. Shielding gas inlet hose (connected)

**Rear view Jasic TIG ET-320P ACDC**




10. Micro USB type-C socket, for software download and phone charging, used for program upgrades and charging of 5V/2A phones **
11. ON/OFF mains power switch
12. Shielding gas inlet connector
13. Rear panel with integrated cooling vents
14. Input power cable

* 4 pin water cooler power/control socket outlet (fitted as standard)

** **Please Note:** Do not charge a mobile phone while the machine is TIG welding.

**Front control panel view Jasic TIG ET-320P ACDC**


15. Easy set control button and Indicator
16. TIG Parameter display area
17. Remote control button and indicator
18. Program save button and indicator
19. Digital display window
20. Load program button and indicator
21. Warning indicators
22. AC TIG, DC TIG, AC Mix TIG and MMA welding process selection switch
23. HF and Lift TIG selection button and indicator
24. TIG torch button control mode selector switch
25. Smart gas enable switch and indicator
26. Water cooler on/off selection button***
27. Parameter adjustment control dial
28. VRD function indicator
29. MMA parameter selection switch
30. TIG Pulse Mode ON/OFF selection switch
31. AC TIG Waveform selection switch, choose between square, triangle and sinusoidal AC waveforms

*** **Please Note:** See page 15 for details of the water cooler.

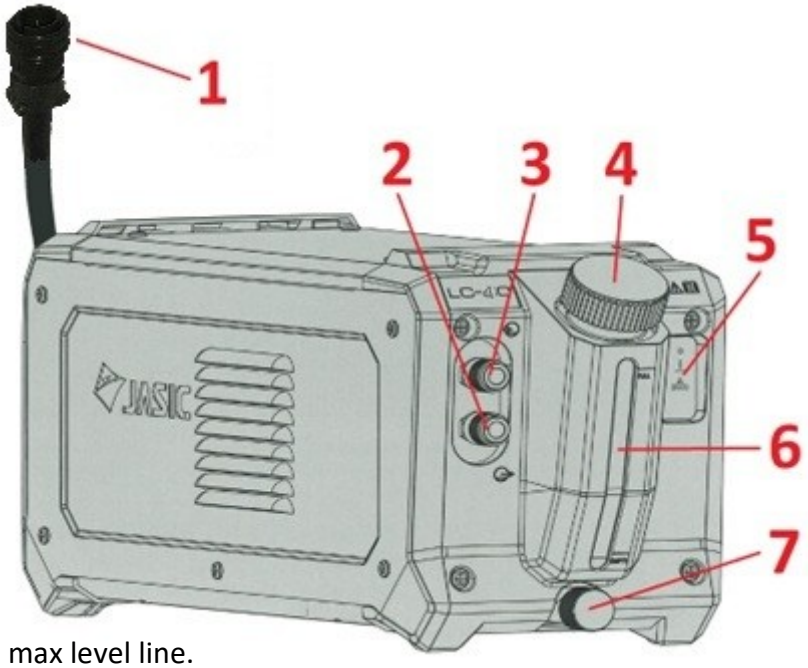
# DESCRIPTION OF CONTROLS - WATER COOLER LC-40

**Overall view and technical details**


| Parameter | Unit | LC-40 Water Cooler |
|---|---|---|
| Rated input voltage | V | AC 400V 15% 50/60Hz |
| Rated input power | W | AC 400 V @ 140W |
| Volume of water tank | L | 6.5 |
| Maximum pressure | MPa | 0.42 |
| Maximum flow rate | L/min | 5 |
| Rated cooling power | KW | 1.5 (1L/min) |
| Protection class | - | IP23S |
| Executive standard | - | EN IEC 60974-2 / BS EN IEC60974-2 |
| Coolant | - | Pure water, anti-freezing solution, mixed liquid |
| Operating ambient temperature | °C | Mixed liquid, pure water: 5 ~ 60<br>Anti-freezing solution: -20 ~ 60 |

**Jasic LC-40 water cooler**

1. Power and control plug and cable
2. Water outlet: (cold) connect the blue TIG torch supply water hose to this connector
3. Water return: (hot) connect the red TIG torch return water hose to this connector
4. Filler cap for coolant, remove to fill water/coolant tank
5. LC-40 Cooler indicators
   Top - Power LED
   Middle - Flow warning LED
   Bottom - Overheat warning LED
6. Coolant min and max level indicator *****
7. Coolant drain plug cap, remove to drain the coolant tank




***** Typically 5ltr of coolant will take fill to the max level line.

**Water (coolant) level:**
The coolant level should always be maintained and should never drop below the minimum level line, over heating of the TIG torch will occur if the level is low and damage may be caused.
Do not over fill the water tank with coolant.

- Please ensure to add coolant when the input cable is disconnected from the power supply.
- The two filter screen in the water filling cap (4 as above) cannot be removed. If unfiltered coolant is added, impurities may block the waterway system and consequently the machine or TIG torch may be damaged.

**Coolant drainage:**
Coolant can be drained by un-screwing and removing the front drain plug (item No 7) in the above image.

**Please Note:**
On first switch on, the flow switch safety circuit is not active for 2 minutes, this is to allow for the water flow to stabilize and remove any air bubbles. After 2 minutes the flow sensing circuit is active and will constantly monitor the water flow rate.

# INSTALLATION

**Installation**

The owner/user are responsible for installing and using this welding machine according to this operating manual.

Before installing this equipment, the owner/user shall make an assessment of potential hazards in the surrounding area.

**Unpacking**

Check the packaging for any signs of damage.

Contact your supplier in the first instance if any item is missing or damaged. Carefully remove the machine and retain the packaging or at least until the installation is complete.

**Lifting**

The Jasic ET-320P ACDC does have an integrated handle for easy hand lifting only. Always ensure the machine is lifted and transported safely and securely.

**Location**

The machine should be located in a suitable position and environment. Care should be taken to avoid moisture, dust, steam, oil or corrosive gases. Place on a secure level surface and ensure that there is adequate clearance around the machine to ensure natural airflow. Do not use the system in rain or snow.

Position the welding power supply near an appropriate power point ensuring you leave at least 30cm of space around the machine to allow for proper ventilation.

Always place the machine on a firm level surface before using, ensuring it cannot tip over. Never use the machine on its side.

Most metals including stainless steel can give off toxic fume when welded or cut.

To protect the operator and others working in the area its important to have adequate ventilation in the work area to ensure air quality level meets all local and national standards.

**Warning!**

**The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. All connections shall be made with the power supply turned off. Incorrect input voltage may damage the equipment.**

**Electric shock may cause death; after switching off the machine, there are still high voltages within**

**the machine, so if removing the covers do not touch any of the live parts on the equipment for at least 10 minutes. Never connect the machine to the mains supply with the panels removed.**

**The electrical connection of this equipment shall be carried out by suitably qualified personnel and these shall be made with the power supply off. Incorrect voltage may damage the equipment.**

**Input power connection**

Before connecting the machine you should ensure that the correct supply is available.

Details of the machine requirements can be found on the data plate of the machine or in the technical specification table shown on pages 12 & 13 within this manual.

This equipment should always be connected by a qualified competent person.

Always ensure the equipment is correctly grounded.

# INSTALLATION

**Input Power Connection continued**

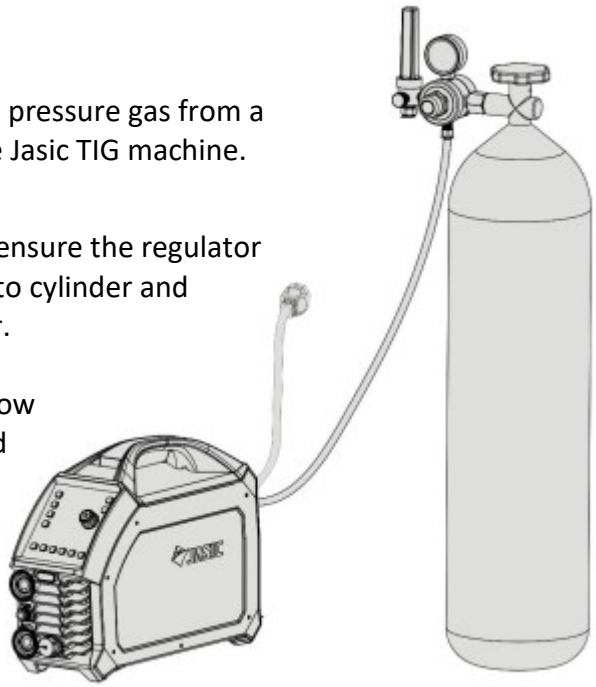
1. Test with multi-meter to ensure the input voltage value is within the specified input voltage range.
2. Ensure the power switch of the welder is turned off.
3. Wire the input mains cable wires to the correct sized mains plug, ensuring the live, neutral and earth (ground) wires are connected correctly.
4. Carry out an electrical test of the machine as required.
5. Ensure that the input fuse is correctly rated for the machine.
6. Connect the machine mains power plug firmly to the corresponding supply socket.

**Please Note!**

If the machine needs to be operated on long extension leads, then please use an extension lead where the cable has a larger cross-sectional area to reduce the voltage drop. Please consult your electrician or electrical supplier for the recommended size.

**Gas Connections**

The gas regulator is designed to reduce and control the high pressure gas from a cylinder or pipeline to the working pressure required for the Jasic TIG machine.



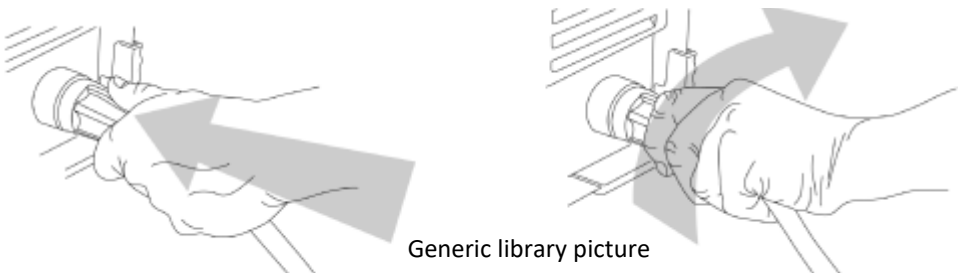
Before fitting the regulator, clean the cylinder valve outlet.
Match the regulator to the cylinder and before connecting, ensure the regulator inlet and cylinder outlet match. Connect the regulator inlet to cylinder and tighten it firmly (do not overtighten) with a suitable spanner.
If using a flowmeter, connect to the regulator outlet.
Connect the gas hose to the regulator/flowmeter which is now located on the shield gas cylinder and connect the other end to the Jasic machine.

With the regulator connected to the cylinder, always stand to one side of regulator and only then slowly open the cylinder valve.
Slowly turn the adjustment knob of the regulator in a clockwise direction until the outlet gauge indicates that you have set the required flow rate. To reduce flow rate, turn the adjusting knob anti-clockwise, until the required flow rate is indicated on the gauge/flow meter.

**Output Power Connections**

When inserting the cable plug of the work return lead, MMA electrode holder or TIG torch adapter into the dinse socket on the front panel of the welding machine, rotate it clockwise to tighten.

It is very important to check these power connections daily to ensure they have not become loose, otherwise arcing may occur when used under load.

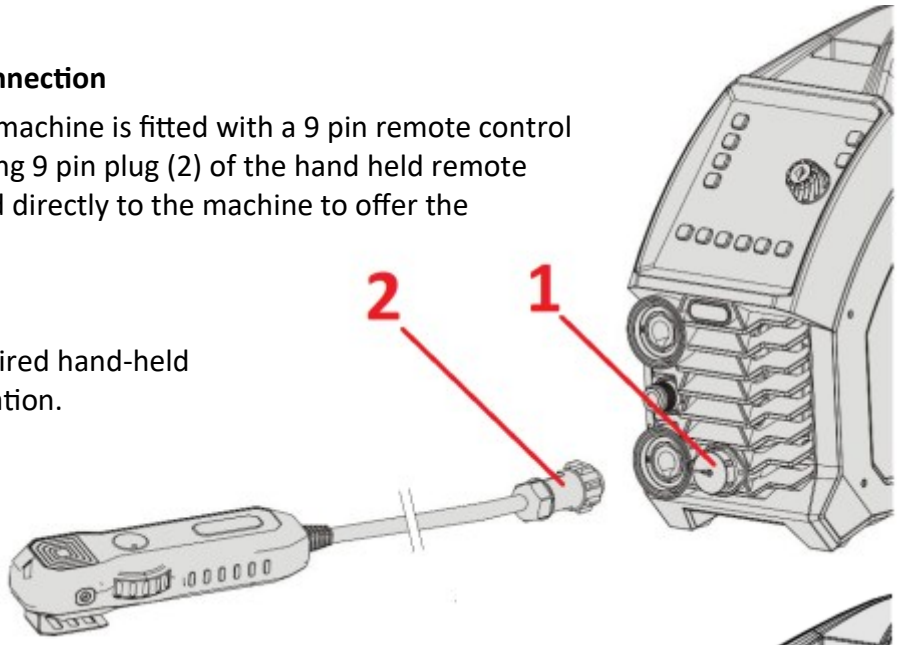


Generic library picture

# CONNECTING WIRED/WIRELESS REMOTE CONTROLS

**Wired hand-held remote-control connection**

As standard the EVO TIG 320P ACDC machine is fitted with a 9 pin remote control socket (1). This allows for the matching 9 pin plug (2) of the hand held remote control or foot pedal to be connected directly to the machine to offer the user remote operation control.

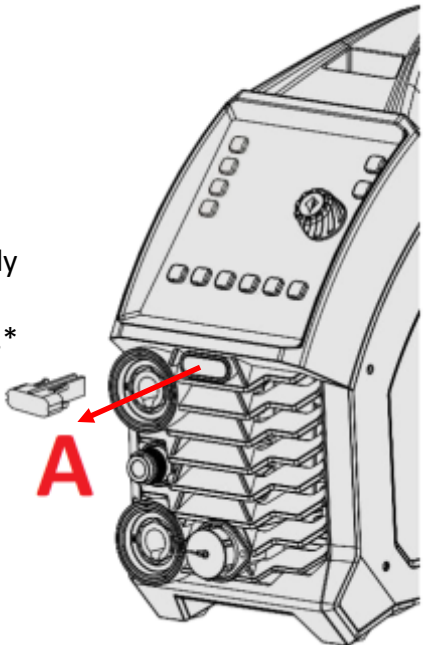



**PLEASE NOTE:**
Check that the machine supports a wired hand-held or foot remote control before installation.

# WIRELESS REMOTE CONTROL

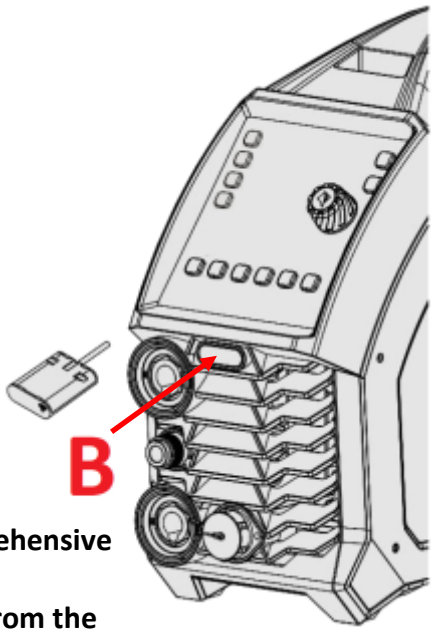
**Wireless hand-held remote-control connection**

For convenience, the EVO TIG range of machines are also able to wirelessly control the welding current.
To enable this, you may need to fit the optional remote interface module.*




**Installation of the wireless receiver module ***

1) Remove the plastic cap 'A' shown in the image right and fit the wireless receiver module as shown.
2) Remove the screws of the left side cover of the machine.
3) Remove the buckle from inside the front panel of the machine and pull out the plug.
3) Insert the wireless receiver module 'B' to the front panel, and then connect the connection line of the receiver module to the CN16 socket on the main board.




**PLEASE NOTE:**
Please check that the machine supports wireless hand held or foot remote controls before installation.

* The ET-320P wireless receiver is fitted as standard.

**The above operation requires sufficient professional comprehensive knowledge of electrical circuits and electrical safety.**
**Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing the machine covers.**

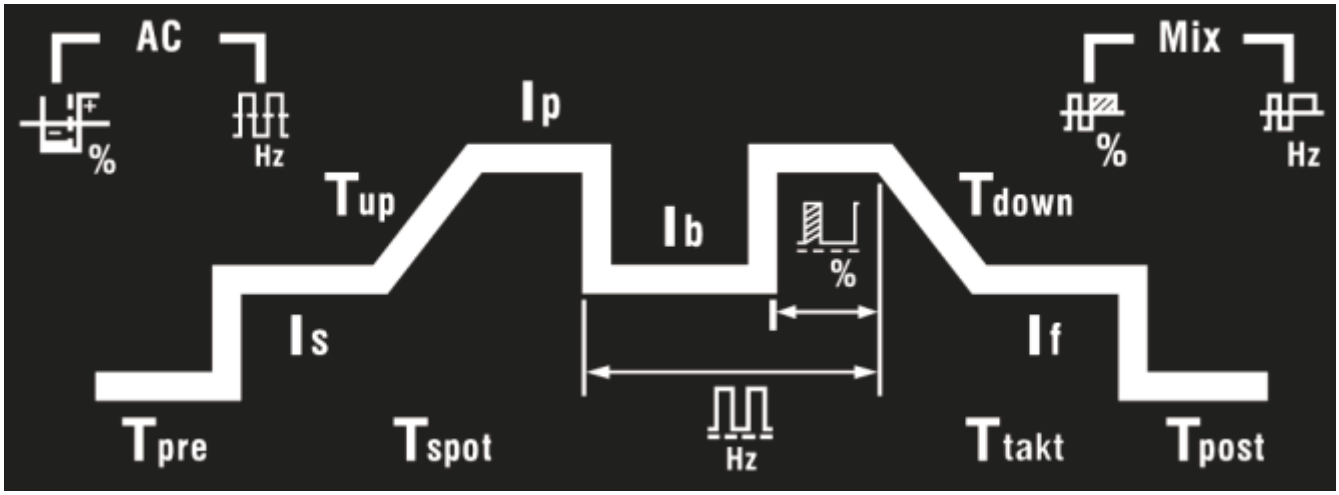
# CONTROL PANEL


1. Easy Set: When the easy set indicator is on, it indicates that the welder enters the easy mode and only the peak welding current can be adjusted. All other parameters are pre-determined in accordance with the peak current. **Note:** The remote control function is not supported in the easy mode! (see page 23 for further details).
2. TIG Parameter selection area: Pushing the adjustment knob (8) will highlight the LED of the parameter to be adjusted in the selection area.
3. Remote control selection: Pressing this button will set current control from the panel to a remote device such as a foot pedal or a TIG torch remote potentiometer as well as a remote control device for MMA.
4. Program storage: Via the control panel, set up the desired welding mode and parameter information to be saved, and click the save button (4) to store the parameters. After the storage indicator is on, turn the adjusting button to select the channels (No 1～No 10). Then, press the save button to finish the information storage. Press the save button again (the indicator is off) to exit the weld program save operation.
5. Digital meter: Displays pre-set and actual current as well as displaying the parameter adjustment settings along with error codes.
6. Program recall: When required to call a saved welding mode and parameter information, click the load button key to recall the parameters. After the load indicator is on, turn the adjusting button to select the channels (No 01～ No 10). Then, press the load button to finish the information recall after selecting the channels to be called. Press the load button again (the load indicator is off) to exit the loading operation.
7. Warning indicators:
   a. The yellow warning LED will light up if the machine overheats.
   b. The red warning LED will illuminate if the machine experiences an input mains under or over voltage situation.

# CONTROL PANEL (CONTINUED)


8. Welding mode selection area: Pressing the welding mode button will highlight the LED of the TIG AC, TIG DC, TIG Hybrid (Mix) and MMA selector and indicators: This area allows the operator to switch between MMA and TIG welding modes via the green button below, the corresponding LED indicator will illuminate, see pages 24 onwards for further details.
9. TIG starting mode selection switch (contact or non contact ignition): When you press this switch, you either select HF arc start ignition or lift arc ignition in TIG mode and the matching indicator will illuminate.
10. TIG torch trigger function modes: 2T, 4T, repeat and spot. Press the 'mode' key to select the required welding trigger mode and depending on your selected TIG torch trigger option the corresponding LED indicator will illuminate, see pages 53 and 54 for further details.
11. Smart Gas selection, This function will automatically match the post-flow gas time to the user's parameter setup in TIG mode (With Smart Gas turned ON, you cannot access the post gas option).
12. Water Cooling selection button (water or air): Using this switch will turn on/off the fitted TIG water cooler and the matching indicator will illuminate.
13. Adjustment control knob/button: Pressing the control knob allows you to scroll through the machines parameters. Rotating the control knob allows you to adjust a selected parameter as noted on the control panel digital display.
14. The VRD indicator The VRD (Voltage Reduction Device) LED will be lit when the machine is in MMA mode and the VRD function is enabled.
15. MMA parameter selection zone: By pressing the adjustment switch you will have access to adjust MMA parameters of MMA welding current, hot start and arc force control.
16. TIG standard or TIG pulse function button: Pressing the pulse button enables the TIG current pulse functions, see from pages 42 & 43 for further details.
17. AC waveform type selection switch: Pressing the AC wave button will allow you to scroll through 3 wave types used in TIG AC welding mode: Square wave, Triangle wave and Sine wave, depending on your selection the corresponding LED indicator will illuminate, see from page 46 for further details.

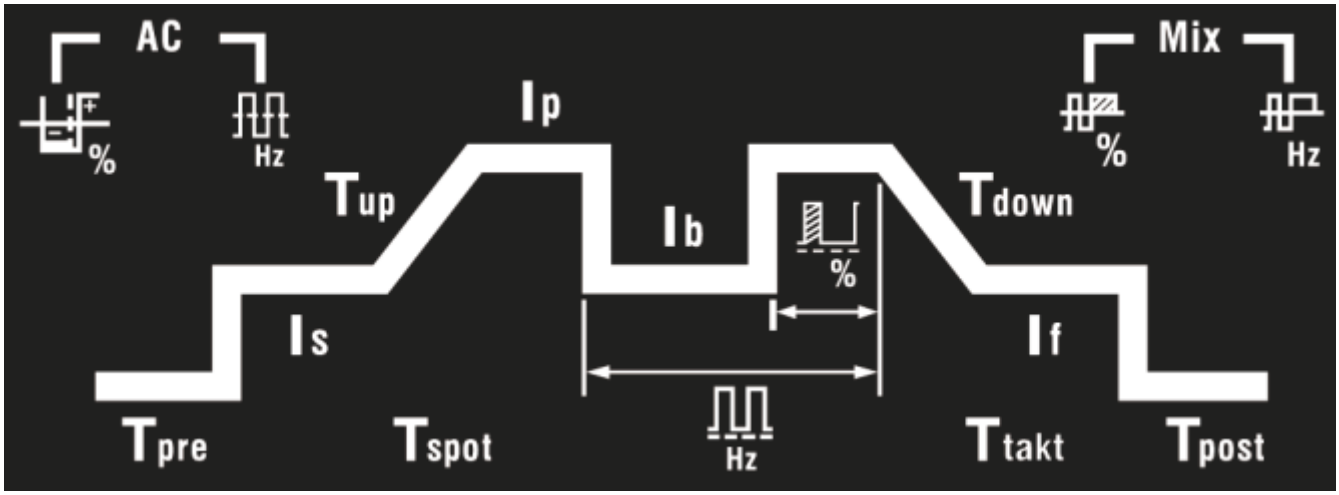
# CONTROL PANEL - FUNCTIONS




The TIG Parameter selection area as shown above shows the process flow when TIG welding.
Pushing the adjustment control dial will highlight the Ip indicator LED and then rotating the control dial will scroll you through the other parameters in the selection area.

| | |
|---|---|
| Tpre | Gas Pre-flow time indicator, when this parameter LED is ON, it indicates that pre-flow gas time can be adjusted from 0 ~ 10 seconds. |
| Is | Initial current indicator, when the parameter LED is ON, it indicates the initial current can be adjusted from DC = 10 ~ 320amps and AC = 20 ~ 320amps. |
| Tup | Up-slope time indicator. When the indicator is ON, upslope current time can be adjusted between initial to peak current between 0 ~ 15 seconds. |
| Ip | The peak current indicator, will be ON when selected and peak welding current can be adjusted from DC = 10 ~ 320amps and AC = 20 ~ 320amps |
| Ib | The base current indicator, when the indicator is on (pulse mode only), the lower current value can be set and is adjustable from DC = 10 ~ 320amps and AC = 20 ~ 320amps. |
| Tdown | Down-slope time indicator. When the indicator is ON, downslope current time can be adjusted between peak to final current between 0 ~ 15 seconds. |
| If | Finish current indicator, when the parameter LED is ON, it indicates the final current can be adjusted from DC = 10 ~ 320amps and AC = 20 ~ 320amps. |
| Tpost | Gas Post-flow time indicator, when this parameter LED is ON, it indicates that post-flow gas time can be adjusted from 0 ~ 50 seconds. |
| T spot | Spot welding time indicator. When the indicator is on, it indicates the spot welding time which is shown on the control panel display. Adjustment is between 0.01 ~ 10 seconds. |
| T takt | Spot welding interval time indicator. Spot welding time indicator. When the indicator is on, it indicates the spot welding. It can be adjusted between 0.1 ~ 10 seconds. |
| Hz | When in TIG pulse mode, the pulse frequency indicator will illuminate to indicate that pulse frequency can be adjusted and between the values of 0.5 ~ 200Hz (Available in AC or DC TIG welding mode). |
| % | When in TIG pulse mode, the pulse duty-cycle indicator will illuminate to indicate that the ratio of the peak current time to pulse period can be adjusted between the values of 5 ~ 95%. (Available in AC or DC TIG welding mode). |

# CONTROL PANEL - FUNCTIONS




The TIG Parameter selection area as shown above shows the process flow when TIG welding.
Pushing the adjustment control dial will highlight the Ip indicator LED and then rotating the control dial will scroll you through the other parameters in the selection area.

| | |
|---|---|
| Hz | When in TIG AC mode, the AC frequency indicator will illuminate to indicate that AC frequency can be adjusted and between the values of 50 ~ 200Hz.<br>(Available in AC TIG welding mode only). |
| | When in TIG AC mode, the AC balance indicator will illuminate to indicate that AC balance the ratio of tungsten anode time to the AC cycle which can be adjusted and between the values of 20 ~ 60Hz.<br>(Available in AC TIG welding mode only). |
| Hz | When in TIG AC hybrid mode, the mixed frequency indicator will illuminate to indicate that the mixed AC frequency can be adjusted and between the values of 1 ~ 5Hz and 1 ~ 20Hz for AC/DC MIX frequency.<br>(Available in AC TIG hybrid welding mode). |
| % | When in TIG AC hybrid mode, the mixed duty cycle indicator will illuminate to indicate that the ratio of DC to the mixture period can be adjusted and between the values of 5 ~ 30%.<br>(Available in AC TIG hybrid welding mode). |

# CONTROL PANEL - FUNCTIONS

### Digital Display


The digital meter as shown right, displays pre-set and actual current values, time settings, frequency values, percentage, error codes and other parameter settings when selected.
When the machine is not welding, the welding current pre-set value will be automatically displayed.
When the machine is welding, the 'actual' output welding current value is displayed.
When the factory settings are restored the countdown is displayed. The serial number can be called up and shown on the display. When the machine incurs a fault, an error code relating to the fault will be displayed .

- The 'A' indicator lights up when amperage is being adjusted or there is current.
- The 'S' indicator lights up when a time parameter is displayed and being adjusted.
- The 'Hz' indicator lights up when a frequency parameter is displayed and being adjusted.
- The '%' indicator lights up when a percentage parameter is displayed and being adjusted.
- The 'V' indicator lights up when output voltage is present at the output.
- 'JOB' references saving and recalling welding programs.

### Parameter adjustment rotary knob

This multi-functional control knob is used to scroll through the various parameters of the welding equipment.
Depending on which welding process you have selected, rotating the control knob allows the operator to select the required parameters of said welding process, then pressing the control knob the parameter LED will illuminate.
You can then make the required adjustment by rotating the control knob and pressing the control knob again stores the setting and is confirmed by the LED ceasing to flash, the parameter is now saved.
The parameter selected and parameter values are shown via the parameter LED as well as on the digital display meters and the LED's next to the meter indicate if the parameter is either amps, seconds, % or Hz as shown above.
During welding, rotating the adjustment control knob will adjust the selected parameter and these adjustments will also be noted by the array of green LED's circling the control dial.

### Warning indicators

**Over temperature**

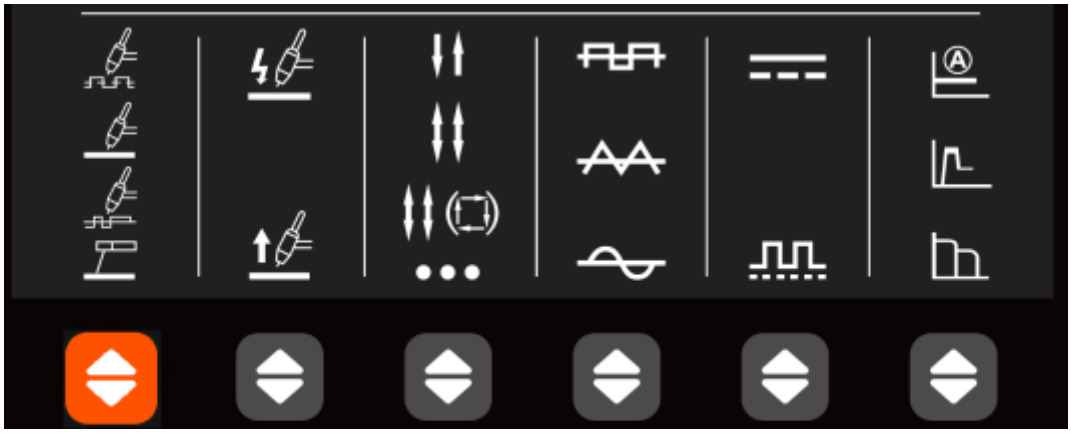
The overheat indicator light indicates that the machine has entered overheat protection and has stopped welding output, the machine will re-activate once the unit has cooled down.

**Over Current**

The over-current indicator light indicates that the machine has entered over-current protection and has stopped the output. Reset the machine by turning off and then back on.

Please Note: If the above faults still occur, refer to page 28 to carry out a factory reset

# CONTROL PANEL - FUNCTIONS



1 2 3 4 5 6

This TIG and MMA option zones (shown above) breaks down into 6 areas, TIG & MMA welding process mode, HF arc ignition switch for either HF ignition or lift TIG arc starting, TIG torch trigger mode, TIG AC waveform options, TIG pulse ON/OFF switch and MMA controls which are described in a little more detail as below:

1. **Welding mode selection switch**
   The welding mode selection zone contains the welding mode indicators along with the mode selection switch for (top down) TIG AC, TIG DC, TIG Mixed (Hybrid) and MMA. Pressing the TIG mode selection key will allow you to choose the required welding mode and the corresponding indicator will be lit according to your selection.
   When in mixed AC-DC mode, this offers the operator an AC that is a mix of AC and DC output which is suitable for welding thicker aluminium and magnesium and their alloys.

2. **TIG welding mode starting method**
   TIG Arc ignition type:

a. Press the key (No 2, shown above) and when the TIG HF (top) indicator is ON, you have engaged HF arc ignition.

b. Press the key again and when the lift arc (bottom) indicator is ON, you have entered lift arc ignition. When in this mode you place the tungsten in contact with the work piece, press the torch trigger then lift the torch slowly to initiate the TIG welding arc.

3. **TIG torch trigger modes**
   Torch trigger function modes: (top down) 2T, 4T, repeat and spot. Press the No 3 key to select the required welding trigger mode and depending on your selected TIG torch trigger option the corresponding LED indicator will illuminate, see pages 52 and 53 for further details.

4. **TIG AC waveform selection modes**
   When in TIG AC mode (see section 1 above) you can now change the to different AC waveforms.

a. Square wave indicator. When the indicator is on, it indicates that the machine is in square wave mode. Standard AC square waves quickly switch polarity, enjoying high arc stability, good dynamin characteristics, and strong ability to clean aluminium oxide film.
   This mode is suitable for welding a wide range of aluminium and aluminium alloys.

b. Triangular wave indicator. When the indicator is on, it indicates that triangular wave mode is selected. Triangular waves reduce the heat input, so the weld can form rapidly, reducing the welding deformation. This mode is suitable for thin-plate welding.

c. Sine wave indicator. When this indicator is on, it indicates that sine wave mode has been selected. Sine waves have less arc noise and are softer.

# CONTROL PANEL - FUNCTIONS

Continued from the previous page describing the panel control in a little more detail as below:

**5. TIG Pulse feature**

Press the pulse selection button to switch between pulse and no pulse in TIG mode.

1. No-pulse indicator. When the indicator is on, this indicates you are not in pulse mode.
2. Pulse indicator. When the indicator is on, this indicates that pulse TIG mode is active.

**6. MMA parameters selection zone**

This area contains the MMA parameters which can be selected. When you have selected MMA mode (as described in note 1 on the previous page) you will be able to press the parameter mode key to circulate through MMA current output, hot start and arc force functions and the corresponding indicator will be lit according to your selection.

**Easy Set**


When the indicator is on, it indicates that you have entered easy set mode.
Only peak welding current can be adjusted in standard TIG and only current and pulse frequency can be adjusted in TIG pulse mode. All other parameters are pre-determined in accordance with the peak current.

Notes: 1) In TIG mode (DC & AC) , smart gas and water cooler will be automatically engaged.
2) In TIG mode (DC & AC), pulse is deactivated.
3) In TIG AC Mode, only Squarewave is available.
4) In TIG AC Mix Mode, only Squarewave is available.
5) The remote control function is not supported in easy mode.
6) If a water cooler is connected, the water cooling function will activate automatically.
7) In MMA mode, only welding current can be adjusted, hot start and arc force are locked.

**Remote control selection**

The remote selection control allows the user to select current control from either the front panel or to be controlled remotely either via the 9 pin control socket or via the optional wireless control.

The LED indicator alongside the remote button indicates whether remote control is enabled or not.
If the LED is OFF then current control is via the control panel and the panel adjustment dial will alter the welding amperage.
If the LED is ON then a connected wired or wireless hand/foot control will start the welding process and control the amperage.
You can also use a remote current control device when in MMA mode which will control MMA amperage.
When a foot pedal is fitted, pressing down on the foot pedal will increase the welding current and releasing the foot pedal will decrease the welding current.

**The remote control facility is effective for both TIG and MMA mode.**

# CONTROL PANEL - FUNCTIONS

**Program Storage**

Program save is a feature where you can save your welding setup via the user control panel. First, setup your desired welding mode and parameter information, press the save button (as shown left) and the storage indicator will illuminate.
Rotate the control dial clockwise or anti-clockwise to select your chosen storage channel number from job No 01 ～ No 10. (Job No 3 shown right).
Pressing the save button again will save your program and exit the weld program save function and turn off the program storage indicator.


**Program Recall**

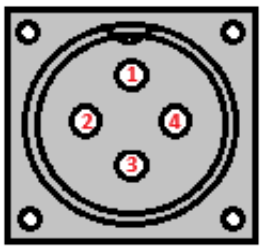
Program recall will allow you to load saved welding programs. First, press the load button to recall the parameters, this is noted by indicator turning on.
Rotate control dial clockwise or anti-clockwise to select storage channels from Job No 01 ～ No 10 (Job No 1 shown right).
Pressing the recall button again will load your program data and then exit program recall function and also turn off the program storage indicator.


**Smart gas feature**


Pressing the Smart Gas switch will enable this feature which when active the indicator will illuminate to show that the machine is in smart gas mode.
This function will automatically match the appropriate post-flow time according to the user's welding specifications which effectively helps to reduce shielding gas consumption.

**Water cooler control**


Press the water cooler control button to enable or disable water-cooled mode.
If the indicator is ON, this indicates that the connected water-cooler is enabled.
When the output is activated and welding starts the water cooler will start and then circulate the coolant around the system, when welding stops and there is no current output, then the water cooler will stop circulating after pre-determined time.
Water-cooled mode is required when using a water-cooled torch, if not then the TIG welding torch will be quickly damaged.




- Pins 1 & 2 is the power output connections for the water cooler.
- Pin 3 is the fault signal input connections, no coolant flow signal.
- Pin 4 is the ground connection.

**Please Note:** The EVO ET-320P can only use the originally designed Jasic water cooler. Do not use water coolers purchased from other sources.

**VRD indicator**


The VRD LED will be lit when the machine is in MMA mode and the VRD function is enabled.
When the VRD indicator is lit the output voltage is 9.5V (see page 75 for further details on VRD).

- The VRD LED will go off when the welding arc is established.
- VRD can be disabled although this requires a technician to carry out this task, please contact your supplier for further details.
- The default setting for VRD, VRD is factory set to off.

# CONTROL PANEL - SETTINGS

### Configuration Settings (Engineers mode)

### Standby Time Adjustment

Standby time is a function that when there is no operator activity with the Jasic TIG machine, then after a pre-determined time (Factory time: 10 minutes) the machine will go into standby (sleep) mode.
To enter the setting screen, press and hold the "Current Setting dial knob" for 2 seconds and you will note on the display a countdown will start from 3 seconds to zero, once the countdown is complete the panel displays "F01".


To access standby time press the control dial again to enter this parameter.

Now, rotate the control dial clockwise/anticlockwise to change the standby response time.
There is four levels to choose from, 0, 5 10, & 15 (where 0 means disabled). 5, 10 & 15 correspond to the response times in minutes. (default value is 10.)

Upon selecting your chosen response time, press the control dial to save the current settings.
Then press the welding mode button to complete the operation and exit.

The standby function is only available in TIG mode.
The machine will not go into standby mode if a wired remote control is connected.


If the machine is not used within a set period of time (10 minutes for example), the machine will then enter a standby state where the unit powers down and only the middle bar of the first digit on the display panel will flash (as circled red in the image right). The flash rate is at a frequency of 1 blink per second.

The machine will wake up immediately and the screen will show the previous data when either the torch trigger, remote device or if one of the control panel buttons are pressed.

### Restore Factory Settings


To reset to factory settings for the ET-320P ACDC, press and hold the welding mode button for 5 seconds to restore all factory settings.

After holding the button for 1 second the display window will show the start of a count down from 3 to zero. When the countdown ends, the factory settings are restored.

If the button is released before the countdown ends, the restore will not have taken place.

# CONTROL PANEL - FUNCTIONS

### Configuration Settings (Engineers mode)

### Restore Factory Settings (Continued)

Following a factory settings, the table below shows the preset factory settings:

| Welding Parameter | Unit | MMA | DC TIG | DC Pulse TIG | AC TIG | AC Pulse TIG | Mixed TIG |
|---|---|---|---|---|---|---|---|
| Pre-flow time | Seconds | - | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Initial current | Amps | - | 20 | 20 | 20 | 20 | 20 |
| Up-slope time | Seconds | - | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Peak current | Amps | - | 100 | 100 | 100 | 100 | 100 |
| Base current | Amps | - | - | 50 | - | 50 | - |
| Down-slope time | Amps | - | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Final current | Amps | - | 20 | 20 | 20 | 20 | 20 |
| Post-flow time | Seconds | - | 2 | 2 | 2 | 2 | 2 |
| Spot welding time | Seconds | - | .01 | - | .01 | - | - |
| Spot interval time | Seconds | - | 0.5 | - | 0.5 | - | - |
| Pulse frequency | Hz | - | - | 50 | - | 0.5 | - |
| Pulse duty cycle | % | - | - | 50 | - | 50 | - |
| Welding current | Amps | 100 | - | - | - | - | - |
| Hot start current | Amps | 30 | - | - | - | - | - |
| Arc-force current | Amps | 30 | - | - | - | - | - |
| AC Frequency | Hz | - | - | - | 20 | 20 | 50 |
| AC Balance | % | - | - | - | 30 | 30 | 30 |
| Mixed Frequency | Hz | - | - | - | - | - | 2.5 |
| Mixed Duty Cycle | % | - | - | - | - | - | 20 |

# CONTROL PANEL - FUNCTIONS

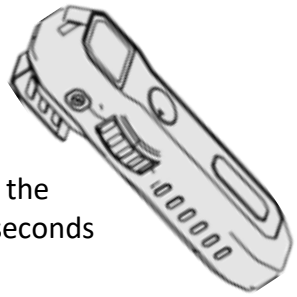
**Wired (Foot pedal / hand-held) Remote Control**

A 9 pin remote control socket is fitted as standard to the front panel of the machine, see pages 80 & 81 for further details on optional remote controls)

1) Before welding, press the remote-control function button to enable the remote control function.
2) The indicator will be lit indicating that the remote-control function is enabled.
   If the remote controller is connected, the remote control device controls the welding current.
   If no remote controller is connected then the welding current is controlled by the panel control dial.
3) If the indicator is not lit, this indicates that the remote-control function is not active and welding current is controlled by the front panel control dial.

Please Note: If remote is selected and no remote device is connected, this can cause unstable output.
The machine will not go into sleep mode if a wired remote control is connected.

**Wireless Remote Controls**



**1) Wireless pairing connection**

Before welding, press and hold the panel remote control function button and the pairing button of the wireless remote controller at the same time, hold for 2 seconds to perform wireless remote control pairing.

During pairing, the blue indicator of wireless receiver module flashes, after successful pairing, the indicator of remote control mode is on .

At the same time the blue indicator of wireless receiver module will be constant on and the welder display window displays "OK".

After successful pairing, the welding current can be adjusted by the wireless remote controller.

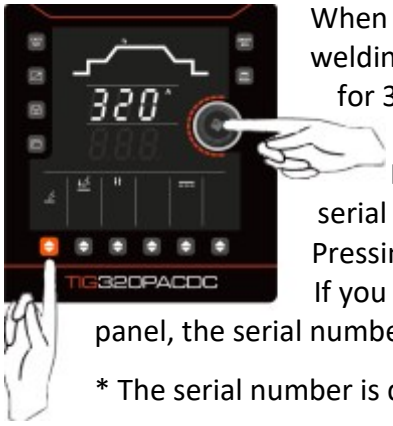
The range of current is from the machines minimum to the maximum current value which was previously displayed as preset current on the panel.

**2) Disconnecting the wireless connection**

After the remote controller is successfully paired, press the remote control function button on the panel or the pairing button of the wireless remote controller for 2 seconds, and the wireless connection of the remote controller will be disconnected.

After disconnecting the display window of the welder displays the character "FAL", and the green indicator of the wireless receiver module will be constantly on.

**Serial Number Display ***




When the machine is in it's idle state (before welding), press and hold both the welding mode button and the parameter adjustment dial button (as shown left) for 3 seconds to display the machines serial number.

Rotating the encoder will allow the operator to scroll though to see the full serial number from the display.

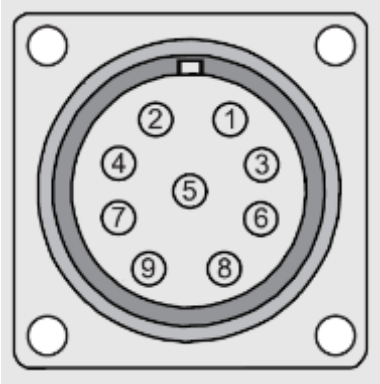
Pressing any key will clear the serial number from the display.

If you do not perform any welding operation or touch any button on the control panel, the serial number will clear automatically from the display after 20 seconds.

* The serial number is different to the warranty number.

# REMOTE CONTROL SOCKET

The Jasic TIG ET-320P ACDC is fitted with 9 pin remote control socket located on the front panel which is used to connect various remote control devices, for example: a TIG torch with trigger switch, a TIG torch with mounted switch and current adjustment dial, the Jasic FRC-01 footpedal or other similar devices including MMA remote control devices.




When fitting the 9 pin remote plug, ensure you align the keyway when inserting the plug, then rotate the threaded collar fully clockwise until finger tight.

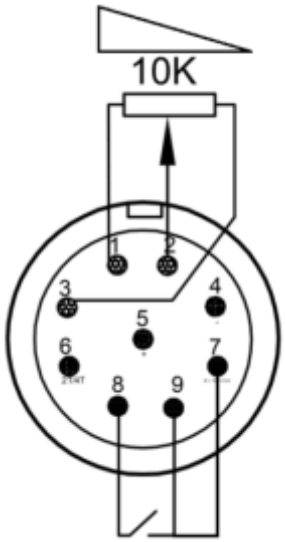
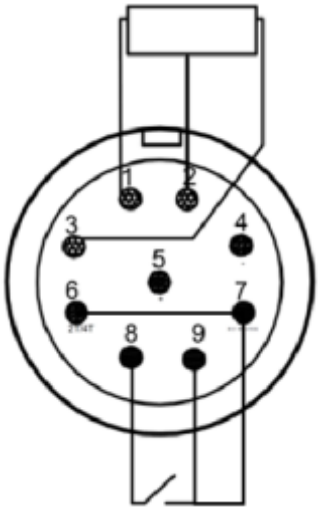
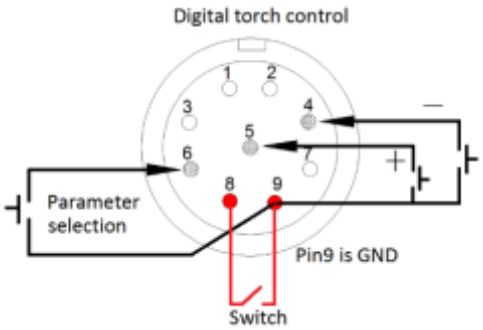
| 9 Pin Remote socket configuration | | | |
|---|---|---|---|
| **Pin** | **Analogue Description** | **Signal** | **Digital Description** |
| 1 | Potentiometer (min) | VCC | - |
| 2 | Potentiometer wiper | ASI | - |
| 3 | Potentiometer (max) | A_GND | - |
| 4 | - | DIG_SI - | Digital signal - |
| 5 | - | DIG_SI + | Digital signal + |
| 6 | Foot pedal controller recognition | TYPE1 | Parameter Selection |
| 7 | Analog signal recognition （Connected to GND） | TYPE | - |
| 8 | Torch switch | TORSWI | Torch switch signal |
| 9 | Torch switch/ground | GND | GND |

The 9 pin plug and clamp part number is: JSG-PLUG-9PIN

**Remote device activation**

As with the previous page, to activate remote, press the remote button and the remote LED will illuminate (as shown left), this indicates that the machine is ready to be used with a remote control device.
Pressing the remote button again will turn off remote control.

**Remote Control Device Wiring**

| Analog Torch Control | FRC-01 Footpedal | Digital Torch Control |
|---|---|---|
|  |  |  |

# MMA SETUP

**Output connections**

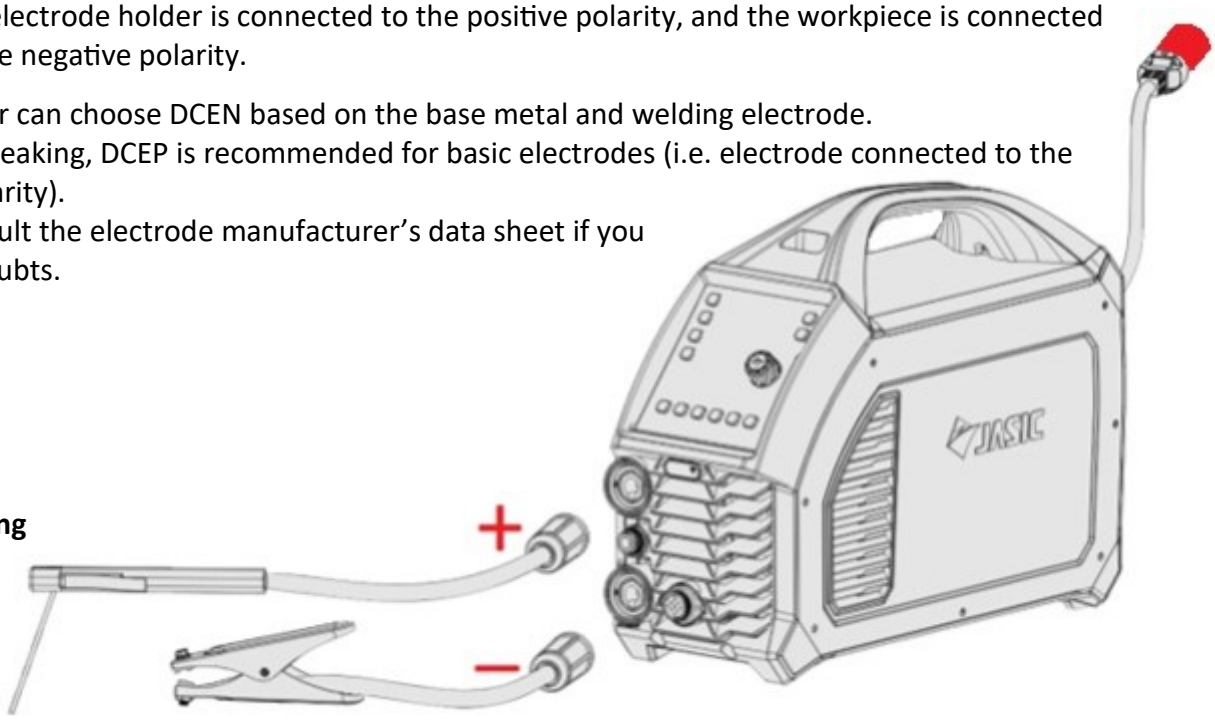
Electrode polarity is generally determined by the type of welding rod being used although in general when using manual arc welding electrodes the electrode holder is connected to the positive terminal and the work return to the negative terminal.

Generally, there are two connection methods of DC welder: DCEN and DCEP connection.

DCEN: The welding electrode holder is connected to the negative polarity, and the workpiece is connected to the positive polarity.
DCEP: The electrode holder is connected to the positive polarity, and the workpiece is connected to the negative polarity.

The operator can choose DCEN based on the base metal and welding electrode.
Generally speaking, DCEP is recommended for basic electrodes (i.e. electrode connected to the positive polarity).
Always consult the electrode manufacturer's data sheet if you have any doubts.

**MMA welding**

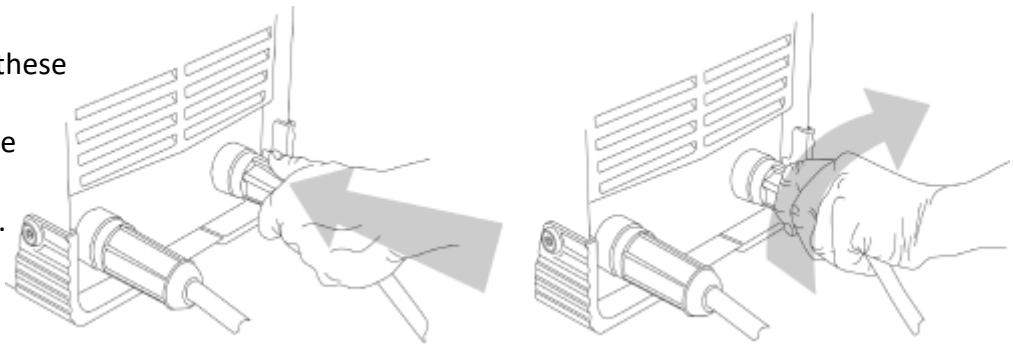



1. When connecting welding cables, ensure that the machines ON/OFF mains switch is turned off and never connect the machine to the mains supply with the panels removed.
2. Insert the cable plug with electrode holder into the "+" socket on the front panel of the welding machine and tighten it clockwise. *
3. Insert the cable plug of the work return lead into the "-" socket on the front panel of the welding machine and tighten it clockwise. *

If you want to use long secondary cables (Electrode holder cable and/or earth cable), you must ensure that the cross-sectional area of the cable is increased appropriately in order to reduce the voltage drop due to the cable length.

* Always check the specifications of the welding rod being used to ensure correct polarity is used.

**Please Note:**
It's very important to check these power connections daily to ensure they have not become loose otherwise arcing may occur when used under load.



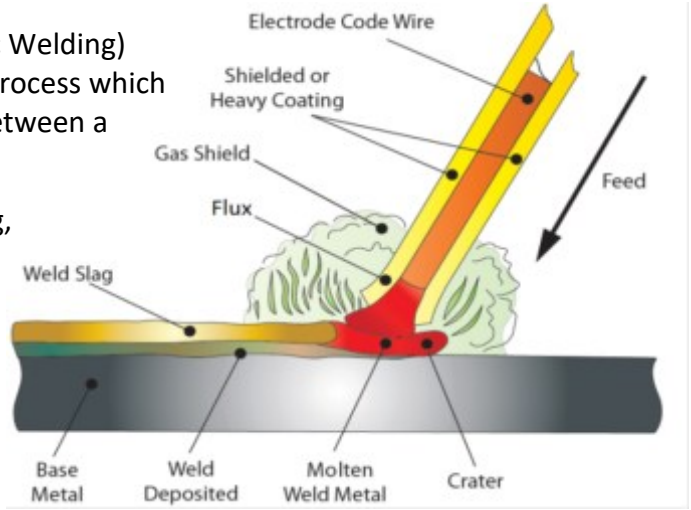
Generic library picture

# OPERATION - MMA

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**MMA welding**

MMA (Manual Metal Arc), SMAW (Shielded Metal Arc Welding) or just Stick Welding. Stick welding is an arc welding process which melts and joins metals by heating them with an arc between a covered metal electrode and the work.

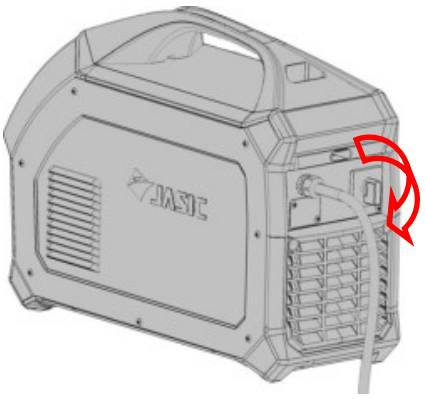



Shielding is obtained from the electrode outer coating, often called flux. Filler metal is primarily obtained from the electrode core.

The electrodes outer coating called flux assists in creating the arc and provides a shielding gas and on cooling forms a slag covering to protect the weld from contamination.

When the electrode is moved along the work piece at the correct speed the metal core deposits a uniformed layer called the weld bead.

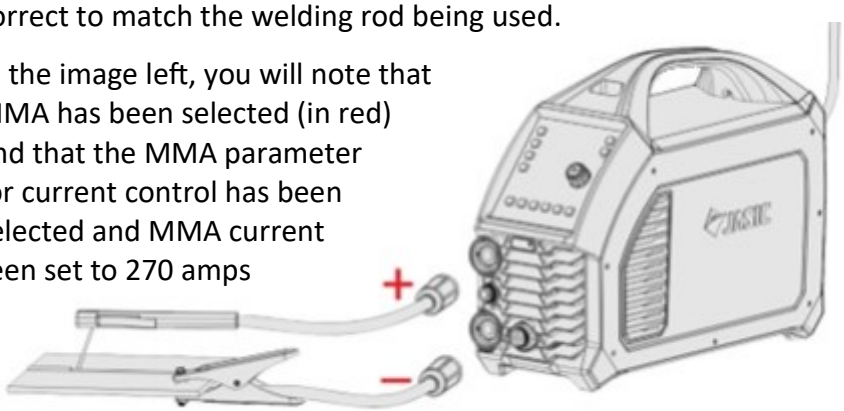
After connecting the welding leads as detailed above, plug your machine into the mains supply and turn 'ON' the machine, the power switch is located at the rear panel of the machine, rotate the switch to the "ON" position, the panel indicator will then light up, the fan may start to rotate as the welding machine powers up and the control panel will also light up to indicate that the machine is ready to use as shown below.



**Caution, there is voltage output at both output terminals.**


**PLEASE NOTE:**
Some welding models are equipped with the smart fan function. When the power supply is turned on after a period before welding starts, the fan will automatically stop running.
The fan will then run automatically when welding begins.

Now you can connect the welding leads as shown in the image below, ensure you check that you have the electrode polarity correct to match the welding rod being used.




In the image left, you will note that MMA has been selected (in red) and that the MMA parameter for current control has been selected and MMA current is adjusted via the control dial and has been set to 270 amps which is previewed on the display.
You will note in the above image that the remote control option is turned off, so current control is via the control panel dial.

# OPERATION - MMA

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing as, welding rays, spatter, smoke and high temperatures produced in the process may cause injury to personnel.**
**Also take the necessary steps to protect any persons within the welding area that may cause injury to.**

### MMA welding


Select MMA welding mode by pressing the green arrow button until the MMA symbol is illuminated as shown in the image right

When in MMA mode you can select and adjust welding current, hot start current and arc force parameters respectively as described below.

MMA current adjustment can now be carried out via the panel control adjustment dial and this can be achieved by pressing the button (as shown left) until the current setting icon is highlighted and illuminated. Rotating the control dial clockwise or anticlockwise will increase or decrease the welding amperage.

Please Note: Welding current adjustment can be carried out during welding.

To select MMA ignition current (hot start current), press the button (as shown left) until the ignition current icon illuminates, you can now rotate the adjustment control knob until the desired ignition amps is shown on the display above. Rotating the control dial clockwise or anticlockwise will increase or decrease the start current. Hot start current is additional to the main current setting.
See page 34 for further details on hot start.

To select MMA arc force, press the button (as shown left) until the arc force icon illuminates, you can now rotate the adjustment control knob until the desired ignition amps is shown on the display above. Rotating the control dial clockwise or anticlockwise will increase or decrease the required arc force current. Arc force current is additional to the main current setting.
See page 34 for further details on arc force.

If the secondary cables (welding cable and earth cable) being used are required to be very long, ensure you select welding cable with larger cross-section to reduce the voltage drop.

### VRD indicator


In MMA mode, the VRD LED will be lit to indicate that VRD is active and the machines output voltage is 9.5V.

The table right offers a guide to set up for various welding electrode diameters sizes versus recommended current ranges.
The operator can set their own parameters based on the type and diameter of welding electrode and their own process requirements.

| Electrode Size (mm) | Recommended Welding Current (A) |
|---|---|
| 1.0 | 20 ~ 60 |
| 1.6 | 44 ~ 84 |
| 2.0 | 60 ~ 100 |
| 2.5 | 80 ~ 120 |
| 3.2 | 108 ~ 148 |
| 4.0 | 140 ~ 180 |
| 5.0 | 160 ~ 250 |

**PLEASE NOTE:**
The operator should set the parameters that suits the welding application. If the selections are incorrect this may lead to problems such as an unstable arc, spatter or sticking of the welding electrode to the work piece.

# OPERATION - MMA

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing as, welding rays, spatter, smoke and high temperatures produced in the process may cause injury to personnel.**
**Also take the necessary steps to protect any persons within the welding area that may cause injury.**

**MMA welding**

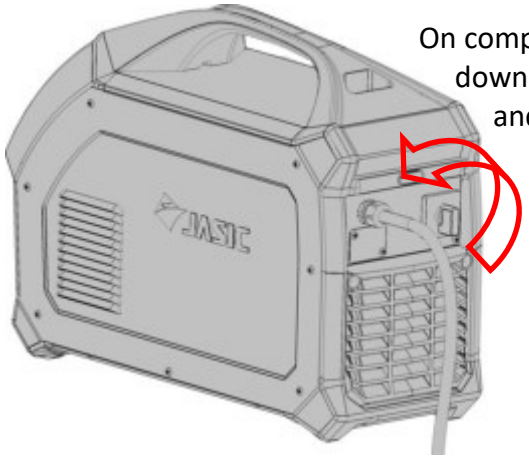
**Arc force:**
Arc force prevents the electrode sticking when welding. Arc force provides a temporary increase in current when the arc is too short and helps maintain consistent excellent arc performance on a wide range of electrodes. The Arc force value should be determined according to welding electrode diameter, current setting, and process requirements. High arc force settings lead to a crisper, higher penetration arc but with some spatter. Lower arc force settings provide a smooth arc with lower spatter and a good weld seam formation, but sometimes the arc is soft or the welding electrode can stick.

**Hot start current:**
The hot start current is an increase in welding current at the start of the weld to give excellent arc ignition and to avoid the electrode sticking. It also can reduce weld defects at the start of the weld.
The magnitude of hot start current is generally determined based on the type, specification, and welding current of welding electrode.

During DC welding the heat on the positive and negative electrodes of the welding arc is different. When welding using DC power supply, there are DCEN (DC electrode negative) and DCEP (DC electrode positive) connections. The DCEN connection refers to the welding electrode connected to the negative electrode of the power supply and the work piece connected to the positive electrode of the power supply.
In this mode the work piece receives more heat, resulting in high temperature, deep molten pool, easy to weld through, suitable for welding thick parts. The DCEP connection refers to the welding electrode connected to the positive power supply with the work piece connected to the negative power supply.
In this mode the work piece receives less heat, resulting in low temperature, shallow pool, and difficulty in welding through. This is suitable for welding thin parts.

**During welding:**
PLEASE NOTE: This unit has anti-stick function by default. In the welding process, if a short circuit occurs on the welding output for 2 seconds, the machine will automatically enter anti-stick mode. This means the welding current will automatically drop to 20A to allow the short circuit to be cleared.
When the short circuit is cleared the welding current will automatically return to the set current.

**Turn off the power supply after welding**



On completion of any welding operating, the machine should be powered down. The power switch is located on the rear panel of the machine and should be set to the "off" position.

It maybe noted that for a short period of time that the machine fan continues to run, this is quite normal and after a short time delay, the control panel lights indicator will turn off and the fan will stop indicating that the welder has now fully powered down.

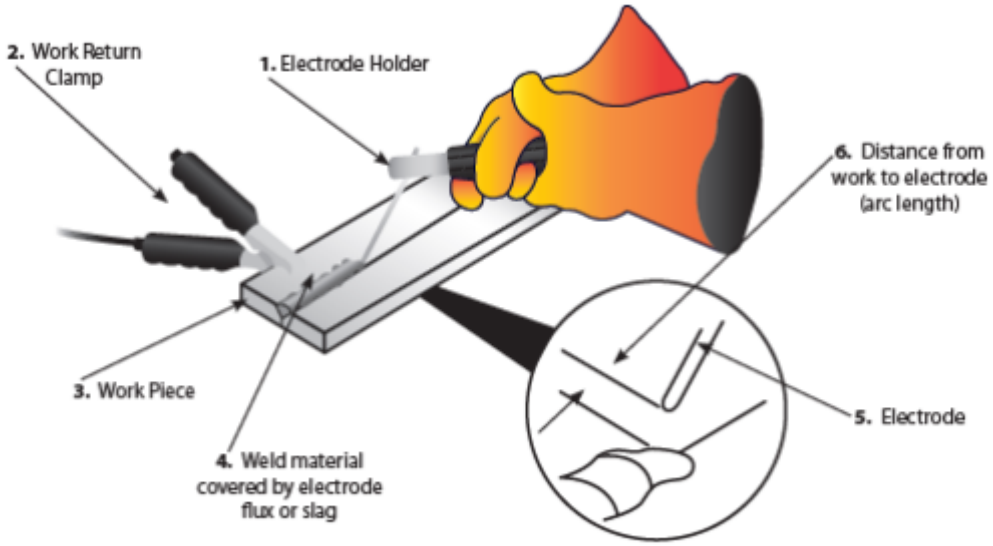
# GUIDE TO MMA WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing.**
**Also take the necessary steps to protect any persons within the welding area.**

**MMA process tips and guides**

**Typical welder set up**

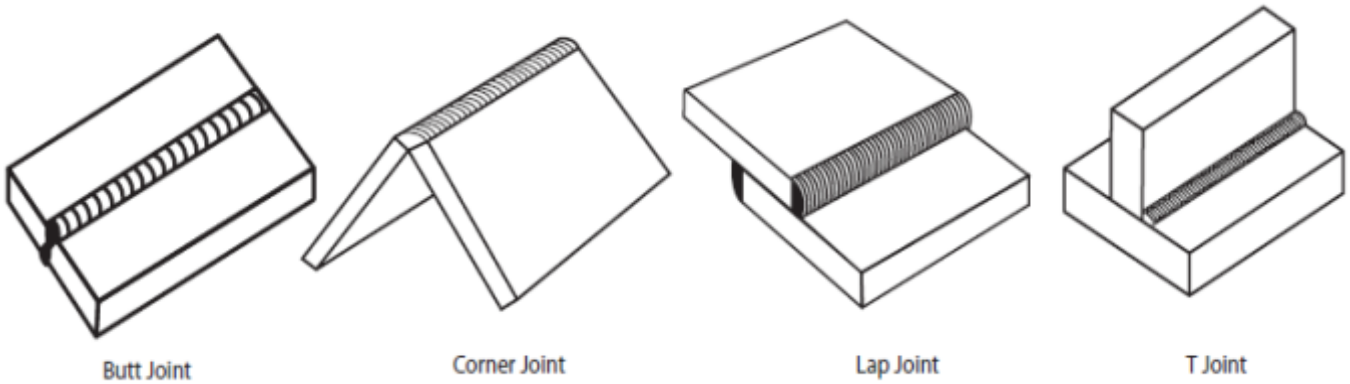
1. Electrode holder
2. Work return clamp
3. Work piece
4. Weld material covered by electrode flux or slag
5. Electrode
6. Distance from work to electrode (arc Length)




Welding current will flow in the circuit as soon as the electrode contacts the work piece. The welder should always ensure a good connection of the work clamp. The nearer the clamp is placed to the welding area the better.
When the arc is struck the distance between the end of the electrode and the work will determine the arc voltage and also affect the weld characteristic. As a guide the arc length for electrodes up to 3.2mm diameter should be around 1.6mm and over 3.2mm around 3mm.
Upon completion of the weld the welding flux or slag will need to be removed usually with a chipping hammer and wire brush.

**Joint form in MMA**

In MMA welding, the common basic joint forms: butt joint, corner joint, lap joint & T joint.

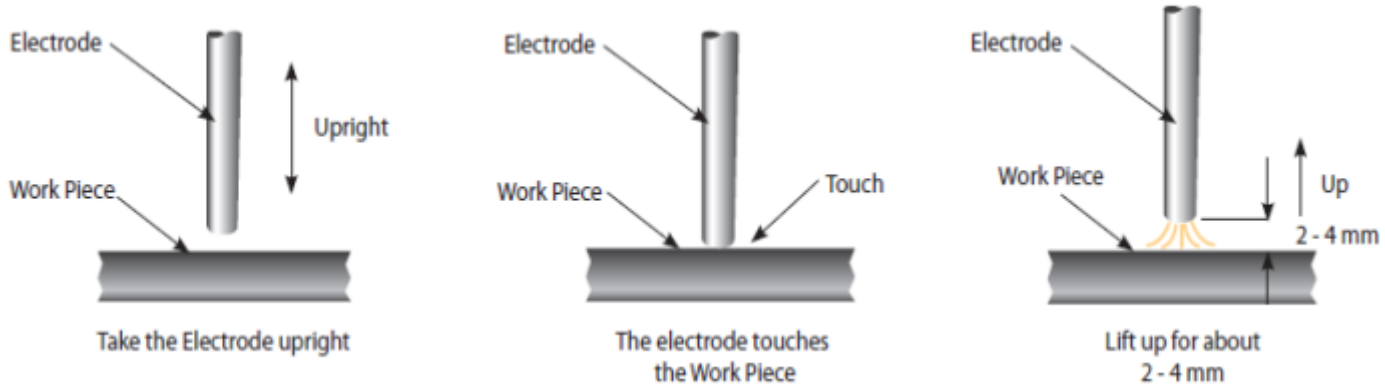


# GUIDE TO MMA WELDING

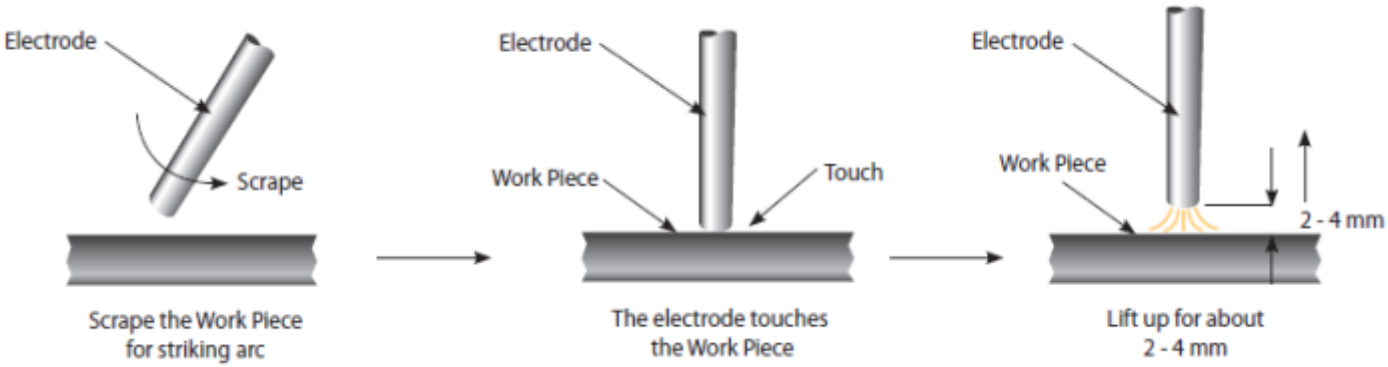
**Before starting any welding activity ensure that you have suitable eye protection and protective clothing.**
**Also take the necessary steps to protect any persons within the welding area.**

### MMA arc striking

**Tap Technique -** Lift the electrode upright and bring it down to strike the work piece. After forming a short circuit, quickly lift up about 2 ~ 4mm and arc will be ignited. This method is difficult to master.



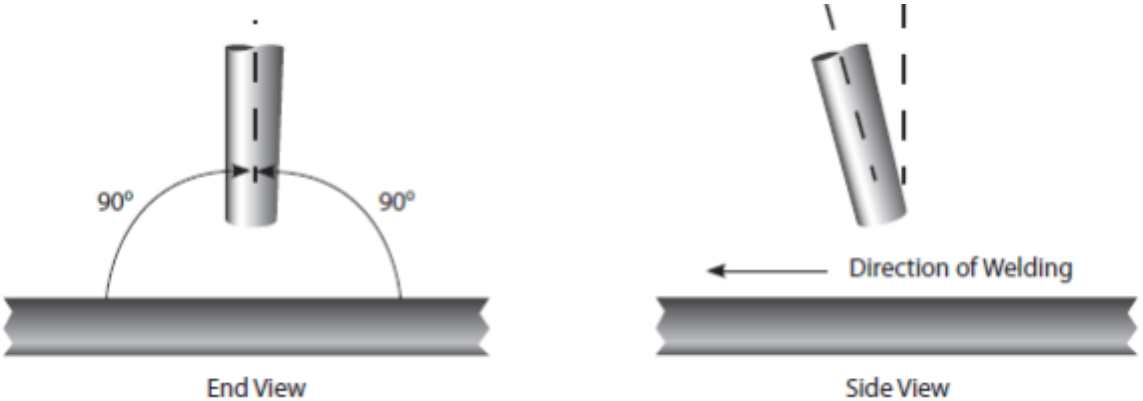

**Scratch technique -** Drag the electrode and scratch the work piece as if striking a match. Scratching the electrode may cause the arc to burn along the scratch path, so care should be taken to scratch in the weld zone. When the arc is struck adopt the correct welding position.




### Electrode positioning

### Horizontal or flat position

The electrode should be positioned at right angles to the plate and inclined in the direction of travel at around 10º ~ 30º.

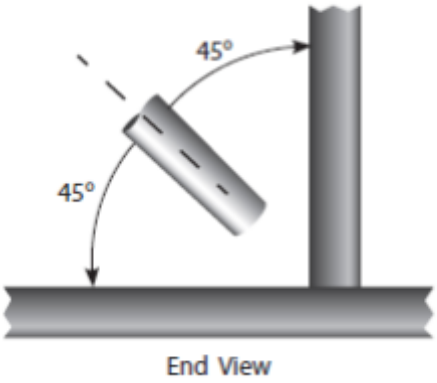


# GUIDE TO MMA WELDING

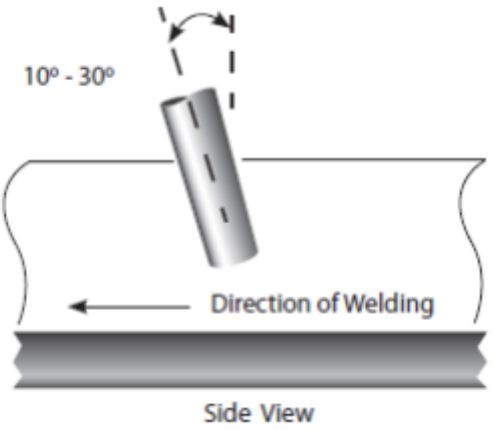
**Before starting any welding activity ensure that you have suitable eye protection and protective clothing.**
**Also take the necessary steps to protect any persons within the welding area.**

**Fillet welding**

The electrode should be positioned to split the angle i.e. 45º. Again the electrode should be inclined in the direction of travel at around 10º ~ 30º.



End View

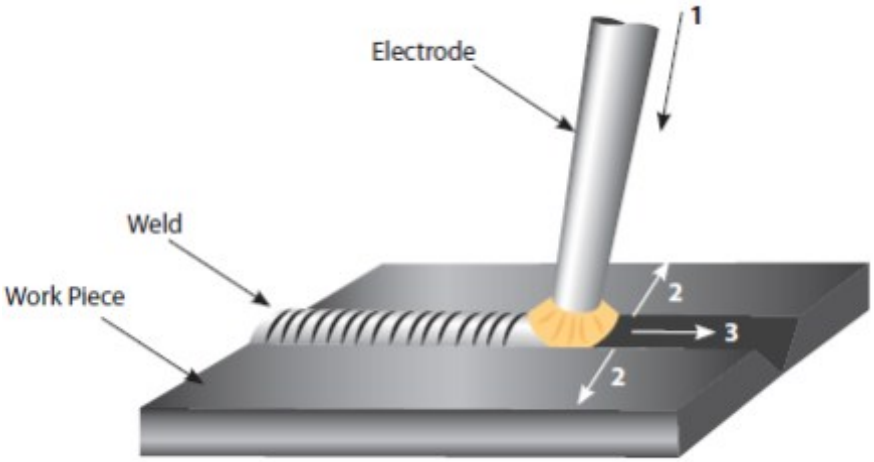


Side View

**Manipulation of electrode**

In MMA welding there are three motions used at the end of electrode:

1. The electrode feeding to the molten pool along axes
2. The electrode swing right and left
3. The electrode moving in the weld direction




The operator can choose the manipulation of electrode based on welding joint, welding position, electrode spec, welding current and operation skill etc.

**Weld characteristics**

A good weld bead should exhibit the following characteristics:

1. Uniform weld bead
2. Good penetration into the base material
3. No overlap
4. Fine spatter level

A poor weld bead should exhibit the following characteristics:

1. Uneven and erratic bead
2. Poor penetration into the base material
3. Bad overlap
4. Excessive spatter levels
5. Weld crater

# GUIDE TO MMA WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**Notes for the welding beginner**

This section is designed to give the beginner who has not yet done any welding some information to get them going. The simplest way to start is to practice by running weld beads on a piece of scrap plate. Start by using mild steel (paint free) plate of 6.0mm thick and using 3.2mm electrodes.
Clean any grease, oil and loose scale from the plate and fix firmly to your work bench so that welding can be carried out. Make sure that the work return clamp is secure and making good electrical contact with the mild steel plate, either directly or through the work table. For best results always clamp the work lead directly to the material being welding, otherwise a poor electrical circuit may create itself.

**Welding position**

When welding, ensure you place yourself in a comfortable position for welding and your welding application before you begin to weld. This maybe be sitting at a suitable height which often is the best way to weld ensuring you're relaxed and not tense. A relaxed posture will ensure the welding task becomes much easier.
Please ensure you always wear suitable PPE and use suitable fume extraction when welding.
Place the work so that the direction of welding is across, rather than to or from your body.
The electrode holder lead should always be clear of any obstruction so that you can move your arm freely along as the electrode burns down. Some elders prefer to have the welding lead over their shoulder, this allows greater freedom of movement and can reduce the weight from your hand.
Always inspect your welding equipment, welding cables and electrode holder before each use to ensure it's not faulty or worn as you may be at risk of an electric shock.

**MMA process features and benefits**

The versatility of the process and the skill level required to learn, basic simplicity of the equipment make the MMA process one of the most common used throughout the world.

The MMA process can be used to weld a wide variety of materials and is normally used in the horizontal position but can be used in vertical or overhead with the correct selection of electrode and current. In addition, it can be used to weld at long distances from the power source subject to the correct cable sizing. The self shielding effect of the electrode coating makes the process suitable for welding in external environments. It is the dominant process used in maintenance and repair industries and is used extensively in structural and fabrication work.
The process is well able to cope with less than ideal material conditions such as dirty or rusty material. Disadvantages of the process are the short welds, slag removal and stop starts which lead to poor weld efficiency which is in the region of 25%. The weld quality is also highly dependent on the skill of the operator and many welding problems can exist.

# MMA WELDING TROUBLESHOOTING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing.**
**Also take the necessary steps to protect any persons within the welding area.**

**Arc welding defects and prevention methods**

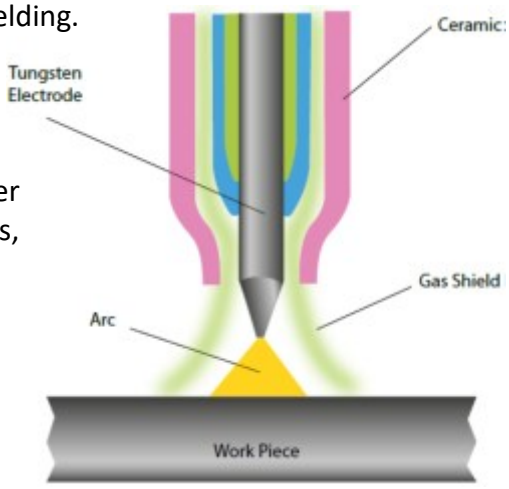
| Defect | Possible cause | Action |
|---|---|---|
| Excessive spatter (beads of metal scattered around the weld area) | Amperage too high for the selected electrode | Reduce amperage or utilise larger diameter electrode |
| | Voltage too high or arc length too long | Reduce arc length or voltage |
| Uneven and erratic weld bead and direction | Weld bead is inconsistent and misses joint due to operator | Operator training required |
| Lack of penetration – The weld bead fails to create complete fusion between material to be welded, often surface appears okay but weld depth is shallow | Poor joint preparation | Joint design must allow for full access to the root of the weld |
| | Insufficient heat input | Material too thick<br>Increase the amperage or increase the electrode size and amperage |
| | Poor weld technique | Reduce travel speed<br>Ensure the arc is on the leading edge of the weld puddle |
| Porosity – Small holes or cavities on the surface or within the weld material | Work piece dirty | Remove all contaminant from the material i.e. oil, grease, rust, moisture prior to welding |
| | Electrode is damp | Replace or dry the electrode |
| | Arc length is excessive | Reduce the arc length |
| Excessive penetration – The weld metal is below the surface level of the material and hangs below | Heat input too high | Reduce the amperage or use a smaller electrode and lower amperage |
| | Poor weld technique | Use correct welding travel speed |
| Burning through – Holes within the material where no weld exists | Heat input too high | Use lower amperage or smaller electrode<br>Use correct welding travel speed |
| Poor fusion – Failing of weld material to fuse either with the material to be welded or previous weld beads | Insufficient heat level | Increase the amperage or increase the electrode size and amperage |
| | Poor welding technique | Joint design must allow for full access to the root of the weld<br>Alter welding technique to ensure penetration such as weaving, arc positioning or stringer bead technique |
| | Work piece dirty | Remove all contaminant from the material i.e. oil, grease, rust, moisture prior to welding |

# TIG SETUP

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

### TIG welding mode

Terms used: TIG – Tungsten Inert Gas, GTAW – Gas Tungsten Arc Welding.

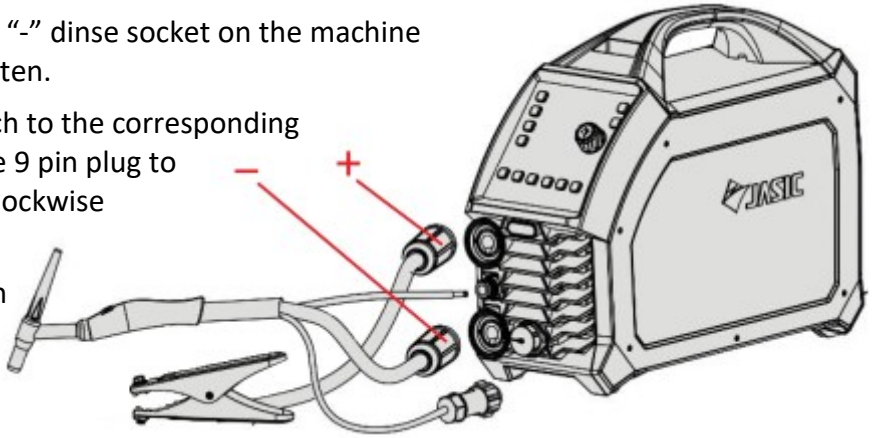



TIG welding is an arc welding process that uses a non-consumable tungsten electrode to produce the heat for welding.
The weld area is protected from atmospheric contamination by a shielding gas (usually an inert gas such as argon or helium) and a filler rod matching the base material is normally used, though some welds, known as autogenous welds, are carried out without the need for filler wire.

The TIG welding process can be either AC or DC, The ET-320P is a AC/DC TIG machine, AC (Alternating Current) for welding aluminium and DC (Direct Current) for welding steel, stainless steel, copper etc.

Connect the TIG torch connector to the "-" dinse socket on the machine front panel and rotate clockwise to tighten.

Connect the switch plug on the TIG torch to the corresponding socket on the machine panel, locate the 9 pin plug to the socket and rotate the locking ring clockwise to secure in place.




Insert the dinse plug on the work return cable into the "+" socket on the front panel of the machine and rotate clockwise to tighten.
Attach the work clamp to the work piece.

Connect the gas hose of the TIG torch to the quick connector on the machine front.
Connect the supply gas hose to the gas inlet on the back panel of the machine. The other end of the supply hose connects to the gas regulator on the cylinder.

Press the torch trigger briefly, the solenoid valve will operate and gas will flow.

Adjust the welding current according to the thickness of the work piece to be welded (for a guide to welding parameters, please refer to the table below).

Hold the torch 2-4mm away from the work piece and then press the torch trigger.
After the arc is ignited, the HF discharge will cease, the current will maintain at the preset value and welding can be carried out.

After releasing the torch trigger, the welding arc stops but gas will continue flowing for the post flow time set, welding then ends.

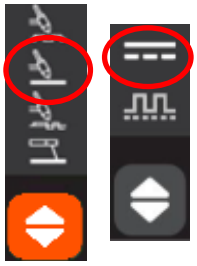
The amperage guide for TIG welding tungsten sizes can vary depending on material, work piece thickness, welding position and joint form.

| Tungsten Size | Amperage Range |
|---|---|
| 1.0mm | 15A ~ 80A |
| 1.6mm | 70A ~ 150A |
| 2.4mm | 150A ~ 250A |
| 3.2mm | 250A ~ 400A |
| 4.0mm | 400A ~ 500A |
| 6.0mm | 750A ~ 1000A |

# OPERATION - TIG

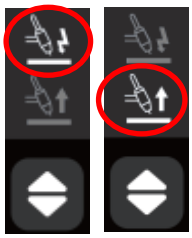
**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG DC operation steps**



To select TIG mode, press the green welding mode selection button until the (2nd to top) TIG DC LED is illuminated as shown far left, then ensure you have also selected standard (pulse off) mode as also circled left.

Select the 2T torch trigger mode by pressing the torch mode button until the 2T LED is Illuminated as shown right (for alternative trigger modes details, please see pages 53/54).



Now, select your TIG starting method of either HF or Lift TIG.
Start by pressing the HF/lift arc button until the desired TIG start LED is illuminated as shown left. See from page 59 for further details.

To select pre flow gas time setting, rotate the adjustment dial until the pre-gas LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the pre flow time shown in the display window.
The pre flow adjustment range is 0 ~ 10 seconds.

To select the initial start current setting, rotate the adjustment dial until the start amps LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the start amps shown in the display window.
The start current adjustment range is 10 ~ 320 amps.

To select upslope time, rotate the adjustment dial until the upslope time LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the upslope time shown in the display window.
The upslope time adjustment range is 0 ~ 15 seconds.

To select the required welding current setting, rotate the adjustment dial until the peak amps LED is lit, then press the dial and the LED will then start to flash, then rotating the adjustment control dial will adjust the welding current shown in the display window.
The welding current adjustment range is 10 ~ 320 amps.

# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG DC operation steps (continued)**

To select downslope time, rotate the adjustment dial until the downslope time LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the downslope time shown in the display window.
The downslope time adjustment range is 0 ~ 15 seconds.

To select final amps (crater current) setting, rotate the adjustment dial until the final amps LED is lit, then press the dial and the LED will then start to flash, by rotating the adjustment control dial will adjust the final amps shown in the display window.
The final current adjustment range is 10 ~ 320 amps.

To select post flow gas time setting, rotate the adjustment dial until the post gas LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the post flow time shown in the display window.
The post flow adjustment range is 0 ~ 50 seconds.

**Please Note**: If you have Smart Gas set to ON, then you will not have the option to adjust post-gas time.

To select spot welding time, first you have to ensure you have selected spot time mode (see pages 53/54 for further details). Rotate the adjustment dial until the spot time LED is lit, then press the dial and the LED will then start to flash, by rotating the adjustment control dial will adjust the spot time shown in the display window.
The spot time adjustment range is 0.01 ~ 10 seconds. Interval time range is 0.1 ~ 10 seconds.

**TIG DC pulse operation steps**

To select TIG pulse mode, first press the green welding mode selection button until the 2nd to top TIG DC LED is illuminated as shown left, then select TIG pulse option (as shown right), when the pulse indicator is illuminated this informs the operator that TIG pulse is active

Proceed with the setting up of pre gas, upslope, welding current, downslope time, final (crater) current and post flow gas time as per standard TIG DC (See page 41).

In pulse mode, the welding current setting now becomes the peak welding current of the pulse.

# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG DC pulse operation steps (continued)**

To select welding current, rotate the dial until the peak amps LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the welding current shown in the display window. Range is 10 ~ 320 amps.

The next step will allow setting of the base current. This function is only allowed when the pulse mode is selected.

To select background current, rotate the dial until the base amps LED is lit, then press the dial and the LED will then start to flash, rotating the adjustment control dial will adjust the base current shown in the display window. Range is 10 ~ 320 amps.

To select and set TIG pulse frequency, rotate the dial until the pulse Hz LED is lit, then press the dial and the Hz LED will then start to flash, rotating the adjustment control dial will adjust the pulse frequency rate between 0.5Hz ~ 200Hz.

To select and set pulse ratio (width), rotate the dial until the pulse % LED is lit, then press the dial and the % LED will then start to flash, rotating the adjustment control dial will adjust the pulse ratio rate between 10% ~ 90% .

After the parameters are set appropriately, open the gas valve of the cylinder and adjust the gas regulator to the desired gas flow.

Keep the torch 2-4mm away from the work piece and then press the torch trigger.

Gas will start to flow followed by the HF and the arc is ignited.

Once the arc is ignited the HF will cease and the current rises up to the pre-set value and welding can be carried out.

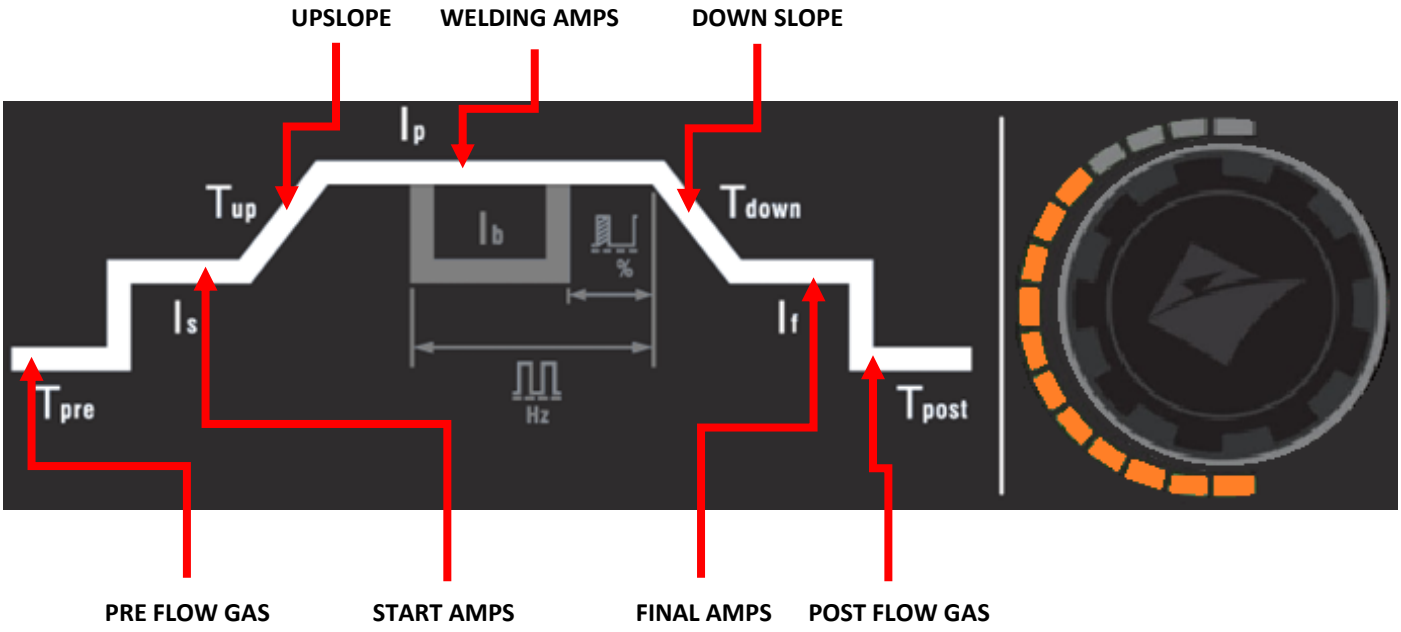
After releasing the torch trigger, the current begins to decrease automatically to the crater current value.

Once the welding arc has extinguished, gas will still flow for the duration of the pre-set post flow time.

# JASIC EVO TIG320P: TIG DC Quick Set-Up Guide

For DC TIG welding, set up as below, ensure you place the machine in DC TIG, HF ON, 2T trigger mode with pulse turned OFF. Ensure the Easy Set feature is turned off.


**Please Note:**
If you have Smart Gas set to ON, then you will not have the option to adjust post-gas time.




**Set parameters as follows using control panel image above as reference**

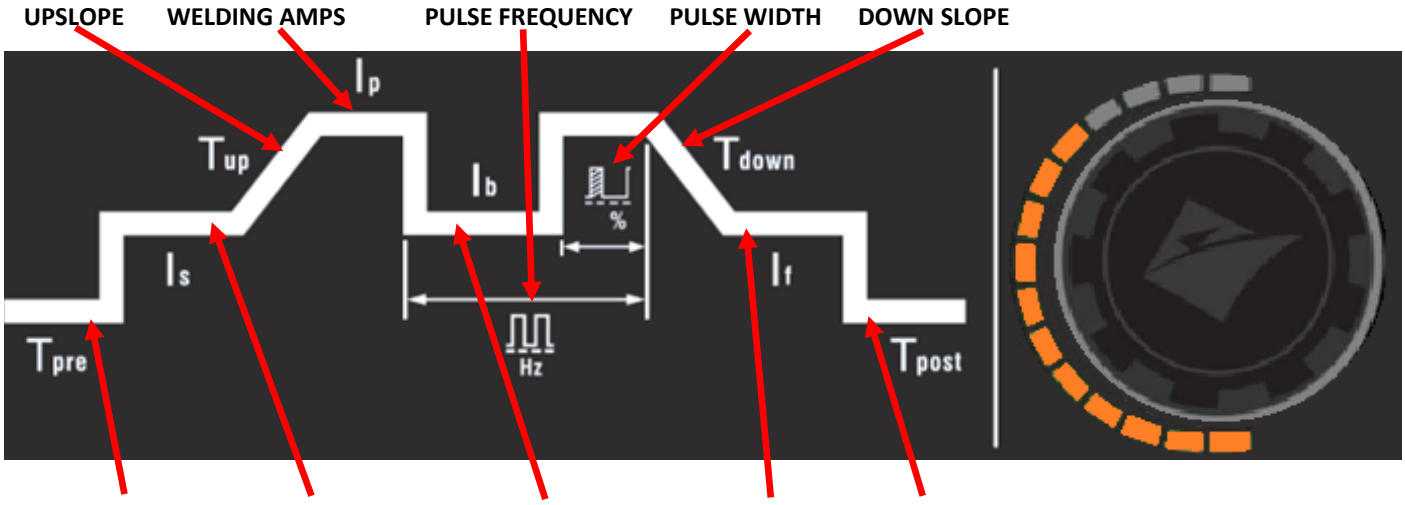
| Parameter | Units | Adjustable Range | Guide Setting | User Setting |
|---|---|---|---|---|
| Job/Material | --- | --- | --- | |
| PRE-GAS TIME | Seconds | 0 ~ 10 | 0.5 | |
| START-CURRENT | Amps | 10 ~ 320 | 15 | |
| UP-SLOPE TIME | Seconds | 0 ~ 15 | 0 | |
| *PEAK WELDING AMPS | Amps | 5 ~ 320 | User defined * | |
| DOWN-SLOPE TIME | Seconds | 0 ~ 15 | 1 | |
| FINAL CURRENT | Amps | 5 ~ 320 | 10 | |
| POST-GAS TIME | Seconds | 0 ~ 50 | 2 | |

* Depends on material thickness (30A per mm) e.g. 3mm = 90A

# JASIC EVO TIG320P: TIG DC Pulse Quick Set-Up Guide

For DC TIG Pulse welding, set up as below and ensure you place the machine in TIG DC mode, HF ON, 2T trigger mode and Pulse turned ON. Ensure the Easy Set feature is turned off.


**Please Note:**
If you have Smart Gas set to ON, then you will not have the option to adjust post-gas time.




**Set parameters as follows using images above as reference:**

| Parameter | Units | Adjustable Range | Guide Setting | User Setting |
|---|---|---|---|---|
| Job/Material | --- | --- | --- | |
| PRE-GAS TIME | Seconds | 0 ~ 10 | 0.5 | |
| START-CURRENT | Amps | 10 ~ 320 | 15 | |
| UP-SLOPE TIME | Seconds | 0 ~ 15 | 0 | |
| PEAK WELDING AMPS * | Amps | 10 ~ 320 | User defined * | |
| BASE CURRENT ** | Amps | 10 ~ 320 | 50% ** | |
| PULSE FREQUENCY | Hz | 10 ~ 320 | 1 | |
| PULSE WIDTH | % | 5 ~ 95 | 50 | |
| DOWN-SLOPE TIME | Seconds | 0 ~ 15 | 1 | |
| FINAL CURRENT | Amps | 10 ~ 320 | 10 | |
| POST-GAS TIME | Seconds | 0 ~ 50 | 2 | |

* Depends on material thickness (30A per mm) e.g. 3mm = 90A
** Set base current to 50% of your peak welding current

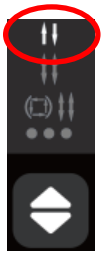
# OPERATION - TIG

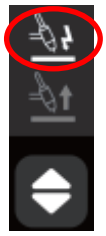
**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG AC operation steps**

To select TIG mode by pressing the green welding mode selection button until the (top) TIG AC LED is illuminated as shown far left, then ensure you have also selected standard (pulse off) mode as also circled left.

Select the 2T torch trigger mode by pressing the torch mode button until the 2T LED is Illuminated as shown right (for alternative trigger modes details, please see pages 53/54).



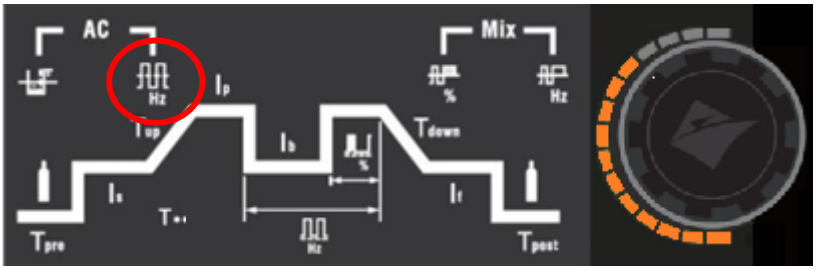


Now, select your TIG starting method with HF or Lift TIG being your options. Press the HF/lift arc button until the TIG HF start LED is illuminated as shown left.

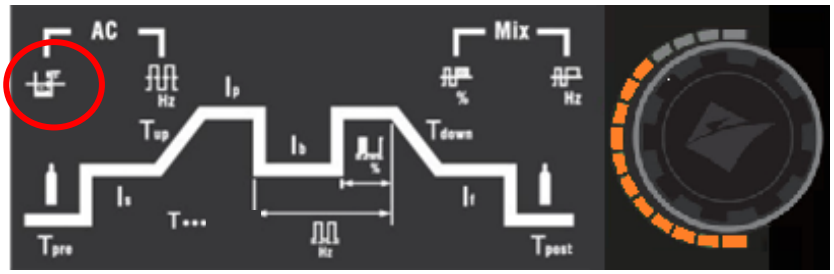
Select the AC square wave mode by pressing the selection button until the TIG AC square wave LED is illuminated as shown right. See page 48 for further information on alternative AC waveforms.

**Selecting pre gas, upslope, welding current, downslope time, crater current and post flow gas time is as standard TIG DC (See from page 41).**

To select and set TIG AC frequency, rotate the dial until the pulse AC Hz LED is lit, then press the dial and the Hz LED will then start to flash, then rotating the adjustment control dial will adjust the AC frequency to your required setting.
The AC frequency adjustment range is 50 ~ 200Hz.




To select and set AC wave balance, rotate the dial until the AC balance LED is lit, then press the dial and the AC balance LED will then start to flash, rotating the adjustment control dial will adjust the AC wave balance to the required setting.
The AC balance adjustment range is 20 ~ 60% with the balanced zero point being 40.

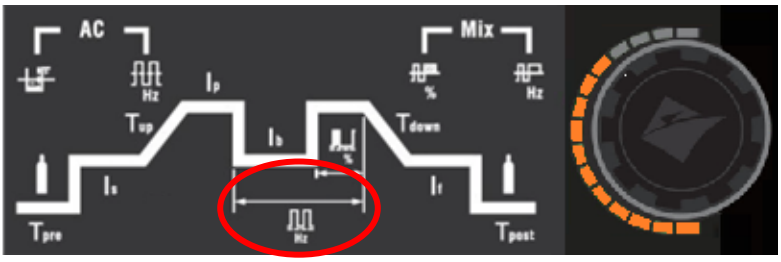


# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

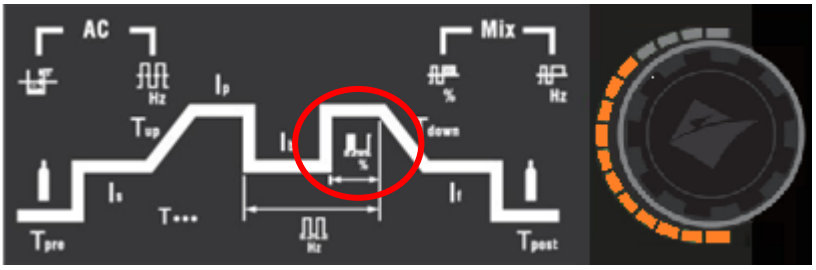
**TIG AC pulse operation steps**

To select and set TIG pulse frequency, rotate the dial until the pulse Hz LED is lit, then press the dial and the Hz LED will then start to flash, then rotating the adjustment control dial will adjust the pulse frequency rate between 0.5Hz to 20Hz in AC mode.




* When AC frequency is set to 50Hz, the pulse frequency range is 0.5 ~ 5Hz
* When AC frequency is set to 200Hz, the pulse frequency range is 0.5 ~ 20Hz

To select and set pulse ratio (width), rotate the dial until the pulse % LED is lit, then press the dial and the % LED will then start to flash, then rotating the adjustment control dial will adjust the pulse ratio rate between 5% ~ 95% in AC mode.




**Please Note:**
**The parameter lit LED will always default back to the peak amps setting when no other control have been touched after approximately 2 seconds.**

After the parameters are set appropriately, open the gas valve of the cylinder and adjust the gas regulator to the desired gas flow.

Keep the torch 2-4mm away from the work piece and then press the torch trigger.

Gas will flow followed by the HF and the arc is ignited.

Once the arc is ignited the HF will cease and the current rises up to the pre-set value and welding can be carried out.

After releasing the torch trigger, the current begins to decrease automatically to the crater current value, the arc will then stop with gas still flowing for the post flow time and the welding process ends.

# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG AC operation steps**


**AC wave forms**
Pressing the AC wave button will allow you to scroll through 3 wave types used in AC welding, the waveform selections are:
1. Square wave
2. Triangle wave
3. Sine wave
Depending on your selection the corresponding LED indicator will illuminate.

**Waveforms summary:**
In AC TIG (Tungsten Inert Gas) welding, the choice of waveforms as square wave, sawtooth wave, or sine wave can significantly impact the welding process, including arc stability, penetration, cleaning action, and overall weld quality.
Each waveform has unique characteristics that make it suitable for specific applications. Additionally, the hybrid(mix) option that mix AC with DC can further enhance welding performance.
Below is an explanation of the benefits of each waveform and the advantages of a mixed AC/DC approach.

**Square Wave AC** 
Benefits:
- Precise Control: Square wave AC allows for independent control of the positive (EP) and negative (EN) portions of the cycle, enabling fine-tuning of arc characteristics.
- Improved Arc Stability: The sharp transitions between polarities create a stable arc, reducing the risk of arc extinguishing.
- Enhanced Cleaning Action: The negative portion of the cycle (EN) provides excellent oxide cleaning, which is critical for welding materials like aluminium and magnesium.
- Balanced Heat Input: The ability to adjust the balance between EP and EN helps control heat input, reducing distortion and improving weld quality.
- Reduced Tungsten Erosion: The square wave minimizes tungsten erosion by optimizing the time spent in each polarity.

Applications:
- Ideal for welding aluminium, magnesium, and other non-ferrous metals where cleaning action and heat control are critical.

**Sawtooth Wave AC** 
Benefits:
- Smoother Arc Transition: The gradual rise and fall of the sawtooth waveform create a smoother transition between polarities, which can reduce spatter and improve arc stability.
- Improved Penetration: The waveform's shape can enhance penetration in certain applications, making it suitable for thicker materials.
- Customizable Frequency: Sawtooth waves can be adjusted to optimize the welding process for specific materials and thicknesses.

Applications:
- Useful for welding materials that benefit from a smoother arc and controlled penetration, such as thin aluminium sheets or specialized alloys.

# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG AC operation steps**

**Sine Wave AC** 
Benefits:

- Simplicity: Sine wave AC is the most basic waveform and is often used in traditional welding machines.
- Gentle Arc: The smooth, continuous waveform creates a softer arc, which can be beneficial for delicate applications.
- Cost-Effective: Sine wave welding machines are typically less expensive and simpler to operate.

Drawbacks:

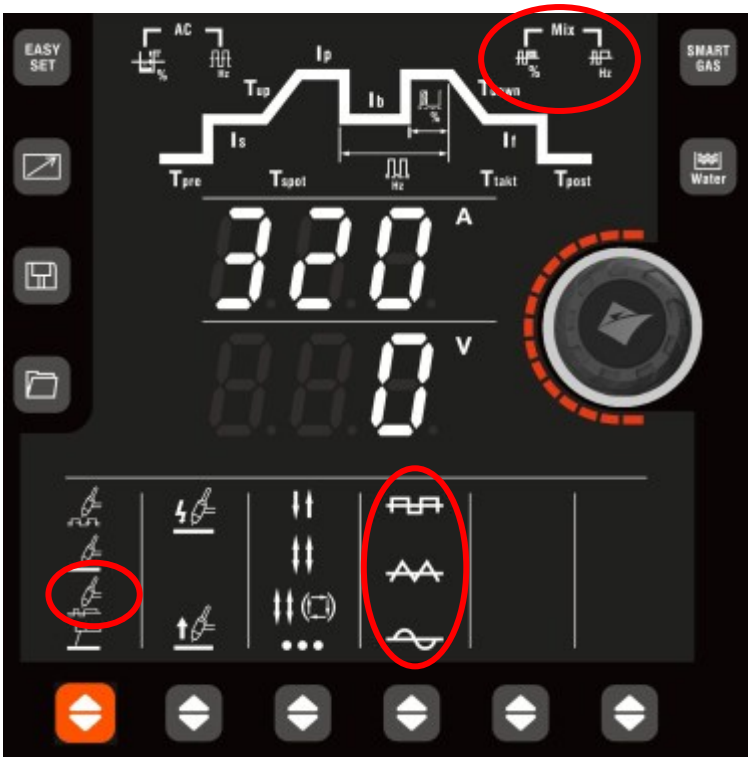
- Limited Control: Sine wave AC offers less control over the arc compared to square or sawtooth waves, making it less suitable for advanced applications.
- Reduced Cleaning Action: The cleaning action is less effective compared to square wave AC, which can be a disadvantage for welding materials with heavy oxide layers.

Applications:

- Suitable for general-purpose welding of aluminium and other non-ferrous metals, but less ideal for precision or demanding applications.

**Mix (Hybrid) mode:**


The 'hybrid' mix AC TIG mode allows for the selected AC waveform to be mixed with a positive element which increases the cleaning action of aluminium oxides along with increasing welding speeds.
When the mixed indicator is ON, this indicates that the machine is in Mix AC DC mode and the additional Mix controls will be active.
Mixed AC-DC output is suitable for welding thicker aluminium, magnesium and their alloys.




**Please Note:** When mix mode is active, pulse is deactivated and will not show as an option.

**Mix AC Waveform selection:**

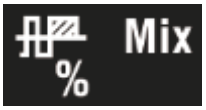

When in MIX AC TIG mode, pressing the AC button still allow you to scroll through the 3 wave types used in AC welding, Square wave , Triangle wave and Sine wave. These 3 waveforms are easily changed by pressing the wave waveform button (shown left) and depending on your selection the corresponding LED indicator will illuminate.

# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG AC operation steps**

**Mixed duty-cycle control and indicator:**




To select and set the ratio of DC time, rotate the dial until the ratio % LED is lit, then press the dial and the % LED will then start to flash, by rotating the control dial you will be able to adjust the mix duty cycle % between the range of 5% ~ 30% .

**Mixed frequency control and indicator.:**


To select and set the mix frequency, rotate the dial until the mix frequency Hz LED is lit, then press the dial and the Hz LED will then start to flash, by rotating the control dial you will be able to adjust the mix frequency rate between the range of 1Hz ~ 20Hz.*

* When AC frequency is set to 50Hz, the pulse frequency range is 1-5Hz
* When AC frequency is set to 200Hz, the pulse frequency range is 1-20Hz

**Mix/Hybrid AC Welding Mode**

Concept: In mix (hybrid) welding mode, AC and DC are combined to leverage the benefits of both. For example, AC can be used for cleaning and oxide removal, while DC provides deeper penetration and better arc stability.

**Benefits:**

- Enhanced penetration in electrode negative cycle: The AC component ensures effective oxide cleaning, while DC component improves penetration and arc focus.
- Improved Weld Quality: The combination of AC and DC can result in better weld appearance, reduced porosity, and stronger joints.
- Versatility: Hybrid welding allows for greater flexibility in welding different materials and thicknesses.
- Reduced Heat Input: By optimizing the balance between AC and DC, heat input can be controlled more precisely, minimizing distortion, and improving weld integrity.

**Applications:**

- Ideal for welding materials that require both cleaning action (e.g., aluminium) and deep penetration (e.g., thick sections or stainless steel). It is also useful for specialized applications where precise control over the welding process is required.

**Summary of Waveform Selection:**

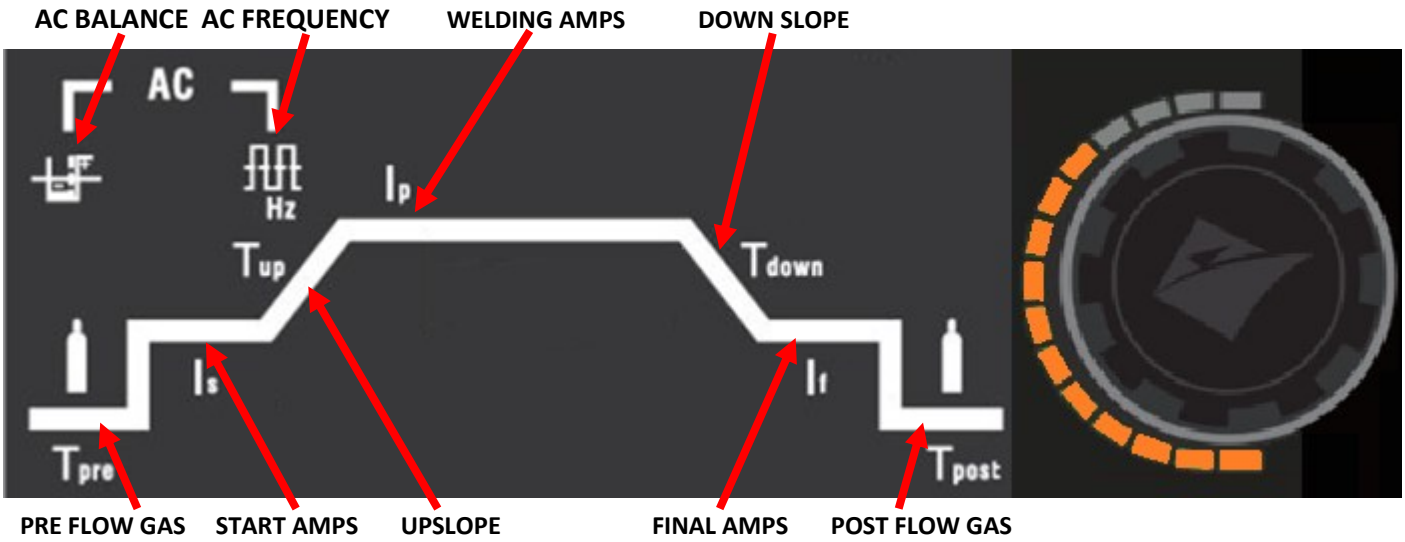
- Square Wave AC: Best for precision, control, and cleaning action in aluminium and magnesium welding.
- Sawtooth Wave AC: Offers smoother transitions and improved penetration for specific applications.
- Sine Wave AC: Simple and cost-effective, but less versatile for advanced welding needs.
- Hybrid AC/DC: Combines the benefits of AC and DC for superior weld quality, versatility, and control.

By selecting the appropriate waveform or hybrid option, the operator can optimize the TIG welding process for specific materials, thicknesses, and desired outcomes.

# JASIC EVO TIG320P: TIG AC Quick Set-Up Guide

For AC TIG welding, set up as below and ensure you place the machine in AC TIG mode, Pulse OFF, HF ON and in 2T trigger mode. Ensure the Easy Set feature is turned off.


**Please Note:**
If you have Smart Gas set to ON, then you will not have the option to adjust post-gas time.




**Set parameters as follows using control panel image above as reference**

| Parameter | Units | Adjustable Range | Guide Setting | User Setting |
|---|---|---|---|---|
| Job/Material | --- | --- | --- | |
| PRE-GAS TIME | Seconds | 0 ~ 10 | 0.5 | |
| START-CURRENT | Amps | 20 ~ 320 | 20 | |
| UP-SLOPE TIME | Seconds | 0 ~ 15 | 0 | |
| PEAK WELDING AMPS * | Amps | 20 ~ 320 | User defined * | |
| AC FREQUENCY | Hz | 50 ~ 200 | 80 | |
| AC BALANCE | % | 20 ~ 60 | 40 | |
| DOWN-SLOPE TIME | Seconds | 0 ~ 15 | 1 | |
| FINAL CURRENT | Amps | 20 ~ 320 | 10 | |
| POST-GAS TIME | Seconds | 0 ~ 50 | 7 | |

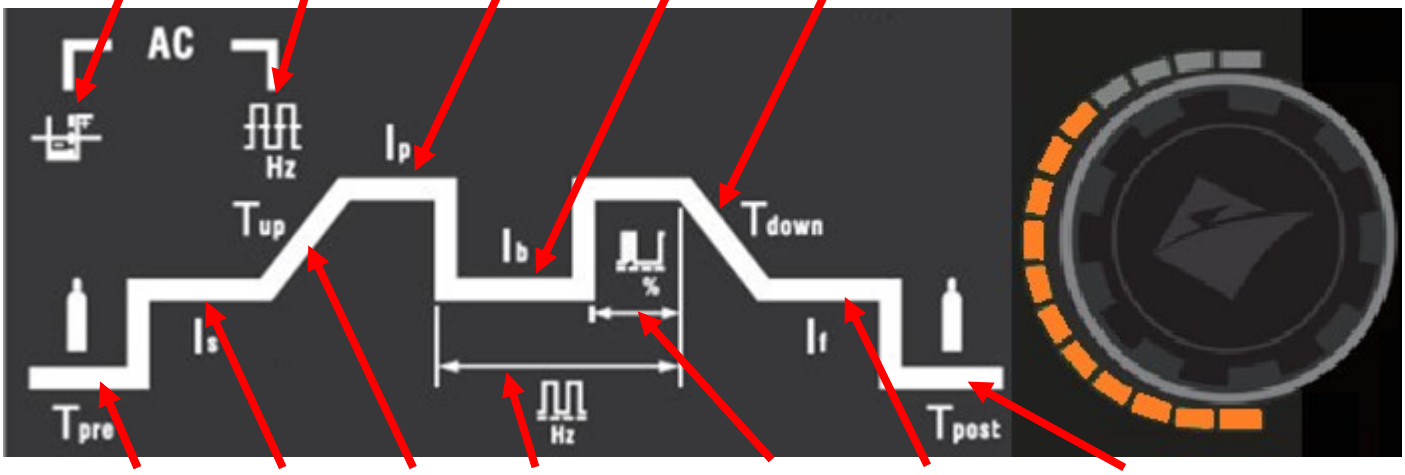
* Depends on material thickness (30A per mm) e.g. 3mm = 90A

# JASIC EVO TIG320P: TIG AC Pulse Quick Set-Up Guide

For AC TIG welding, set up as below and ensure you place the machine in AC TIG mode, Pulse ON, HF ON and in 2T trigger mode. Ensure the Easy Set feature is turned off.


**Please Note:**
If you have Smart Gas set to ON, then you will not have the option to adjust post-gas time.

**AC BALANCE** **AC FREQUENCY** **PEAK AMPS** **BASE AMPS** **DOWN SLOPE**




**PRE FLOW GAS** **START AMPS** **UPSLOPE** **PULSE FREQUENCY** **PULSE WIDTH** **FINAL AMPS** **POST FLOW GAS**

**Set parameters as follows using control panel image above as reference**

| Parameter | Units | Adjustable Range | Guide Setting | User Setting |
|---|---|---|---|---|
| Job/Material | --- | --- | --- | |
| PRE-GAS TIME | Seconds | 0 ~ 10 | 0.5 | |
| START-CURRENT | Amps | 20 ~ 320 | 20 | |
| UP-SLOPE TIME | Seconds | 0 ~ 15 | 0 | |
| PEAK WELDING AMPS* | Amps | 20 ~ 320 | User defined * | |
| BASE AMPS** | Amps | 20 ~ 320 | 50% ** | |
| AC FREQUENCY | Hz | 50 ~ 200 | 80 | |
| AC BALANCE | % | 20 ~ 60 | 40 | |
| PULSE FREQUENCY | Hz | 0.5 ~ 200 | 1 | |
| PULSE WIDTH | % | 5 ~ 95 | 50 | |
| DOWN-SLOPE TIME | Seconds | 0 ~ 15 | 1 | |
| FINAL CURRENT | Amps | 20 ~ 320 | 10 | |
| POST-GAS TIME | Seconds | 0 ~ 50 | 7 | |

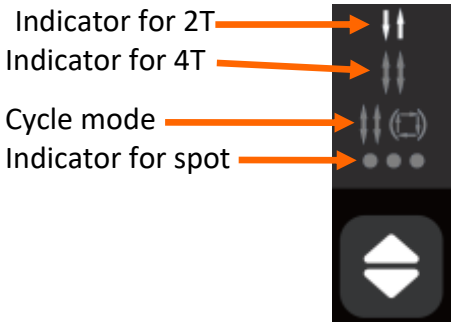
* Depends on material thickness (30A per mm) e.g. 3mm = 90A

** Set base current to 50% of your peak welding current

# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG torch trigger operation steps**

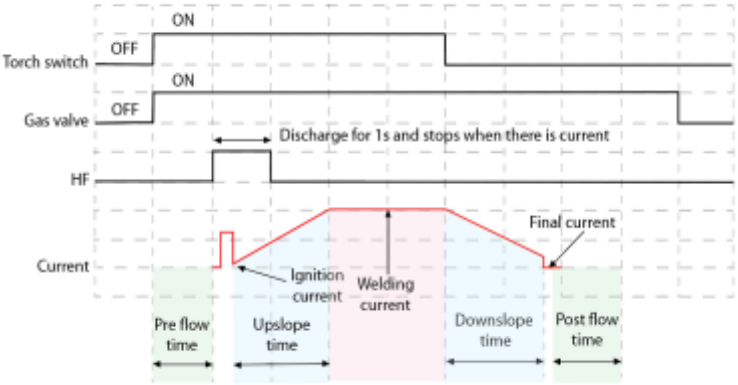



**2T mode (normal trigger control)**

The 2T (↑↓) LED light will illuminate when the power source is in 2T welding mode. In this mode, the torch trigger must remain pressed (closed) for the welding output to be active. See example below:

Press and hold the torch trigger to activate the power source, the gas valve will open and gas will flow. After the gas pre flow time ends, HF discharge begins and then the welding arc will ignite and the current rises up (slope up time) to the welding current value gradually until you achieve the preset welding current.

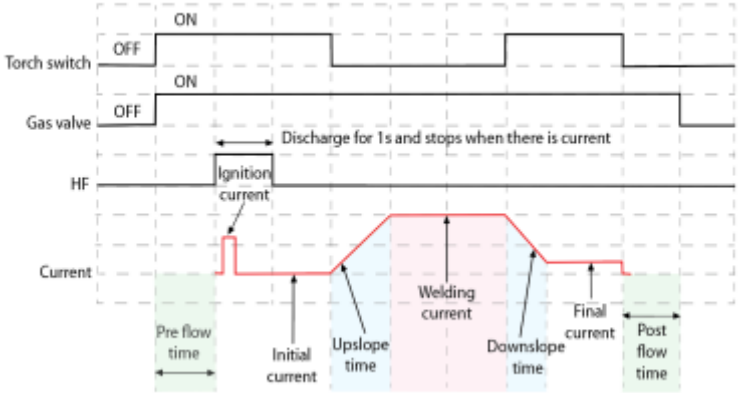
When the torch switch is released, the current begins to drop gradually (slope down time) and when it drops to the minimum current value, the welding output is cut off and the gas valve will close, once the post flow time ends, this is the end of the welding process.




**4T (latch trigger control)**

The 4T ↕↕ LED will illuminate when the power source is in 4T welding mode, this trigger mode is mainly used for long welding runs to assist in reducing operator finger fatigue. In this mode the user can press and release the torch trigger and the output will remain active until the trigger switch is depressed again and released.

In 4T mode, the gas valve opens when the torch switch is pressed down, after the pre flow time ends, HF discharge occurs which ignites the welding arc. Once the welding arc has successfully ignited the initial current value is active and the torch switch can now be released, the welding current rises up to the preset welding current value gradually and you will continue to weld your material. To finish welding, simply press the torch switch down again and the current will begin to gradually drop (slope out time) to the final current value. When the torch switch is released the current output is cut off and the gas will continue to flow until your preset post flow time has elapsed.



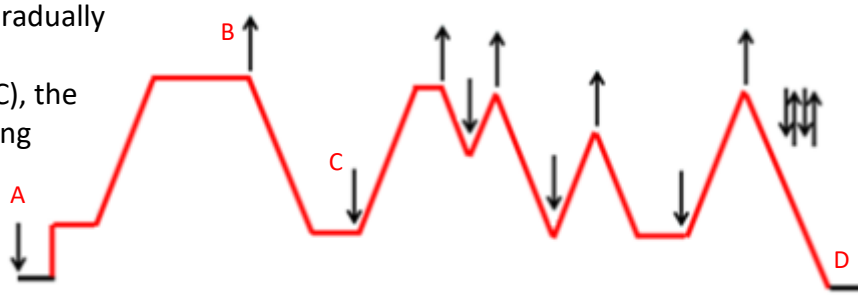
# OPERATION - TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**TIG torch trigger operation steps**

**Cycle mode**

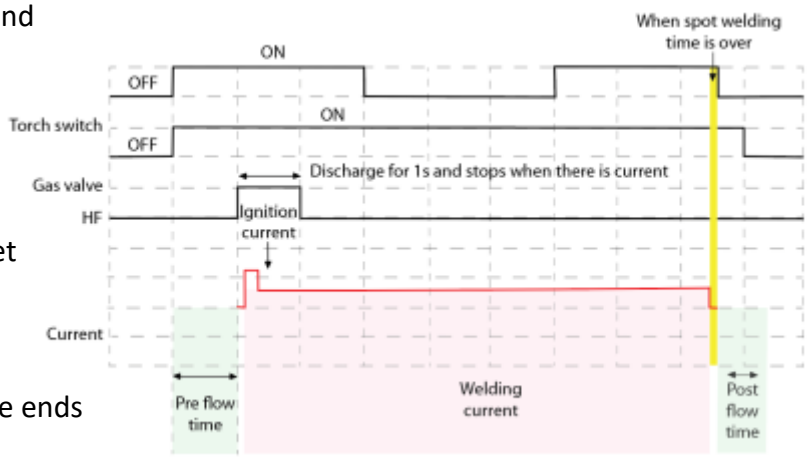
The cycle ↕↕ (⌞) LED light will illuminate when the power source is in repeating mode, upon pressing the torch trigger switch (A) the gas valve opens, pre flow gas time starts, then HF discharge will engage the welding arc. Once the welding arc has successfully ignited, the welding current will rise up to the preset welding current value gradually (depending on preset upslope time). When the torch switch is released (B), the current begins to drop gradually to the final current arc value.
When the torch switch is pressed again (C), the current will gradually rise up to the welding current value again. 'Cycle' means that the welding current varies between the main welding current value and the final arc current value.




To extinguish the welding arc, press and release the torch trigger (D) briefly (within 1/5 of a second) and the arc will be extinguished immediately and the current output will be shut off.
The gas valve will then close when the post flow time ends and the welding process ends.

**Spot welding mode**

The spot ••• LED will illuminate when the power source is in spot welding mode.
To set the spot welding time setting, refer to pages 3 & 53 for selecting and setting the spot time.
On pressing the torch trigger, gas will flow and at the end of the gas pre-flow time HF will initiate the welding arc.
Once the welding arc is ignited the welding current is present and no matter if the torch switch is on or off the machine will still offer welding current until the preset spot welding time the user set has timed out and then the welding arc will be extinguished.
The gas will continue until the post flow time ends when the welding process ends.




**Please note:**
The spot welding option can only be carried out in HF TIG mode only.

# FUNCTION TABLE

When the machine is either welding or not, you are able to access the below welding parameters by rotate the control dial to select the optional parameters as required and adjustment can be carried out without affecting welding.

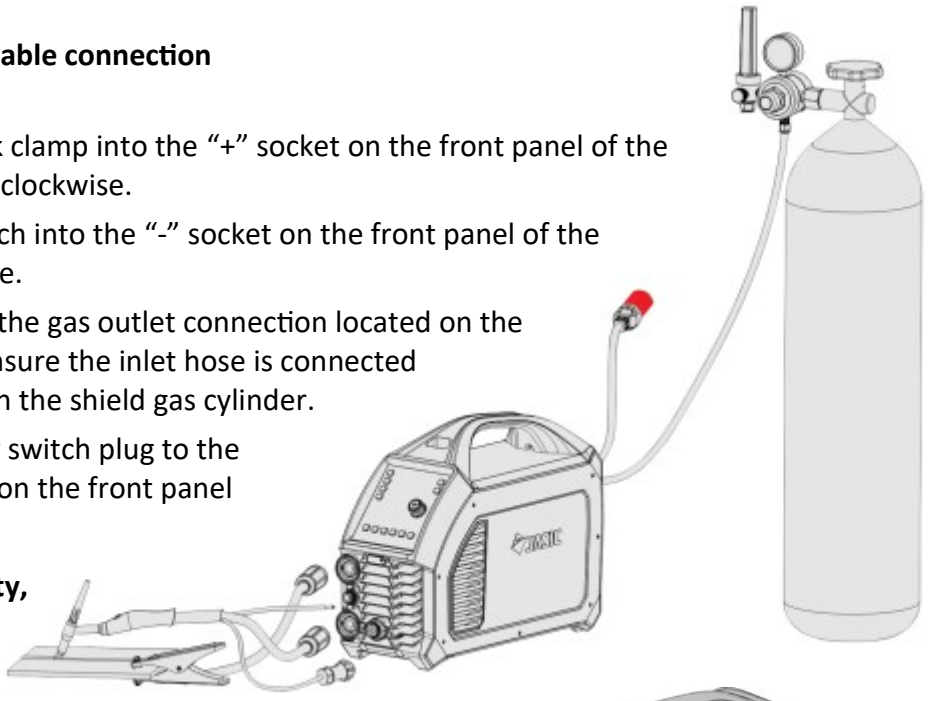
"✓" indicates that the parameter is optional, and "✖" indicates that it is not optional.

| Welding Mode | Trigger Mode | Pre-flow time | Initial Current | Upslope Time | Peak Current | Base Current | Downslope Time | Final Current | Post-flow time | Spot Time | AC Frequency | AC Balance | Pulse Frequency | Pulse Duty Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DC TIG | 2T | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ | ✖ | ✖ |
| | 4T | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ | ✖ | ✖ |
| | Repeat | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ | ✖ | ✖ |
| | Spot Welding | ✓ | ✖ | ✖ | ✓ | ✖ | ✖ | ✖ | ✓ | ✓ | ✖ | ✖ | ✖ | ✖ |
| DC PULSE TIG | 2T | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ | ✖ | ✓ | ✓ |
| | 4T | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ | ✖ | ✓ | ✓ |
| | Repeat | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ | ✖ | ✓ | ✓ |
| AC TIG | 2T | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✖ | ✖ |
| | 4T | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✖ | ✖ |
| | Repeat | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✖ | ✖ |
| | Spot Welding | ✓ | ✖ | ✖ | ✓ | ✖ | ✖ | ✖ | ✓ | ✓ | ✓ | ✓ | ✖ | ✖ |
| AC PULSE TIG | 2T | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ |
| | 4T | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ |
| | Repeat | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ |
| MIX TIG | 2T | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ |
| | 4T | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ |
| | Cycle | ✓ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✖ | ✓ | ✓ | ✓ | ✓ |

# TIG SETUP LIFT TIG

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing as, welding rays, spatter, smoke and high temperatures produced in the process may cause injury to personnel.**
**Also take the necessary steps to protect any persons within the welding area that may cause injury.**

**LIFT TIG welding torch and earth cable connection**



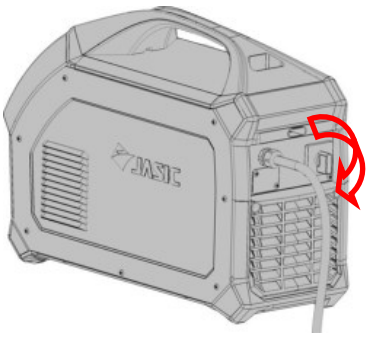
Insert the cable plug with the work clamp into the “+” socket on the front panel of the Jasic welding machine and tighten clockwise.

Insert the cable plug of the TIG torch into the “-” socket on the front panel of the Jasic machine and tighten clockwise.

Connect the TIG torch gas hose to the gas outlet connection located on the front panel of the machine, also ensure the inlet hose is connected to the regulator which is located on the shield gas cylinder.

Connect the 9 pin TIG torch trigger switch plug to the matching control socket mounted on the front panel of the machine

**Before starting any welding activity, please ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**



After connecting the welding leads as detailed above, plug your machine into the mains supply and turn ‘ON’ the machine, the power switch is located at the rear panel of the machine, place it to the "ON" position, the panel indicator will then light up, the fan may start to rotate as the welding machine powers up and the control panel will also light up to indicate that the machine is now ready to use as shown below.




Select DC TIG by pressing the green welding mode selection button until the TIG DC LED lights up as shown left.

Select the lift TIG option by using the arc starting method mode button until the lift TIG symbol is illuminated as shown right.

**Set the welding parameters**

TIG welding parameters can now be adjusted and set according to your welding requirements, see pages 41 to page 43 for further information.

**LIFT TIG process**

Press the TIG torch switch, then touch the tungsten electrode to the work piece for less than 2 seconds and then lift away to 2-4mm from the work piece and the welding arc is then established.

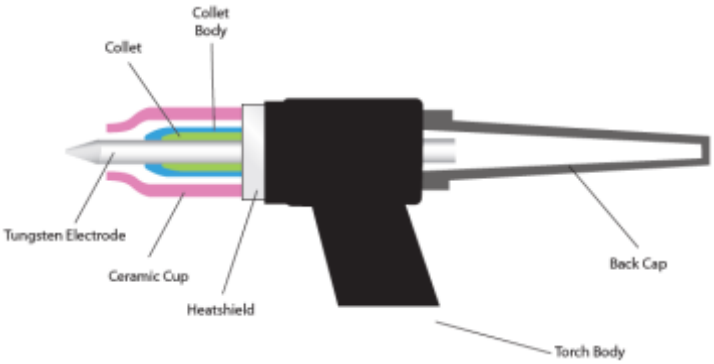
Once welding is complete release the torch trigger to disengage the welding arc, ensure to leave the torch in place to shield the weld with gas until the shielding gas has automatically turned off.

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

### TIG torch body and components

The torch body holds the various welding consumables in place as shown and is covered by a either a rigid phenolic or rubberised covering.




### Collet body

The collet body screws into the torch body. It is replaceable and is changed to accommodate the different sizes tungsten's and their respective collets.

### Collets

The welding electrode (tungsten) is held in the torch by the collet. The collet is usually made of copper or a copper alloy. The collet's grip on the electrode is secured when the torch back cap is tightened in place. Good electrical contact between the collet and tungsten electrode is essential for good welding current transfer.

### Gas lens body

A gas lens is a device that can be used in place of the normal collet body. It screws into the torch body and is used to reduce turbulence in the flow of shield gas and produce a stiff column of undisturbed flow of shielding gas. A gas lens will allow the welder to move the nozzle further away from the joint allowing increased visibility of the arc. A much larger diameter nozzle can be used which will produce a large blanket of shielding gas. This can be very useful in welding material like titanium. The gas lens will also enable the welder to reach joints with limited access such as inside corners.

### Ceramic cups

Gas cups are made of various types of heat resistant materials in different shapes, diameters and lengths. The cups are either screwed onto the collet body or gas lens body or in some cases pushed in place. Cups can be made of ceramic, metal, metal-jacketed ceramic, glass or other materials. The ceramic type is quite easily broken so take care when putting the torch down.

Gas cups must be large enough to provide adequate shielding gas coverage to the weld pool and surrounding area. A cup of a given size will allow only a given amount of gas to flow before the gas flow becomes disturbed due to the speed of flow. Should this condition exist the size of cup should be increased to allow the flow speed to reduce and once again establish an effective regular shield.

### Back cap

The back cap screws into the rear on the torch head and applies pressure to the back end of the collet which in turn forces up against the collet body, the resulting pressure holds the tungsten in place to ensure it does not move during the welding process.
Back caps are made from a rigid phenolic material and generally come in 3 sizes, short, medium and long.

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

### TIG welding electrodes


TIG welding electrodes are a 'non consumable' as it is not melted into the weld pool and great care should be taken not to let the electrode contact the welding pool to avoid weld contamination. This would be referred to as tungsten inclusion and may result in weld failure.
Electrodes will often contain small quantities of metallic oxides which can offer the following benefits:

- Assist in arc starting
- Improve current carrying capacity of the electrode
- Reduce the risk of weld contamination
- Increase electrode life
- Increase arc stability

Oxides used are primarily zirconium, thorium, lanthanum or cerium. These are added usually 1% ~ 4%.

**Tungsten Electrode Colour Chart - DC**

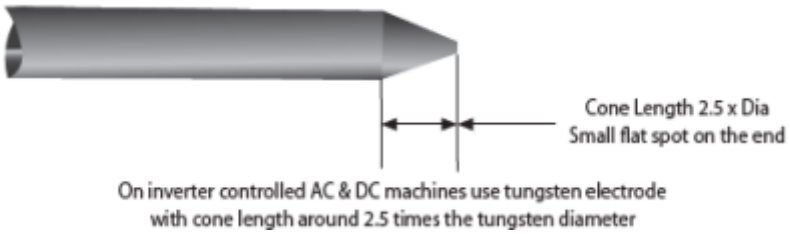
| Welding Mode | Tungsten Type | Colour |
|---|---|---|
| DC or AC/DC | Ceriated 2% | Grey |
| DC or AC/DC | Lanthanated 1% | Black |
| DC or AC/DC | Lanthanated 1.5% | Gold |
| DC or AC/DC | Lanthanated 2% | Blue |
| DC | Thoriated 1% | Yellow |
| DC | Thoriated 2% | Red |

**Tungsten Electrode Current Ranges**

| Tungsten Electrode Size | DC Current Amp |
|---|---|
| 1.0mm | 30 ~ 60 |
| 1.6mm | 60 ~ 115 |
| 2.4mm | 100 ~ 165 |
| 3.2mm | 135 ~ 200 |
| 4.0mm | 190 ~ 280 |
| 4.8mm | 250 ~ 340 |

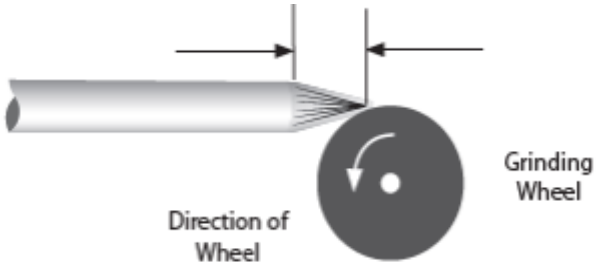
### Tungsten electrode preparation - DC

When welding at low current the electrode can be ground to a point.
At higher current a small flat on the end of the electrode is preferable as this helps with arc stability.




### Electrode grinding

It is important when grinding the electrode to take all necessary precautions such as wearing eye protection and ensuring adequate protection against breathing in any grinding dust.




Tungsten electrodes should always be ground lengthwise (as shown) and not in a radial operation.
Electrodes ground in a radial operation tend to contribute to arc wander due to the arc transfer from the grinding pattern. Always use a grinder solely for grinding electrodes to avoid contamination.

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

### TIG welding consumables

The consumables of the TIG welding process are filler wires and shield gas.

### Filler wires

Filler wires come in many different material types and usually as cut lengths, unless some automated feeding is required where it will be in reel form.
Filler wire is generally fed in by hand.
Always consult the manufacturer's data and welding requirements.

| Filler Wire Diameter | DC Current Range (Amps) |
|---|---|
| 1.0mm | 20 ~ 90 |
| 2.4mm | 65 ~ 115 |
| 3.2mm | 100 ~ 165 |
| 4.8mm | 200 ~ 350 |

Filler Wire Selection Guide

### Gases

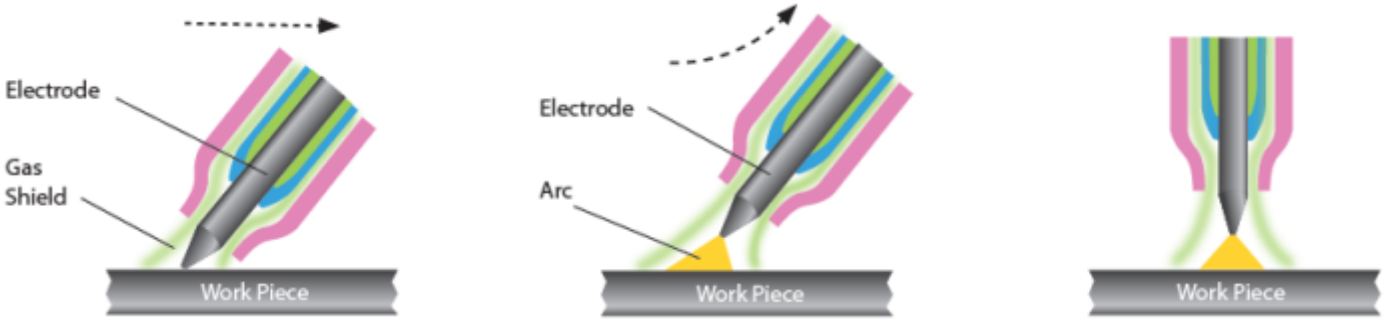
Shielding gas is required when welding to keep the weld pool free of oxygen. Whether you are welding mild steel or stainless steel the most commonly used shielding gas used in TIG welding is argon, for more specialised applications an argon helium mix or pure helium may be used.

### TIG welding - arc starting

The TIG process can use both non contact and contact methods to provide arc starting. Depending on the Jasic model, the options are indicated on a selector switch on the front control panel of the power source. The most common method of arc starting is 'HF' start. This term is often used for a variety of starting methods and covers many different types of start.

### Arc starting - scratch start

This system is where the electrode is scratched along the work piece like striking a match. This is a basic way of turning any DC stick welder into a TIG welder without much work.
It is not considered suitable for high integrity welding due to the fact that the tungsten can be melted on the work piece thereby contaminating the weld.




The main challenge with scratch start TIG welding is keeping your electrode clean. While a quick strike with the electrode on the metal is essential and then not lifting it more than 3mm away to create the arc will help, you also need to ensure your metal is completely clean.

# GUIDE TO TIG WELDING

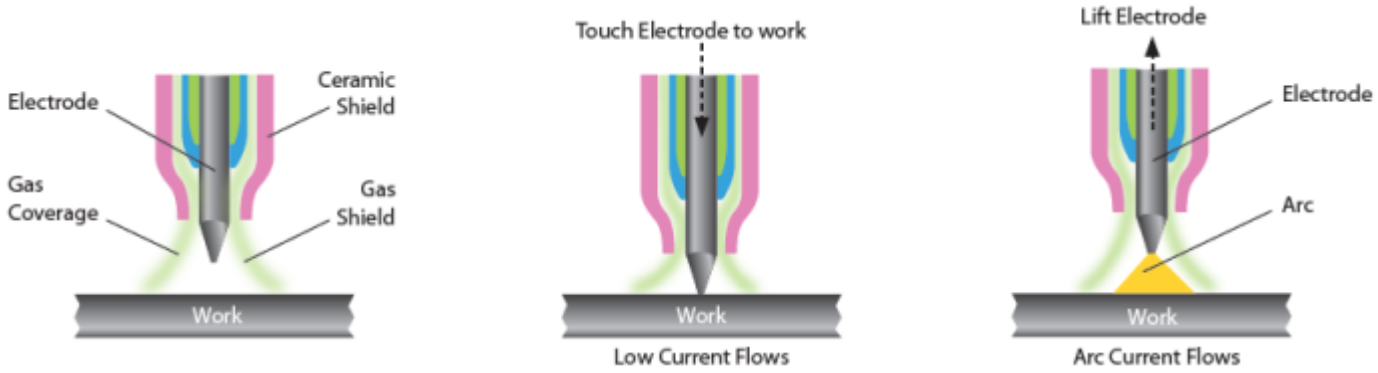
**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**Lift TIG (lift arc)**

Not to be confused with scratch start, this arc starting method allows the tungsten to be in direct contact with the work piece first but with minimal current so as not to leave a tungsten deposit when the tungsten is lifted and an arc is established.

With lift TIG, the open circuit voltage (OCV) of the welder folds back to a very low voltage output when the unit senses it has made continuity with the work piece. Once the torch is lifted the unit increases output as the tungsten leaves the surface. This creates little contamination and preserves the point on the tungsten although this is still not a 100% clean process. The tungsten still can get contaminated but lift TIG is still a much better option than scratch starting, for mild and stainless steel although these methods of arc starting are not a good option when welding aluminium.

The Jasic TIG 320P ACDC Lift TIG mode utilises the TIG torch switch operation mode which starts the process with the internal gas valve opening to start the gas flow first.




Set the TIG welding current and other TIG welding parameters by using the control dial (see page 41 onwards for further details).

**LIFT TIG process**

Press the TIG torch switch, then touch the tungsten electrode to the work piece for less than 2 seconds and then lift away to 2-4mm  from the work piece and the welding arc is then established.

Once welding is complete release the torch trigger to disengage the welding arc but ensure you leave the torch in place to shield the weld with gas for a few seconds and then turn off the gas at the valve on the torch head.

**PLEASE NOTE:**

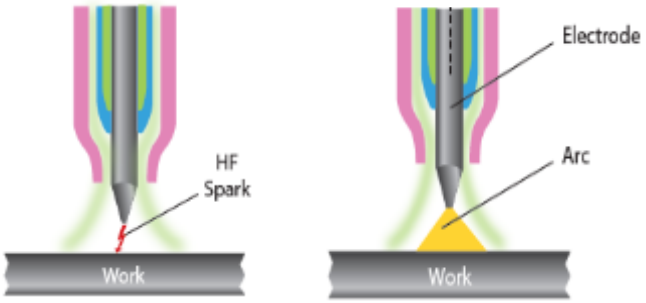
- When starting the arc if the short-circuit time exceeds 2 seconds the welder turns off the output current, lift the welding torch tungsten away from the work piece and restart the process as above to start the arc again.
- During welding, if there is short circuit between tungsten electrode and the work piece, the welder will immediately reduce the output current; if the short circuit exceeds 1 second, the welder will turn off the output current. If this happens, the arc will need to be restarted as above and the welding torch needs to be lifted to start the arc again.

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**Arc starting - HF start**

Non contact High Frequency (HF) start method is a high voltage and low amperage generated using a spark gap assembly and is the most popular and generally considered best TIG arc starting method.
The High Frequency (HF) start generates a high frequency arc that ionizes the gas bridging the gap between the tungsten point and the work piece. This touchless method creates almost no contamination unless the tungsten has been over sharpened or the start amperage is too high. It is an excellent choice for all material being welded especially aluminium although.
The HF frequency varies with the spark gap and can be around 16000 Hz to 100000 Hz depending on spark gap width so consideration should be given with this method as it can cause electrical interference to nearby electrical equipment such as computers, CNC controls and phone systems.
If the spark gap is widened, the HF can become erratic.

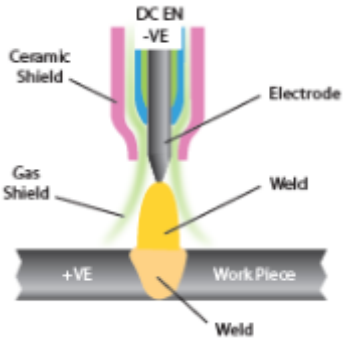



**DC TIG welding**

Direct current welding is when the current flows in one direction only. Compared with AC welding the current once flowing will not go to zero until welding has ended.

The TIG torch polarity should generally be set up for Direct Current - Electrode Negative (DCEN), this method of welding can be used for a wide range of materials. The TIG welding torch is connected to the negative output of the machine and the work return cable to the positive output.

When the arc is established the current flows in the circuit and the heat distribution in the arc is around 33% in the negative side of the arc (the welding torch) and 67% in the positive side of the arc (the work piece). This balance gives deep arc penetration of the arc into the work piece and reduces heat in the electrode. This reduced heat in the electrode allows more current to be carried by smaller electrodes compared to other polarity connections. This starting method is often referred to as straight polarity and is the most common connection used in DC welding.




**TIG welding techniques**

- Before welding you should ensure all material being welded are clean, as particulates can weaken the weld.
- The torch angle is best kept at 15 - 20° (from vertical) away from the direction of travel. This assists with visibility of the weld area and allows easier access for the filler material.
- The filler metal should be fed in at a low angle to help avoid touching the tungsten electrode.
- The TIG welding arc melts the base material and the molten puddle melts the filler rod, it's important you resist the urge to melt the filler material directly into the welding arc.
- For thinner sheet materials, a filler material may not be needed.
- Prepare the tungsten correctly, using a diamond grinding wheel will give you the best results for a sharp point (see page 58).
- For welding stainless steel, be careful of applying too much heat. If the colour is dark grey and looks dirty and heavily oxidized then too much heat has been applied, this could also cause the material to warp. Reducing the amperage and increase travel speed may correct this problem, you could also consider using a smaller diameter filler material, as that will require less energy to melt.

**See the following page for a TIG DC welding amperage guide**

# GUIDE TO DC TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

## Manual DC TIG Welding Amperage Guide- Mild Steel and Stainless Steel

| Base Metal Thickness mm | Base Metal Thickness Inch | Tungsten Electrode Diameter | Output Polarity | Filler Wire Diameter (If Required) | Argon Gas Flow Rate (Litres/Min) | Joint Types | Amperage Range |
|---|---|---|---|---|---|---|---|
| 1.6mm | 1/16” | 1.6mm | DC | 1.6mm | 5 ~ 8 | Butt | 50 ~ 80 |
| 1.6mm | 1/16” | 1.6mm | DC | 1.6mm | 5 ~ 8 | Corner | 50 ~ 80 |
| 1.6mm | 1/16” | 1.6mm | DC | 1.6mm | 5 ~ 8 | Fillet | 60 ~ 90 |
| 1.6mm | 1/16” | 1.6mm | DC | 1.6mm | 5 ~ 8 | Lap | 60 ~ 90 |
| 2.4mm | 3/32” | 1.6/2.4mm | DC | 1.6/2.4mm | 5 ~ 9 | Butt | 80 ~ 110 |
| 2.4mm | 3/32” | 1.6/2.4mm | DC | 1.6/2.4mm | 5 ~ 9 | Corner | 80 ~ 110 |
| 2.4mm | 3/32” | 1.6/2.4mm | DC | 1.6/2.4mm | 5 ~ 9 | Fillet | 90 ~ 120 |
| 2.4mm | 3/32” | 1.6/2.4mm | DC | 1.6/2.4mm | 5 ~ 9 | Lap | 90 ~ 120 |
| 3.2mm | 1/8” | 2.4mm | DC | 2.4mm | 5 ~ 10 | Butt | 80 ~ 120 |
| 3.2mm | 1/8” | 2.4mm | DC | 2.4mm | 5 ~ 10 | Corner | 90 ~ 120 |
| 3.2mm | 1/8” | 2.4mm | DC | 2.4mm | 5 ~ 10 | Fillet | 100 ~ 140 |
| 3.2mm | 1/8” | 2.4mm | DC | 2.4mm | 5 ~ 10 | Lap | 100 ~ 140 |
| 4.8mm | 3/16” | 2.4mm | DC | 2.4mm | 6 ~ 11 | Butt | 120 ~ 200 |
| 4.8mm | 3/16” | 2.4mm | DC | 2.4mm | 6 ~ 11 | Corner | 150 ~ 200 |
| 4.8mm | 3/16” | 2.4mm | DC | 2.4mm | 6 ~ 11 | Fillet | 170 ~ 220 |
| 4.8mm | 3/16” | 2.4mm | DC | 2.4mm | 6 ~ 11 | Lap | 150 ~ 200 |
| 6.4mm | 1/4” | 2.4mm | DC | 3.2mm | 7 ~ 12 | Butt | 225 ~ 300 |
| 6.4mm | 1/4” | 2.4mm | DC | 3.2mm | 7 ~ 12 | Corner | 250 ~ 300 |
| 6.4mm | 1/4” | 2.4mm | DC | 3.2mm | 7 ~ 12 | Fillet | 250 ~ 320 |
| 6.4mm | 1/4” | 2.4mm | DC | 3.2mm | 7 ~ 12 | Lap | 250 ~ 320 |
| 9.5mm | 3/8” | 3.2mm | DC | 3.2mm | 7 ~ 12 | Butt | 250 ~ 360 |
| 9.5mm | 3/8” | 3.2mm | DC | 3.2mm | 7 ~ 12 | Corner | 260 ~ 360 |
| 9.5mm | 3/8” | 3.2mm | DC | 3.2mm | 7 ~ 12 | Fillet | 270 ~ 380 |
| 9.5mm | 3/8” | 3.2mm | DC | 3.2mm | 7 ~ 12 | Lap | 230 ~ 380 |
| 12.7mm | 1/2” | 3.2/4mm | DC | 3.2mm | 8 ~ 13 | Butt | 300 ~ 400 |
| 12.7mm | 1/2” | 3.2/4mm | DC | 3.2mm | 8 ~ 13 | Corner | 320 ~ 420 |
| 12.7mm | 1/2” | 3.2/4mm | DC | 3.2mm | 8 ~ 13 | Fillet | 320 ~ 420 |
| 12.7mm | 1/2” | 3.2/4mm | DC | 3.2mm | 8 ~ 13 | Lap | 320 - 420 |

**Please Note:**

- All above guide settings are approximate and will vary depending on application, prep, required passes and type of welding equipment used.
- The welds would need to be tested to ensure they comply to your welding specifications.

# GUIDE TO TIG WELDING

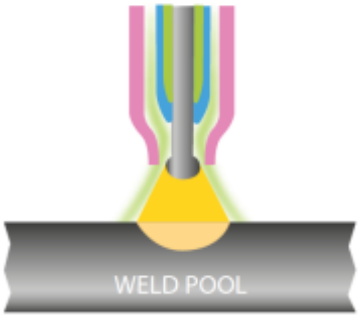
**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**AC TIG welding**

Alternating current, AC welding, is when the current once flowing will not go to zero until welding has ended, compared with DC welding when the current flows in one direction only.
The Jasic TIG series polarity should generally be set up like Direct Current - Electrode Negative (DCEN) as this method of welding can be used for a wide range of materials.

The TIG welding torch is connected to the negative output of the machine and the work return cable to the positive output.

When the arc is established the current supplied by the machine operates with either positive and negative elements of half cycles. This means current flows one way and then the other at different times so the term alternating current is used. The combination of one positive element and one negative element is termed one cycle.




The number of times a cycle is completed within one second is referred to as the frequency.
In the UK the frequency of alternating current supplied by the mains network is 50 cycles per second and is denoted as 50 Hertz (Hz).

This would mean that the current changes 100 times each second. The number of cycles per second (frequency) in a standard machine is dictated by the mains frequency which in the UK is 50Hz.

It is worth noting that as frequency increases magnetic effects increase and items such as transformers become increasingly more efficient. Also increasing the frequency of the welding current stiffens the arc, improves arc stability and leads to a more controllable welding condition.
However, this is theoretical as when welding in the TIG mode there are other influences on the arc.
The AC sine wave can be affected by the oxide coating of some materials which acts as a rectifier restricting the electron flow. This is known as arc rectification and its effect causes the positive half cycle to be clipped off or distorted.
The effect for the weld zone is erratic arc conditions, lack of cleaning action and possible tungsten damage.

**See following page for the TIG AC welding amperage guide**

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

## Manual AC TIG Welding Amperage Guide - Aluminium Material

| Base Metal Thickness mm | Base Metal Thickness Inch | Tungsten Electrode Diameter | Output Polarity | Filler Wire Diameter (If Required) | Argon Gas Flow Rate (Litres/Min) | Joint Types | Amperage Range Guide |
|---|---|---|---|---|---|---|---|
| 1.6mm | 1/16” | 1.6mm | AC | 1.6mm | 6 - 9 | Butt | 65—75 |
| 1.6mm | 1/16” | 1.6mm | AC | 1.6mm | 6 - 9 | Corner | 55—65 |
| 1.6mm | 1/16” | 1.6mm | AC | 1.6mm | 6 - 9 | Fillet | 55—75 |
| 1.6mm | 1/16” | 1.6mm | AC | 1.6mm | 6 - 9 | Lap | 60—70 |
| 2.4mm | 3/32” | 1.6/2.4mm | AC | 1.6/2.4mm | 8 - 10 | Butt | 80—110 |
| 2.4mm | 3/32” | 1.6/2.4mm | AC | 1.6/2.4mm | 8 - 10 | Corner | 80—110 |
| 2.4mm | 3/32” | 1.6/2.4mm | AC | 1.6/2.4mm | 8 - 10 | Fillet | 90—130 |
| 2.4mm | 3/32” | 1.6/2.4mm | AC | 1.6/2.4mm | 8 - 10 | Lap | 95—130 |
| 3.2mm | 1/8” | 2.4mm | AC | 2.4mm | 8 - 11 | Butt | 115—135 |
| 3.2mm | 1/8” | 2.4mm | AC | 2.4mm | 8 - 11 | Corner | 90—120 |
| 3.2mm | 1/8” | 2.4mm | AC | 2.4mm | 8 - 11 | Fillet | 100—140 |
| 3.2mm | 1/8” | 2.4mm | AC | 2.4mm | 8 - 11 | Lap | 105—130 |
| 4.8mm | 3/16” | 2.4mm | AC | 2.4mm | 9 - 12 | Butt | 125—150 |
| 4.8mm | 3/16” | 2.4mm | AC | 2.4mm | 9 - 12 | Corner | 130—160 |
| 4.8mm | 3/16” | 2.4mm | AC | 2.4mm | 9 - 12 | Fillet | 150—180 |
| 4.8mm | 3/16” | 2.4mm | AC | 2.4mm | 9 - 12 | Lap | 130—170 |
| 6.4mm | 1/4” | 2.4mm | AC | 2.4mm | 11 - 14 | Butt | 190—220 |
| 6.4mm | 1/4” | 2.4mm | AC | 2.4mm | 11 - 14 | Corner | 140—170 |
| 6.4mm | 1/4” | 2.4mm | AC | 2.4mm | 11 - 14 | Fillet | 170—190 |
| 6.4mm | 1/4” | 2.4mm | AC | 2.4mm | 11 - 14 | Lap | 160—180 |
| 9.5mm | 3/8” | 3.2mm | AC | 3.2mm | 12 - 15 | Butt | 110—260 |
| 9.5mm | 3/8” | 3.2mm | AC | 3.2mm | 12 - 15 | Corner | 130—260 |
| 9.5mm | 3/8” | 3.2mm | AC | 3.2mm | 12 - 15 | Fillet | 240—270 |
| 9.5mm | 3/8” | 3.2mm | AC | 3.2mm | 12 - 15 | Lap | 230—250 |
| 12.7mm | 1/2” | 3.2/4mm | AC | 3.2mm | 13 - 16 | Butt | 120—290 |
| 12.7mm | 1/2” | 3.2/4mm | AC | 3.2mm | 13 - 16 | Corner | 145—300 |
| 12.7mm | 1/2” | 3.2/4mm | AC | 3.2mm | 13 - 16 | Fillet | 320—350 |
| 12.7mm | 1/2” | 3.2/4mm | AC | 3.2mm | 13 - 16 | Lap | 280—320 |

**Please Note:**

- All above guide settings are approximate and will vary depending on application, prep, passes and type of welding equipment used.
- The welds would need to be tested to ensure they comply to your welding specifications.

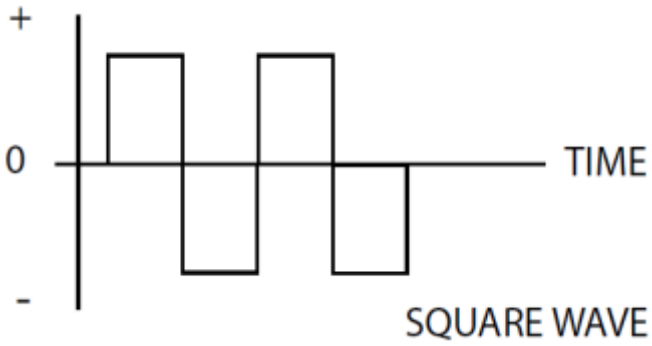
# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**AC TIG welding square wave**

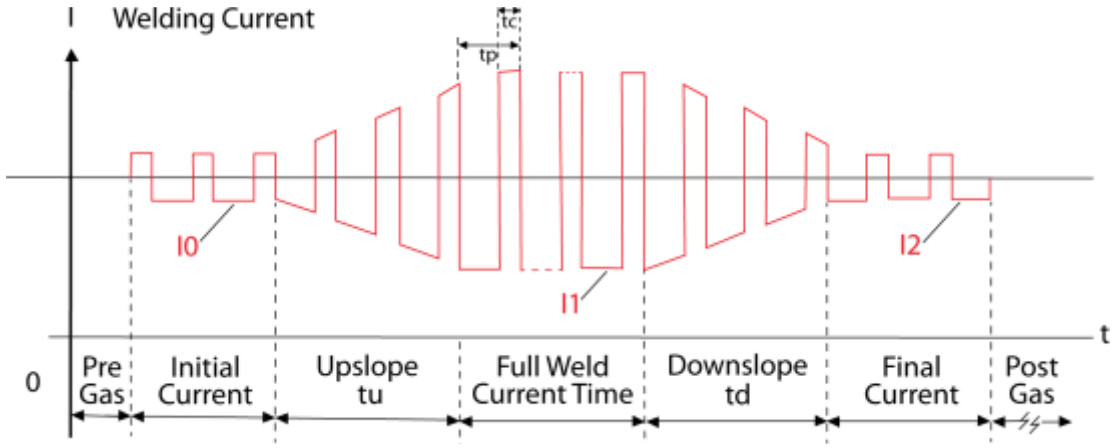
With the electronic development of inverter power sources, the square wave machine was developed. Due to these electronic controls the cross over from positive to negative and vice versa can be made almost in an instant which leads to more effective current in each half cycle due to a longer period at maximum. The effective use of the magnetic field energy stored creates waveforms which are very near square.

The ET-320P ACDC square wave machine allows us control of the positive (cleaning) and negative (penetration) half cycles.
The balance condition with equal positive and negative half cycles will give a stable weld condition.
The problems that can be encountered are that once cleaning has occurred in less than the positive half cycle time then some of the positive half cycle is not productive and can also increase potential damage to the electrode due to overheating.




However, this can be eliminated by the use of balance control which allows the time of the positive half cycle to be varied within the cycle time.

I0 - Initial current
I1 - Welding current
I2 - Final current
tu - Upslope time
td - Downslope time
tp - AC period
tc - Cleaning time



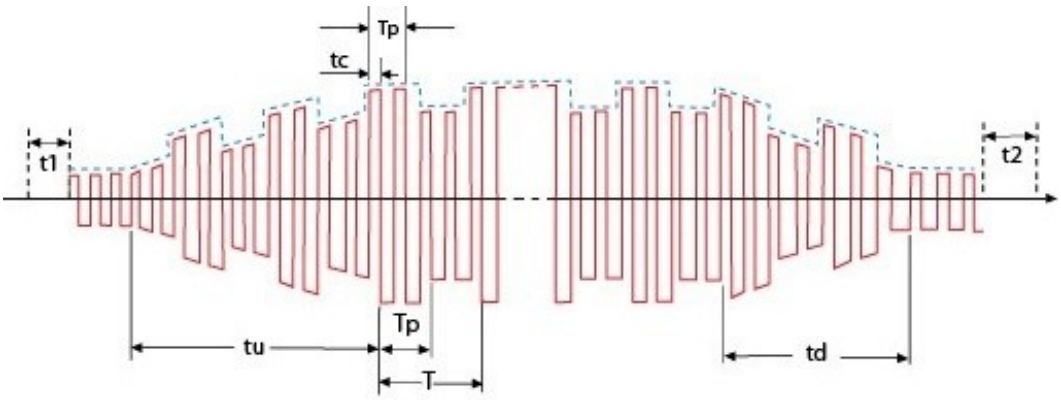

In AC square wave TIG welding, the pre flow time and post flow time are the same as in DC TIG welding.
Others parameters are described below:
Initial current (I0), welding current (I1) and pilot arc current (I2).
The preset value of the three parameters is approximately the absolute average of the practical welding current and can be adjusted according to users technical requirements.
Pulse frequency (1/tp): It can be adjusted according to users technical requirements.
Cleaning strength (100%*Tc/Tp): Generally, in AC welding when taking the electrode as the anode, the current is called the cathode current. Its main function is to break up the oxidized layer of the work piece and the cleaning strength is the percentage cathode current holding in the AC period.
This parameter is 10 ~ 40% commonly. When the value is smaller the arc is concentrated and the molten pool is narrow and deep although when the value is larger, the arc is spread, the molten pool is wide and shallow.

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

**AC pulsed TIG welding**

Tc - Cleaning time
Tp - AC period
Tp - Pulsed peak current time
T - Pulse period

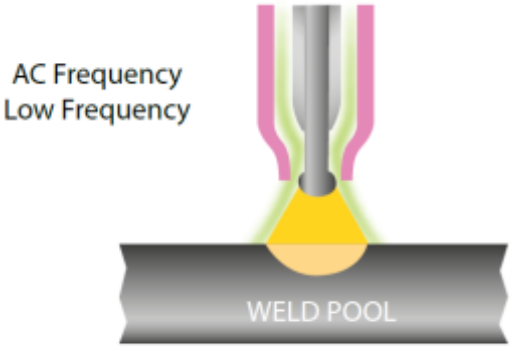



AC pulsed TIG welding is almost the same as AC square wave TIG welding and what makes them different is that in AC pulsed TIG welding the welding current varies with the pulse peak current and base current. For the AC square wave parameter selecting and setting, please refer to the corresponding contents in AC square wave TIG welding. For the pulse frequency and pulse duration ratio users may refer to the corresponding contents in DC pulsed TIG welding.
The pulse frequency (1/T) can be adjusted between 0.2Hz and 5Hz. The pulse duration ratio (Tp/T) can be adjusted between 10% and 90%.

**AC frequency**

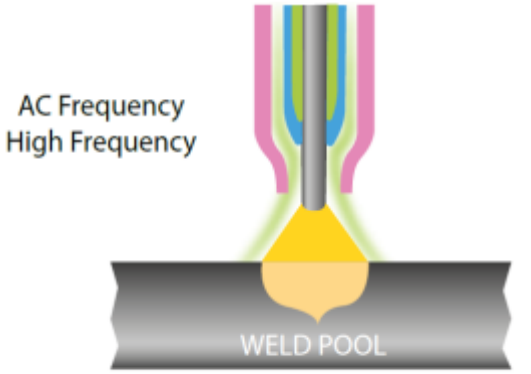
The normal mains frequency of equipment is 50Hz. However, this ET-320P ACDC has an output adjustment range of between 50 ~ 200Hz.

With TIG welding power supplies that have an adjustable AC frequency, lowering the AC frequency would provide a softer, less forceful wide arc which offers a wider bead with shallow penetration.



Soft Arc with Shallow Penetration

Increasing the AC frequency has the effect of concentrating the arc making it easily directional with narrower bead with deeper penetration.

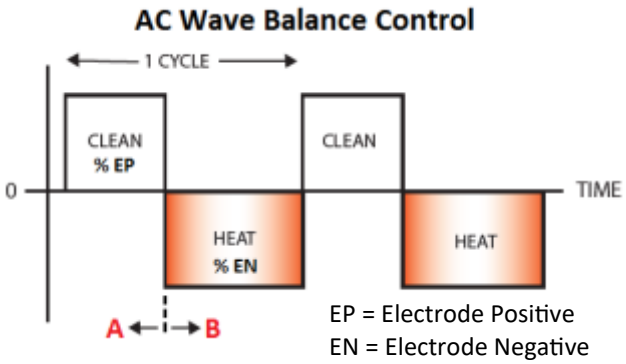


Tighter Arc with Deeper Penetration

# GUIDE TO TIG WELDING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

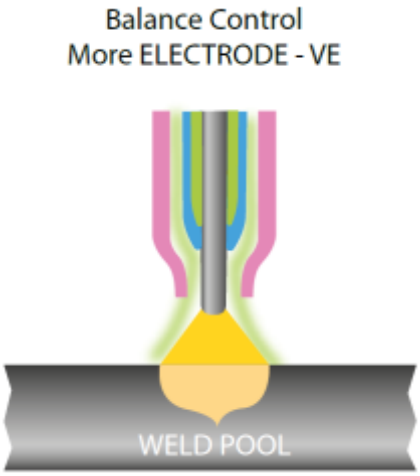
### AC Wave balance or cleaning control




When welding materials with a refractory oxide surface such as aluminium this oxide needs to be removed to allow welding of the base material. In the AC mode the oxide is removed during the positive half of the AC wave. This control allows the user to set the amount of time between positive and negative which is represented by moving A or B in the image right.
The higher the setting the more aggressive the cleaning action but more time in the positive cycle drives more energy into the tungsten so care should be taken to avoid overheating the tungsten.
AC balance zero is normally 50% positive and 50% negative.

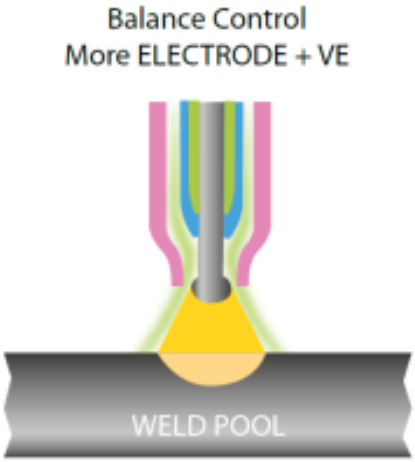
**Please Note:**
For the ET-320P ACDC the factor set balanced 'zero' point is represented as 40 on the digital display and the range of balance varies between 20 ~ 60.
With the correct setting of the frequency and balance controls it is possible to use a smaller size tungsten.

### Maximum penetration




This can be achieved by placing the control to a position which will enable more time to be spent in the negative half cycle with respect to the positive half cycle. This will allow for higher current to be used with smaller electrodes as more of the heat is in the positive (work).
The increase in heat also results in deeper penetration when welding at the same travel speed as the balanced condition, a reduced heat affected zone and less distortion due to the narrower arc.
**Please Note:**
To obtain more penetration for the ET-320P ACDC, the AC balance adjustment range is represented between 20 ~ 40.

### Maximum cleaning



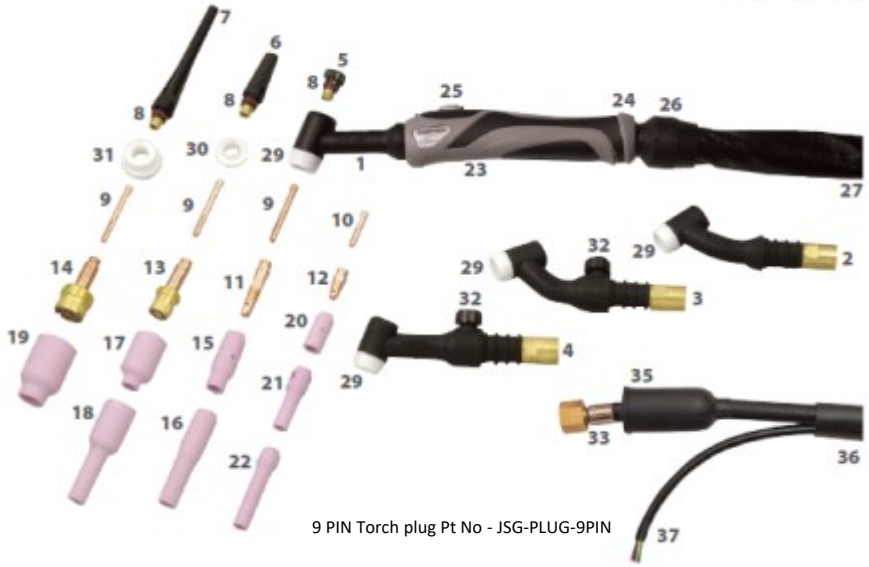

This can be achieved by placing the control to a position which will enable more time to be spent in the positive half cycle with respect to the negative half cycle. This will allow for very active cleaning current to be used. It should be noted that there is an optimum cleaning time after which more cleaning will not occur and the potential of damage to the electrode is greater. The effect on the arc is to provide a wider clean weld pool with shallow penetration.
**Please Note:**
To obtain more cleaning for the ET-320P ACDC, the AC balance adjustment range is represented between 40 ~ 60.

# TIG TORCH SPARE PARTS LIST (ET-320P ACDC)

**TIG Welding Torch Air Cooled - Model JE79-ERGO**

Rating 200A DC, 150A AC @ 60% Duty Cycle EN60974-7 • 0.5mm to 4mm Electrodes

STARPARTS




9 PIN Torch plug Pt No - JSG-PLUG-9PIN

## Consumables

### Model: T26

#### Main Consumables

| | Code | Description | Pack Qty |
|---|---|---|---|
| 1 | WP26 | Rigid Torch Body | 1 |
| 2 | WP26F | Flexible Torch Body | 1 |
| 3 | WP26FV | Flexible Torch Body c/w Argon Valve | 1 |
| 4 | WP26V | Torch Body c/w Argon Valve | 1 |
| 5 | 57Y04 | Short Back Cap | 1 |
| 6 | 300M | Medium Back Cap | 1 |
| 7 | 57Y02 | Long Back Cap | 1 |
| 8 | 98W18 | Back Cap 'O' Ring | 10 |

#### Collets

| | | | |
|---|---|---|---|
| 9 | 10N21 | Standard .020" (0.5mm) | 5 |
| | 10N22 | Standard .040" (1.0mm) | 5 |
| | 10N23 | Standard 1/16" (1.6mm) | 5 |
| | 10N26 | Standard 5/64" (2.0mm) | 5 |
| | 10N24 | Standard 3/32" (2.4mm) | 5 |
| | 10N25 | Standard 1/8" (3.2mm) | 5 |
| | 54N20 | Standard 5/32" (4.0mm) | 5 |
| 10 | 10N21S | Stubby .020" (0.5mm) | 5 |
| | 10N22S | Stubby .040" (1.0mm) | 5 |
| | 10N23S | Stubby 1/16" (1.6mm) | 5 |
| | 10N24S | Stubby 3/32" (2.4mm) | 5 |
| | 10N25S | Stubby 1/8" (3.2mm) | 5 |

#### Collet Bodies

| | | | |
|---|---|---|---|
| 11 | 10N29 | Standard .020" (0.5mm) | 5 |
| | 10N30 | Standard .040" (1.0mm) | 5 |
| | 10N31 | Standard 1/16" (1.6mm) | 5 |
| | 10N31M | Standard 5/64" (2.0mm) | 5 |
| | 10N32 | Standard 3/32" (2.4mm) | 5 |
| | 10N28 | Standard 1/8" (3.2mm) | 5 |
| | 406488 | Standard 5/32" (4.0mm) | 5 |
| 12 | 17CB20 | Stubby .020"- 1/8" (0.5 - 3.2mm) | 5 |

#### Gas Lens Bodies

| | | | |
|---|---|---|---|
| 13 | 45V29 | Standard .020" (0.5mm) | 1 |
| | 45V24 | Standard .040" (1.0mm) | 1 |
| | 45V25 | Standard 1/16" (1.6mm) | 1 |
| | 45V25M | Standard 5/64" (2.0mm) | 1 |
| | 45V26 | Standard 3/32" (2.4mm) | 1 |
| | 45V27 | Standard 1/8" (3.2mm) | 1 |
| | 45V28 | Standard 5/32" (4.0mm) | 1 |
| 14 | 45V0204 | Large Dia .020"-.040" (0.5 - 1.0mm) | 1 |
| | 45V116 | Large Dia 1/16" (1.6mm) | 1 |
| | 45V64 | Large Dia 3/32" (2.4mm) | 1 |
| | 995795 | Large Dia 1/8" (3.2mm) | 1 |
| | 45V63 | Large Dia 5/32" (4.0mm) | 1 |

#### Ceramic Cups

| | | | |
|---|---|---|---|
| 15 | 10N50 | Standard Cup 1/4" Bore | 10 |
| | 10N49 | Standard Cup 5/16" Bore | 10 |
| | 10N48 | Standard Cup 3/8" Bore | 10 |
| | 10N47 | Standard Cup 7/16" Bore | 10 |
| | 10N46 | Standard Cup 1/2" Bore | 10 |
| | 10N45 | Standard Cup 5/8" Bore | 10 |
| | 10N44 | Standard Cup 3/4" Bore | 10 |

#### Ceramic Cups (continued)

| | Code | Description | Pack Qty |
|---|---|---|---|
| 16 | 10N50L | Long Cup 1/4" Bore | 10 |
| | 10N49L | Long Cup 5/16" Bore | 10 |
| | 10N48L | Long Cup 3/8" Bore | 10 |
| | 10N47L | Long Cup 7/16" Bore | 10 |

#### Gas Lens Cups

| | | | |
|---|---|---|---|
| 17 | 54N18 | Standard Cup 1/4" Bore | 10 |
| | 54N17 | Standard Cup 5/16" Bore | 10 |
| | 54N16 | Standard Cup 3/8" Bore | 10 |
| | 54N15 | Standard Cup 7/16" Bore | 10 |
| | 54N14 | Standard Cup 1/2" Bore | 10 |
| | 54N19 | Standard Cup 11/16" Bore | 10 |
| 18 | 54N17L | Long Cup 5/16" Bore | 10 |
| | 54N16L | Long Cup 3/8" Bore | 10 |
| | 54N15L | Long Cup 7/16" Bore | 10 |
| | 54N14L | Long Cup 1/2" Bore | 10 |
| 19 | 57N75 | Large Dia Cup 3/8" Bore | 5 |
| | 57N74 | Large Dia Cup 1/2" Bore | 5 |
| | 53N88 | Large Dia Cup 5/8" Bore | 5 |
| | 53N87 | Large Dia Cup 3/4" Bore | 5 |

#### Ceramic Cups for use with item 12

| | | | |
|---|---|---|---|
| 20 | 13N08 | Standard Cup 1/4" Bore | 10 |
| | 13N09 | Standard Cup 5/16" Bore | 10 |
| | 13N10 | Standard Cup 3/8" Bore | 10 |
| | 13N11 | Standard Cup 7/16" Bore | 10 |
| | 13N12 | Standard Cup 1/2" Bore | 10 |
| | 13N13 | Standard Cup 5/8" Bore | 10 |
| 21 | 796F70 | Long Cup 3/16" Bore | 10 |
| | 796F71 | Long Cup 1/4" Bore | 10 |
| | 796F72 | Long Cup 5/16" Bore | 10 |
| | 796F73 | Long Cup 3/8" Bore | 10 |
| 22 | 796F74 | X - Long Cup 3/16" Bore | 10 |
| | 796F75 | X - Long Cup 1/4" Bore | 10 |
| | 796F76 | X - Long Cup 5/16" Bore | 10 |
| | 796F77 | X - Long Cup 3/8" Bore | 10 |

#### Secondary Consumables

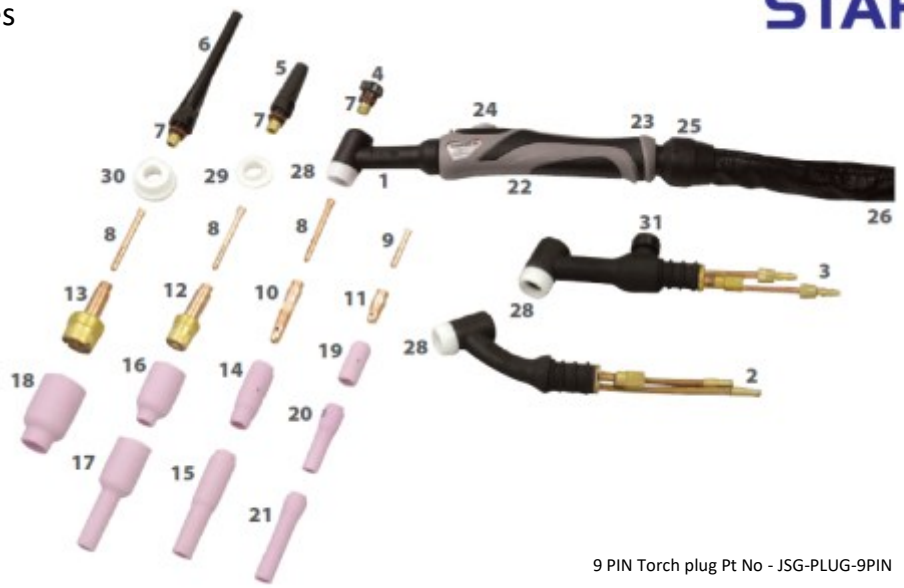
TBC

| | | | |
|---|---|---|---|
| 23 | SP9110 | LH & RH Handle Shell | 1 |
| 24 | SP9111 | Handle Screw | 1 |
| 25 | SP9120 | Single Button Switch | 1 |
| | SP9121 | 2 Button Switch | 1 |
| | SP9122 | 5K Potentiometer Switch | 1 |
| | SP9123 | 10K Potentiometer Switch | 1 |
| | SP9128 | 47K Potentiometer Switch | 1 |
| | SP9129 | 4 Button Switch | 1 |
| 26 | SP9114 | Handle Ball Joint | 1 |
| 27 | SP9117 | Leather Cover 800mm | 1 |
| 28 | SP9119 | Cable Cover Joint (not illustrated) | 1 |
| 29 | 18CG | Standard Heat Shield | 1 |
| 30 | 54N01 | Gas Lens Heat Shield | 1 |
| 31 | 54N63 | Large Gas Lens Insulator | 1 |
| 32 | V5-1 | Valve Stem WP26V & WP26FV | 1 |
| 33 | 46V28 | Mono Power Cable Assy 12.5ft - 3/8" Bsp | 1 |
| | 46V30 | Mono Power Cable Assy 25ft - 3/8" Bsp | 1 |
| 34 | 46V28-2D | 2 Piece Power Cable Assy 12.5ft - Dinse / 3/8" Bsp | 1 |
| | 46V30-2D | 2 Piece Power Cable Assy 25ft - Dinse / 3/8" Bsp | 1 |
| 35 | 0315071 | Insulation Boot | 5 |
| 36 | 6091 | Neoprene Protective Cover | 1m |
| 37 | SP9126 | 4m Switch Cable c/w 5 Pin Receptacle | 1 |
| | SP9127 | 8m Switch Cable c/w 5 Pin Receptacle | 1 |

# TIG TORCH SPARE PARTS LIST (ET-320P ACDC-WC)

## TIG Welding Torch Water Cooled - Model JE83-ERGO

Rating 350A DC, 260A AC @ 100% Duty Cycle EN60974-7 • 0.5mm to 4.0mm Electrodes




9 PIN Torch plug Pt No - JSG-PLUG-9PIN

### Main Consumables

| | Code | Description | Pack Qty |
|---|---|---|---|
| 1 | WP18 | Rigid Torch Body | 1 |
| 2 | WP18F | Flexible Torch Body | 1 |
| 3 | WP18V | Torch Body c/w Argon Valve | 1 |
| 4 | 57Y04 | Short Back Cap | 1 |
| 5 | 300M | Medium Back Cap | 1 |
| 6 | 57Y02 | Long Back Cap | 1 |
| 7 | 98W18 | Back Cap 'O' Ring | 10 |

### Collets

| | | | |
|---|---|---|---|
| 8 | 10N21 | Standard .020" (0.5mm) | 5 |
| | 10N22 | Standard .040" (1.0mm) | 5 |
| | 10N23 | Standard 1/16" (1.6mm) | 5 |
| | 10N26 | Standard 5/64" (2.0mm) | 5 |
| | 10N24 | Standard 3/32" (2.4mm) | 5 |
| | 10N25 | Standard 1/8" (3.2mm) | 5 |
| | 54N20 | Standard 5/32" (4.0mm) | 5 |
| 9 | 10N21S | Stubby .020" (0.5mm) | 5 |
| | 10N22S | Stubby .040" (1.0mm) | 5 |
| | 10N23S | Stubby 1/16" (1.6mm) | 5 |
| | 10N24S | Stubby 3/32" (2.4mm) | 5 |
| | 10N25S | Stubby 1/8" (3.2mm) | 5 |

### Collet Bodies

| | | | |
|---|---|---|---|
| 10 | 10N29 | Standard .020" (0.5mm) | 5 |
| | 10N30 | Standard .040" (1.0mm) | 5 |
| | 10N31 | Standard 1/16" (1.6mm) | 5 |
| | 10N31M | Standard 5/64" (2.0mm) | 5 |
| | 10N32 | Standard 3/32" (2.4mm) | 5 |
| | 10N28 | Standard 1/8" (3.2mm) | 5 |
| | 406488 | Standard 5/32" (4.0mm) | 5 |
| 11 | 17CB20 | Stubby .020"- 1/8" (0.5 - 3.2mm) | 5 |

### Gas Lens Bodies

| | | | |
|---|---|---|---|
| 12 | 45V29 | Standard .020" (0.5mm) | 1 |
| | 45V24 | Standard .040" (1.0mm) | 1 |
| | 45V25 | Standard 1/16" (1.6mm) | 1 |
| | 45V25M | Standard 5/64" (2.0mm) | 1 |
| | 45V26 | Standard 3/32" (2.4mm) | 1 |
| | 45V27 | Standard 1/8" (3.2mm) | 1 |
| | 45V28 | Standard 5/32" (4.0mm) | 1 |
| 13 | 45V0204 | Large Dia .020"-.040" (0.5 - 1.0mm) | 1 |
| | 45V116 | Large Dia 1/16" (1.6mm) | 1 |
| | 45V64 | Large Dia 3/32" (2.4mm) | 1 |
| | 995795 | Large Dia 1/8" (3.2mm) | 1 |
| | 45V63 | Large Dia 5/32" (4.0mm) | 1 |

### Ceramic Cups

| | | | |
|---|---|---|---|
| 14 | 10N50 | Standard Cup 1/4" Bore | 10 |
| | 10N49 | Standard Cup 5/16" Bore | 10 |
| | 10N48 | Standard Cup 3/8" Bore | 10 |
| | 10N47 | Standard Cup 7/16" Bore | 10 |
| | 10N46 | Standard Cup 1/2" Bore | 10 |
| | 10N45 | Standard Cup 5/8" Bore | 10 |
| | 10N44 | Standard Cup 3/4" Bore | 10 |
| 15 | 10N50L | Long Cup 1/4" Bore | 10 |
| | 10N49L | Long Cup 5/16" Bore | 10 |
| | 10N48L | Long Cup 3/8" Bore | 10 |
| | 10N47L | Long Cup 7/16" Bore | 10 |

### Gas Lens Cups

| | Code | Description | Pack Qty |
|---|---|---|---|
| 16 | 54N18 | Standard Cup 1/4" Bore | 10 |
| | 54N17 | Standard Cup 5/16" Bore | 10 |
| | 54N16 | Standard Cup 3/8" Bore | 10 |
| | 54N15 | Standard Cup 7/16" Bore | 10 |
| | 54N14 | Standard Cup 1/2" Bore | 10 |
| | 54N19 | Standard Cup 11/16" Bore | 10 |
| 17 | 54N17L | Long Cup 5/16" Bore | 10 |
| | 54N16L | Long Cup 3/8" Bore | 10 |
| | 54N15L | Long Cup 7/16" Bore | 10 |
| | 54N14L | Long Cup 1/2" Bore | 10 |
| 18 | 57N75 | Large Dia Cup 3/8" Bore | 5 |
| | 57N74 | Large Dia Cup 1/2" Bore | 5 |
| | 53N88 | Large Dia Cup 5/8" Bore | 5 |
| | 53N87 | Large Dia Cup 3/4" Bore | 5 |

### Ceramic Cups for use with item 11

| | | | |
|---|---|---|---|
| 19 | 13N08 | Standard Cup 1/4" Bore | 10 |
| | 13N09 | Standard Cup 5/16" Bore | 10 |
| | 13N10 | Standard Cup 3/8" Bore | 10 |
| | 13N11 | Standard Cup 7/16" Bore | 10 |
| | 13N12 | Standard Cup 1/2" Bore | 10 |
| | 13N13 | Standard Cup 5/8" Bore | 10 |
| 20 | 796F70 | Long Cup 3/16" Bore | 10 |
| | 796F71 | Long Cup 1/4" Bore | 10 |
| | 796F72 | Long Cup 5/16" Bore | 10 |
| | 796F73 | Long Cup 3/8" Bore | 10 |
| 21 | 796F74 | X - Long Cup 3/16" Bore | 10 |
| | 796F75 | X - Long Cup 1/4" Bore | 10 |
| | 796F76 | X - Long Cup 5/16" Bore | 10 |
| | 796F77 | X - Long Cup 3/8" Bore | 10 |

### Secondary Consumables

| | | | |
|---|---|---|---|
| 22 | TBC_0 | LH & RH Handle Shell | 1 |
| 23 | SP9111 | Handle Screw | 1 |
| 24 | SP9120 | Single Button Switch | 1 |
| | SP9121 | 2 Button Switch | 1 |
| | SP9122 | 5K Potentiometer Switch | 1 |
| | SP9123 | 10K Potentiometer Switch | 1 |
| | SP9128 | 47K Potentiometer Switch | 1 |
| | SP9129 | 4 Button Switch | 1 |
| 25 | SP9114 | Handle Ball Joint | 1 |
| 26 | SP9117 | Leather Cover 800mm | 1 |
| 27 | SP9119 | Cable Cover Joint (not illustrated) | 1 |
| 28 | 18CG | Standard Heat Shield | 1 |
| 29 | 54N01 | Gas Lens Heat Shield | 1 |
| 30 | 54N63 | Large Gas Lens Insulator | 1 |
| 31 | VS-1 | Valve Stem WP18V | 1 |
| 32 | 40V64 | Power Cable Assy 12.5ft - 3/8" Bsp | 1 |
| | 41V29 | Power Cable Assy 25ft - 3/8" Bsp | 1 |
| 33 | 45V07 | Argon Hose Assy 12.5ft - 3/8" Bsp | 1 |
| | 45V08 | Argon Hose Assy 25ft - 3/8" Bsp | 1 |
| 34 | 40V74 | Water Hose Assy 12.5ft - 3/8" Bsp | 1 |
| | 41V32 | Water Hose Assy 25ft - 3/8" Bsp | 1 |
| 35 | 0315071 | Insulation Boot | 5 |
| 36 | 6091 | Neoprene Protective Cover | 1m |
| 37 | SP9126 | 4m Switch Cable c/w 5 Pin Receptacle | 1 |
| | SP9127 | 8m Switch Cable c/w 5 Pin Receptacle | 1 |

# TIG WELDING TROUBLESHOOTING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

### TIG welding defects and prevention methods

| Defect | Possible cause | Action |
|---|---|---|
| Excessive tungsten use | Set up for DCEP | Change to DCEN |
| | Insufficient shield gas flow | Check for gas restriction and correct flow rates. Check for drafts in the weld area |
| | Electrode size too small | Select correct size |
| | Electrode contamination during cooling time | Extend post flow gas time |
| Porosity/weld contamination | Loose torch or hose fitting | Check and tighten all fitting |
| | Inadequate shield gas flow | Adjust flow rate - normally 8-12L/m |
| | Incorrect shield gas | Use correct shield gas |
| | Gas hose damaged | Check and repair any damaged hoses |
| | Base material contaminated | Clean material properly |
| | Incorrect filler material | Check correct filler wire for grade of use |
| No operation when torch switch is operated | Torch switch or cable faulty | Check the torch switch continuity and repair or replace as required |
| | ON/OFF switch turned off | Check position of ON/OFF switch |
| | Mains fuses blown | Check fuses and replace as required |
| | Fault inside the machine | Call for a repair technician |
| Low output current | Loose or defective work clamp | Tighten/replace clamp |
| | Loose cable plug | Check and tighten all plugs |
| | Power source faulty | Call a repair technician |
| High frequency will not strike the arc | Weld/power cable open circuit | Check all cables and connections for continuity, especially the torch cables |
| | No shield gas flowing | Check cylinder contents, regulator and valves, also check the power source |
| Unstable arc when welding in DC | Tungsten contaminated | Break off contaminated end and regrind the tungsten |
| | Arc length incorrect | Arc length should be between 3 ~ 6mm |
| | Material contaminated | Clean all base and filler material |
| | Electrode connected to the wrong polarity | Reconnect to correct polarity |
| Arc is difficult to start | Incorrect tungsten type | Check and fit correct tungsten |
| | Incorrect shield gas | Use argon shield gas |

# TIG WELDING TROUBLESHOOTING

**Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.**

### TIG welding defects and prevention methods

| Defect | Possible cause | Action |
|---|---|---|
| Excessive bead build up, poor penetration or poor fusion at the edges of the weld | Weld current too low | Increase the welding amperage<br>Poor material prep |
| Weld bead flat and too wide or undercut at the weld edge or burning through | Weld current too high | Decrease the welding amperage |
| Weld bead too small or insufficient penetration | Welding travel speed too fast | Reduce your welding travel speed |
| Weld bead too wide or excessive bead build up | Welding travel speed too slow | Increase your welding travel speed |
| Uneven leg length in fillet joint | Wrong placement of filler rod | Re-position filler rod |
| Tungsten melts or oxidises when welding arc is made | TIG torch lead connected to +<br>Little or no gas flow to weld pool<br><br>Gas cylinder or hoses contain impurities<br>The tungsten is too small for the weld current<br>TIG/MMA selector set to MMA | Connect to - polarity<br>Check gas apparatus as well as torch and hoses for breaks or restrictions<br>Change gas cylinder and blow out torch and gas hoses<br>Increase the size of the tungsten<br><br>Ensure you have the power source set to TIG function |

# TIG TORCH TROUBLESHOOTING

**TIG welding defects and prevention methods**

The TIG torch used for lift TIG welding comprises of several items which ensure current flow and arc shielding from the atmosphere.
Regular maintenance of the welding torch is one of the most important measures to ensure its normal operation and extend lifespan.
In order to ensure normal maintenance, the wearing parts of the torch should have spares, including the electrode holder, nozzle, sealing ring, insulating washer, etc.
Common faults of the welding torch include overheating, gas leakage, water leakage, poor gas protection, electric leakage, nozzle burn out, and cracking. The causes of these faults and troubleshooting methods are as shown in the following table:

| Symptom | Reasons | Troubleshooting |
|---|---|---|
| The welding torch is overheating | The welding torch capacity is too small | Replace with a welding torch with large capacity |
| | The collet fails to clamp the tungsten electrode | Replace the collet or back cap |
| Gas leakage | The sealing ring is worn | Replace the sealing ring |
| | The gas connection thread is loose | Tighten it |
| | The gas inlet pipe joint is damaged or not fastened | Cut off the damaged joint, reconnect and tighten the replaced gas inlet pipe or wrap up the damaged area |
| | The gas inlet pipe has been damaged by heat or aging | Replace the gas inlet pipe |
| Operator receiving a shock from the torch | The torch head is wet due to leakage or other reasons | Find the cause of water leakage, and fully dry the torch head |
| | The torch head is damaged or the live metal part is exposed | Replace the torch head or wrap the exposed electrified metal part with adhesive tape |
| Poor gas flow or porosity in the weld | The welding torch is leaking | Locate the leakage |
| | The nozzle diameter is too small | Replace with a nozzle of larger diameter |
| | The nozzle is damaged or cracked | Replace with a new nozzle |
| | The gas circuit in the welding torch is blocked | Blow the circuit with compressed air to clear the blockage |
| | The gas screen has been damaged or lost during disassembly and assembly | Replace with a new gas screen |
| | The argon gas is impure | Replace with standard argon gas |
| | The gas flow is too large or small | Adjust the gas flow properly |
| Arc started between the collet/collet holder or the tungsten electrode/torch head | The collet and tungsten electrode have poor contact, or arc is started when the tungsten electrode contacts the base metal | Replace the collet or repair |
| | The collet and welding torch have poor contact | Connect the collet and welding torch properly |

# MAINTENANCE

**The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing the machine covers.**

In order to guarantee that the arc welding machine works efficiently and in safety, it must be maintained regularly. Operators should understand the maintenance methods and means of arc welding machine operation. This guide should enable customers to carry out simple examination and safeguarding by oneself, try to reduce the fault rate and repair times of the arc welding machine, so as to lengthen service life of arc welding machines.

| **Period** | **Maintenance item** |
|---|---|
| Daily examination | Check the condition of the machine, mains cables, welding cables and connections.<br>Check for any warnings LEDs and machine operation. |
| Monthly examination | Disconnect from the mains supply and wait for at least 5 minutes before removing the cover.<br>Check internal connections and tighten if required.<br>Clean the inside of the machine with a soft brush and vacuum cleaner.<br>Take care not to remove any cables or cause damage to components.<br>Ensure that ventilation grills are clear.<br>Carefully replace the covers and test the unit.<br>**This work should be carried out by a suitably qualified competent person.** |
| Yearly examination | Carry out an annual service to include a safety check in accordance with the manufacturers standard (EN 60974-1).<br>**This work should be carried out by a suitably qualified competent person.** |

# TROUBLESHOOTING

Before arc welding machines are dispatched from the factory, they have already been checked thoroughly. The machine should not be tampered with or altered. Maintenance must be carried out carefully. If any wire becomes loose or is misplaced, it maybe potentially dangerous to user!

Only professional maintenance personnel should repair the machine!

| **Description of fault** | **Possible cause** | **Action** |
|---|---|---|
| The welding arc cannot be established | Power switch has not been switched ON<br>Incoming mains power supply is not ON<br>Possible internal power failure | - Switch ON power switch<br>- Check incoming power switch for correct operation and supply<br>- Have a technician check the machine and mains power supply |
| Difficult arc ignition | Low arc current | - Increase the arc current setting<br>- Check condition of the MMA welding leads |
| Overheat LED lit | Machine operated outside duty cycle<br>Fan not working | - Allow the machine to cool and the unit will reset automatically<br>- Have a technician check for obstructions blocking the fan |
| Over current LED lit | Mains supply problem | - Have a technician check the mains supply |

# TROUBLESHOOTING - ERROR CODES

**The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing any machine covers.**

The below is a list of error codes for the Jasic EVO ET-320P welding machine.

| Error Code | Error Code Description | Possible Cause | Check |
|---|---|---|---|
| E10 | Overcurrent protection | The output is at maximum capacity current of machine | Turn the machine off and back on again.<br>If overcurrent protection alarm is still active, contact your suppliers approved technician. |
| E30 | Open-phase protection | The input power cable/mains plug is not connected properly | After the welder is shut down, check the three-phase input voltage is normal. If the loss of phase protection still exists, contact the company's after-sales service |
| E31 | Undervoltage protection | The input mains voltage is too low | Turn the machine off and back on again.<br>If the alarm continues, check the input voltage.<br>If the input voltage is within specification and the alarm persists, contact your suppliers approved technician. |
| E32 | Overvoltage protection | The input mains voltage is too high | Turn the machine off and back on again.<br>If the alarm continues, check the input voltage.<br>If the input voltage is within specification and the alarm persists, contact your suppliers approved technician. |
| E34 | Undervoltage protection | Under voltage in inverter circuit | Turn the machine off and back on again.<br>If the alarm continues, check the input voltage.<br>If the input voltage is within specification and the alarm persists, contact your suppliers approved technician. |
| E60 | Overheating | An over temperature signal received from the output rectifier circuit | Do not turn off the machine, wait for a while and after the thermal error goes off then you can continue welding.<br>While error code is ON, machine cannot cut.<br>Ensure cooling fans are operational.<br>Decrease duty cycle welding activity. |
| E61 | Overheating | An over temperature signal received from the Inverter IGBT circuit | Do not turn off the machine, wait for a while and after the thermal error goes off then you can continue welding.<br>While error code is ON, machine cannot cut.<br>Ensure cooling fans are operational.<br>Decrease duty cycle welding activity. |

**Please Note:**
If you have checked over the fault and the alarm condition still persists then contact your suppliers approved technician.

# TROUBLESHOOTING - ERROR CODES

**The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing any machine covers.**

The below is a list of error codes for the Jasic EVO ET-320P ACDC welding machine.

| Error Code | Error Code Description | Possible Cause | Check |
|---|---|---|---|
| E71 | Water cooler alarm | Lack of water flow | Turn off and restart the machine. Check coolant level in tank, check flow and also check for blockage. If the alarm cannot be eliminated, contact your maintenance personnel. |
|  | Abnormal VRD | VRD voltage is too high or too low | Turn the machine off and back on again. If the fault VRD alarm persists, contact your suppliers approved technician. |

**Please Note:**

- If you have checked over the fault and the alarm condition still persists then contact your suppliers approved technician.
- If the machine experiences a 'U' error code, please contact your supplier for further details.

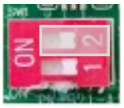
## VRD Control

The below instructions will guide you through the process of turning the VRD option ON or OFF for the Jasic Evo ET-320P ACDC when in MMA mode.
To gain access to the control PC Board (PK-521) where the VRD control switch is located, remove the four handle screws and then remove the 4 top cover screws and then lift away the top cover.
This now offers you access to the control PC Board where the VRD activation DIP switch is located.

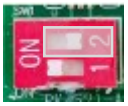
As shown right, the 2 position DIP switch SW1 is centrally located on the control PC Board with the switches accessed from the top.
This 2 position dip switch uses position 1 * for VRD switching.
Using a very small flat screw driver carefully slide switch position 1 (VRD) to either ON or OFF depending on your welding requirement.

* SW1 DIP switch position 2 is not used and is shown greyed out.

VRD Off.
(default for factory machines)




VRD ON
Turn the pin1 of the dip switch to the On.




**EVO ET-320P ACDC VRD control panel function indicators (when in MMA mode).**

1. When the VRD function is not enabled, the VRD indicator LED's will always be off.
2. When the VRD function is enabled, the VRD indicator displays green when no welding is being undertaken, indicating that the VRD function is active. 

3. When the VRD function is enabled the VRD indicator will turn OFF when stick welding starts.
4. When the VRD function is enabled and the VRD indicator LED displays red, this indicates an error with the VRD circuit. 

# WEEE disposal

The equipment is manufactured with materials which do not contain any toxic or poisonous materials dangerous to the operator.
When the equipment is scrapped, it should be dismantled separating components according to the type of materials.
Do not dispose of the equipment with normal waste. The European Directive 2002/96/EC and United Kingdom's Directive The Waste Electrical and Electronic Equipment (WEEE) regulations 2013 states that electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility.
Jasic has a relevant recycling system which is compliant and registered in the UK with the environment agency. Our registration reference is WEEMM3813AA.
In order to comply with WEEE regulations outside the UK you should contact your supplier.

# RoHS Compliance Declaration

We herewith confirm, that the above mentioned product does not contain any of the restricted substances as listed in EU Directive 2011/65/EU and the UK directive ROHS Regulations 2012 in concentrations above the limits as specified therein.

**Disclaimer:**
Please note that this confirmation is given to the best of our present knowledge and belief.
Nothing herein represents and/or may be interpreted as warranty within the meaning of the applicable warranty law.

# EC DECLARATION OF CONFORMITY

WILKINSON STAR

## EU Declaration of Conformity

The manufacture or its legal representative Wilkinson Star Limited declares that the equipment listed described below is designed and produced according to the following EU directives:

| | |
|---|---|
| Low Voltage Directive (LVD) | 2014/35/EU |
| Electromagnetic Compatibility Directive (EMC) | 2014/30/EU |
| ROHS2.0: | 2011/65/EU |
| Annex 11 of RoHS2 | 2015/863 |
| Eco Design Requirements for Welding Equipment Pursuant 2009/125/EC | 2019/1784 |

Inspections in compliance with the following standards were applied:

EN 60974-1:2018 + A1:2019
EN 60974-10:2014 + A1:2015
EN 62822-1:2018
EN 62874-3:2013

**Any alterations or change to these machines by any unauthorised person makes this declaration invalid.**

| **Wilkinson Star Model** | **Jasic Model** |
|---|---|
| ET-320PACDC | TIG 320P ACDC E2S32 |
| ET-320PACDC-WC | LC-40 |

**Authorised Representative**
Wilkinson Star Limited
Shield Drive, Wardley Industrial Estate,
Worsley, Salford, M28 2WD.
Tel: +44 161 793 8127

Signature:

Dr John A Wilkinson OBE

Position: CHAIRMAN

Date: 11th February 2025

Company Stamp

**Manufacture**
Shenzhen Jasic Technology Co Ltd
No3 Qinglan, 1st Road,
Pingshan District,
Shenzhen, China.

Signature: Ye

Shenzhen Jasic Technology Co Ltd

Position: Deputy Director of INTL Business

Date: 11th Feb, 2025

Company Stamp

**Authorized representative established within the EU:** JTE S.R.L Via Fogazzaro CAP 36030 Calogno (VI) Vicenza Italy

# STATEMENT OF WARRANTY

All new JASIC EVO2.0 welding, plasma cutters and multi-process machines are sold through our partner Wilkinson Star Limited within the United Kingdom and Ireland shall be warrantied to the original owner, non transferable, against failure due to defective materials or production.
The warranty period is 5 years following the date of purchase and we recommend you register your product online within 28 days of purchase.
The original invoice is documentation for the standard warranty period. The warranty period is based on a single shift pattern.

Defective units shall be repaired or replaced by the company at our workshop. The company may opt to refund the purchase price (less any costs and depreciation due to use and wear).
The company reserves the right to alter the warranty conditions at any time with effect for the future.

A prerequisite for the full warranty is that products are operated in accordance with the operating instructions supplied, observing the relevant installation and any legal requirements recommendations and guidelines and carrying out the maintenance instructions shown in the operator manual. This should be carried out by a suitably qualified competent person.

Warranty claims will only be accepted from authorised Jasic distributors and in the unlikely event of a problem this should be reported to the technical support team to review the claim.
The customer has no claim to loan or replacement products whilst repairs are being performed.

The following falls outside the scope of the warranty:

- Defects due to natural wear and tear
- Failure to observe the operating and maintenance instructions
- Connection to an incorrect or faulty mains supply
- Overloading during use
- Any modifications that are made to the product without the prior written consent
- Software errors due incorrect operation
- Any repairs that are carried out using non-approved spare parts
- Any transport or storage damage
- Direct or indirect damage as well as any loss of earnings are not covered under the warranty
- External damage such as fire or damage due to natural causes e.g. flooding
- Warranty repairs carried out by non-authorised Jasic distributors.

**NOTE: Under the terms of the warranty, welding torches, their consumable parts, wire feed unit drive rolls and guide tubes, work return cables and clamps, electrode holders, connection and extension cables, mains and control leads, plugs, wheels, coolant etc. are covered with a 3 month warranty.**

Jasic shall in no event be responsible for any third party expenses or expenses/costs or any indirect or consequential expenses/costs.

Jasic will submit an invoice for any repair work performed outside the scope of the warranty. A quotation for any non warranty will be raised prior to any repairs being carried out.

The decision about repair or replacement of the defective part(s) is made by Jasic. The replaced part(s) remain(s) Jasic property.

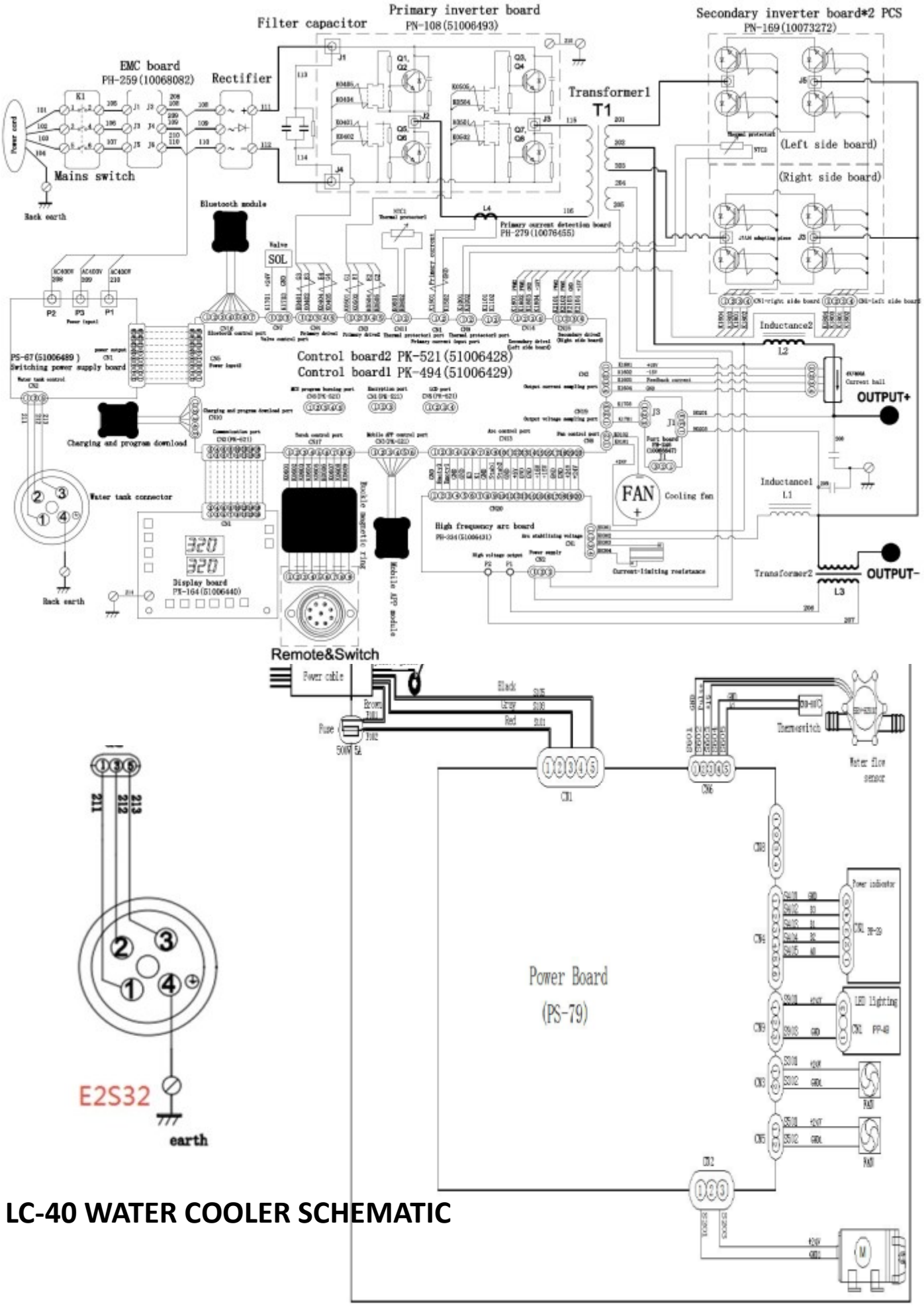
Warranty extends only to the machine, its accessories and parts contained inside. No other warranty is expressed or implied. No warranty is expressed or implied in regards to the fitness of the product for any particular application or use.

If in our judgment you fail, or we suspect that you have failed, to comply with any term or provision of the product warranty terms, we reserve the right to deny you access to our services (or any part thereof).

For further information on Jasic product warranty terms and product warranty registration please visit:

**www.jasic.co.uk/warranty-information**
**www.jasic.co.uk/warranty-registration**

# EP-320P ACDC POWER SOURCE SCHEMATIC




# LC-40 WATER COOLER SCHEMATIC

# OPTIONS AND ACCESSORIES

| Part Number | Description |
|---|---|
| JE79-ERGO | 26 TIG Torch, 12.5ft, TIG Torch c/w Plug (air cooled) |
| JE79-ERGO-8M | 26 TIG Torch, 25ft, TIG Torch c/w Plug (air cooled) |
| JE83-ERGO | 18 TIG Torch, 12.5ft, TIG Torch c/w Plug (water Cooled) |
| JE83-ERGO 8M | 18 TIG Torch, 25ft, TIG Torch c/w Plug (water Cooled) |
| WCS50-5 | Welding Cable Set (MMA) 5m (50mm Cable) |
| WC-5-05 | Electrode Holder and Lead 5m |
| EC-5-05 | Work Return Lead and Clamp 3m |
| CP3550 | Cable Plug 35-50mm |
| JH-HDX | Jasic HD True Colour Auto Darkening Welding Helmet |
| HRC-01 | Wired hand held remote current control |
| HRC-02 | Wireless hand held remote current control |
| FRC-01 | Wired foot pedal remote current control |
| FRC-02 | Wireless foot pedal remote current control |
| LC-40 | Optional Cooler LC-40 |
| TR-03 * | Optional Trolley 2 Wheel |
| 51009435 | EVO20 MIG Remote Control APP Module |

* The TR-03 trolley can only be used for the ET-300P power source c/w LC-40 cooler (water cooled setup), but not with the ET-300P power source only (air cooled setup).

# OPTIONAL REMOTE CONTROL DEVICES

| Control Type | Name | Model | Wireless Receiver | Welding Mode | Image |
|---|---|---|---|---|---|
| Wired | Analog TIG torch trigger | 10K potentiometer TIG Torch | N/A | TIG | - |
| | Digital TIG torch trigger | Digital TIG Torch | N/A | TIG | - |
| | Wired foot pedal remote control | FRC-01 | N/A | TIG |  |
| | Wired handheld remote control | HRC-01 | N/A | TIG/MMA |  |
| Wireless | Wireless handheld remote control | HRC-02 | Yes | TIG/MMA |  |
| | Wireless Foot pedal remote control | FRC-02 | Yes | TIG |  |
| | Wireless Transceiver | TS4 | Yes | TIG/MMA | N/A |

# REMOTE CONTROL DEVICE FUNCTIONALITY

| Control Type | Model Name | Welding Mode | Remote Control Function |
|---|---|---|---|
| Wired | FRC-01 foot pedal | TIG | Adjust welding current in TIG mode. |
| | HRC-01 handheld | TIG/MMA | Adjust welding current in TIG mode.<br>Adjust welding current on MMA mode. |
| Wireless | FRC-02 foot pedal | TIG | Adjust welding current on TIG mode. |
| | HRC-02 handheld | TIG/MMA | DC TIG: adjust welding current.<br>DC pulse TIG: adjust welding current and pulse frequency.<br>AC (pulse) TIG: adjust welding current and AC balance.<br>MMA: adjust welding current. |

# NOTES

# NOTES

# NOTES

**Wilkinson Star Limited**
Shield Drive
Wardley Industrial Estate
Worsley
Manchester
UK
M28 2WD

**+44(0)161 793 8127**

Jasic.co.uk

JASIC | Passionate About Your Welding

**www.jasic.co.uk** August 2025 Issue 4