

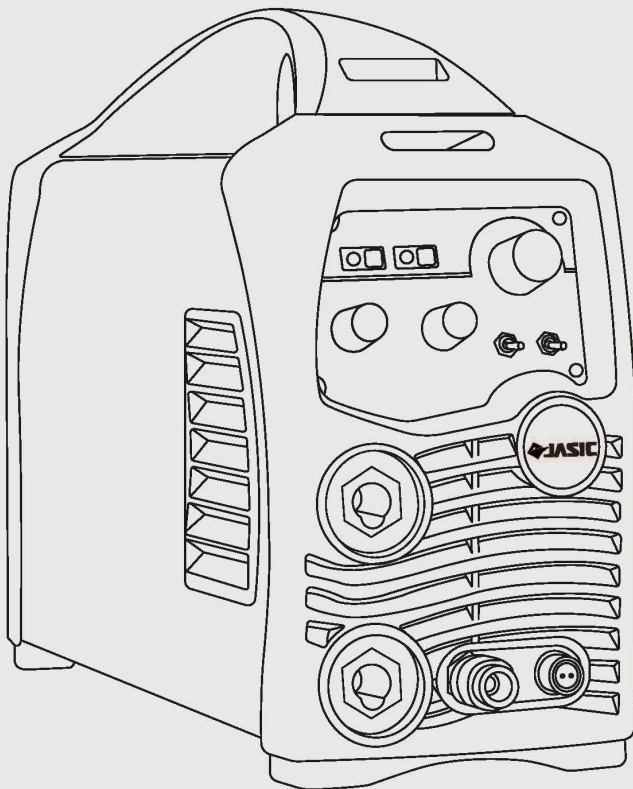


# TIG Series

TIG 180 (JT-180)

TIG 180 Dual Voltage (JT-180DV)

TIG 200 (JT-200)



# Operator Manual



CE

UK  
CA



# Your new product

Thank you for selecting this Jasic 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](http://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](http://www.Jasic.co.uk) for revision updated operating manuals.

No part of this manual may be copied or reproduced by any means without the written permission of Wilkinson Star Limited.

# 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                | 8    |
| Product Overview                            | 9    |
| Technical Specifications                    | 10   |
| Description of Controls                     | 11   |
| Installation                                | 12   |
| Operation MMA                               | 14   |
| Operation TIG                               | 15   |
| Guide to MMA Welding                        | 16   |
| MMA Welding Problems                        | 20   |
| Guide to TIG Welding                        | 21   |
| TIG Welding Torch                           | 27   |
| Tig Welding Problems                        | 28   |
| Maintenance                                 | 30   |
| Service Schedule Record                     | 30   |
| Troubleshooting                             | 31   |
| WEEE Disposal                               | 32   |
| RoHS Compliance Declaration                 | 32   |
| UKCA Declaration of Conformity              | 32   |
| EC Declaration of Conformity                | 33   |
| Statement of Warranty                       | 34   |
| Schematic                                   | 35   |
| Options and Accessories                     | 36   |
| Notes                                       | 37   |
| Jasic Contact Details                       | 38   |

# SAFETY INSTRUCTION

These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted.

It is important that users of this equipment protect yourselves 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 use the equipment.

Pacemaker wearers should consult your doctor prior to using this equipment.

PPE and workplace safety equipment must be compatible for the application of work involved.

## **Always carry out a risk assessment before undertaking any welding or cutting activity**

### **General electrical safety**



The equipment should be installed by a qualified person and in accordance with current standards 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 with 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 environment 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 processes 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 or watching.
- Wear approved safety glasses with side shields under your helmet.
- Never use broken or faulty welding helmets.
- Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the welding area.
- Ensure that there are adequate warnings that welding or cutting is taking place.
- Wear suitable protective flame resistant clothing, gloves and footwear.
- Check and be sure the area is safe and clear of inflammable material before carrying out any welding.

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

| CURRENT | MMA ELECTRODES | MIG LIGHT ALLOYS | MIG HEAVY METALS | MAG | TIG ON ALL METALS | PLASMA CUTTING | PLASMA WELDING | GOUGING ARC/AIR |
|---------|----------------|------------------|------------------|-----|-------------------|----------------|----------------|-----------------|
| 10      | 8              |                  |                  |     |                   |                |                |                 |
| 15      |                |                  |                  |     | 9                 |                | 10             |                 |
| 20      |                |                  |                  |     |                   |                |                |                 |
| 30      | 9              | 10               | 10               | 10  | 10                |                |                |                 |
| 40      |                |                  |                  |     |                   |                |                |                 |
| 60      | 10             |                  |                  |     |                   | 11             | 11             | 10              |
| 80      |                |                  |                  |     |                   |                |                |                 |
| 100     |                |                  |                  |     |                   |                |                |                 |
| 125     | 11             | 11               |                  | 11  |                   |                |                |                 |
| 150     |                |                  | 11               |     |                   | 12             |                |                 |
| 175     |                |                  |                  |     |                   |                |                |                 |
| 200     |                |                  |                  |     |                   |                | 13             |                 |
| 225     |                | 12               |                  |     | 13                | 12             |                | 11              |
| 250     | 12             | 12               | 12               | 13  |                   |                |                | 12              |
| 275     |                |                  |                  |     |                   |                |                |                 |
| 300     |                | 13               |                  |     |                   |                |                |                 |
| 350     |                |                  |                  |     |                   |                |                | 13              |
| 400     | 13             | 14               | 13               | 14  | 14                |                | 13             | 14              |
| 450     |                |                  |                  |     |                   |                |                |                 |
| 500     | 14             | 15               | 14               | 15  |                   |                |                | 15              |

# SAFETY INSTRUCTION

## Safety against fumes and welding gases



**Warning**  
Fumes and  
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.

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 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.

**For further information please refer to the HSE website [www.hse.gov.uk](http://www.hse.gov.uk) for related documentation.**



An example of personal fume protection

## Precautions against fire and explosion



**Warning**  
Fire Risk

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 electrode to metal objects. This could cause arcs, explosion, overheating or fire.



## **Understand your fire extinguishers**

# 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 controls 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 INSTRUCTION

## 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 those 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.

## Materials and their disposal

Welding equipment is manufactured with BSI published standards meeting CE requirements 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 the 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](http://www.hse.gov.uk)**



## PRODUCT OVERVIEW

The Jasic TIG inverter range of welding machines have been designed as integrated and portable welding power supply units incorporating the most advanced IGBT inverter technology in power electronics with easy operation and adjustment due to friendly user interface.

Unique electric structure and air channel design in this series of machines can speed up the heat dissipation of the power device as well as improving the duty cycles of the machines. The unique heat rejection efficiency of the air channel can effectively prevent the power devices and control circuits from being damaged by the dust absorbed by the fan and thereby, the reliability of the machine is greatly improved.

The entire machine is in form of coherent streamline, the front and rear panels are naturally integrated via large-radian transition manner. The front panel and the rear panel of the machine and the handle are coated with rubber oil, so the machine has soft texture, good hand feeling that feels warm and comfortable to hold.

### Jasic TIG 180 and 200 Product Features:

- Compact size, lightweight and modern design
- 180DV has dual voltage inputs of 115V and 230V
- DC TIG with excellent HF arc ignition which offers reduced interference and high reliability
- Suitable for a wide range of DC MMA welding electrodes
- Advanced IGBT inverter technology
- 40Khz inverter frequency, high efficiency
- Downslope in TIG mode with post flow gas function
- Built in hot start arc ignition function which ensures excellent arc ignition
- Built in self adaptive arc force technology which maintains the optimum MMA arc conditions during operation even with long welding cables
- Excellent weld characteristics
- Auto compensation for mains voltage fluctuation
- Easy arc starting, low spatter, stable current which offers good weld bead shape
- High quality tactile finish to mouldings and handle
- Supplied with 12' TIG Torch Model TIG37ERGO, Gas regulator, Gas hose, Work return lead and clamp



## TECHNICAL SPECIFICATIONS

| Parameter                            | Unit | Jasic TIG 180 DC                           | Jasic TIG 180 DC DV  | Jasic TIG 200 DC                           |
|--------------------------------------|------|--|--|--|
| Rated input voltage                  | V    | -<br>AC230V±15% 50/60Hz                    | AC115V±15% 50/60Hz<br>AC230V±15% 50/60Hz   | -<br>AC230V±15% 50/60Hz                    |
| Rated input power                    | kVA  | -<br>7.1                                   | 115V - 4<br>230V - 7   | -<br>8.2                                   |
| Rated input current I <sub>max</sub> | A    | 31   | 35.6   | 35.6                                       |
| Rated input current I <sub>eff</sub> | A    | -<br>16.5                                  | 115V - 18.5<br>230V - 14.2   | -<br>18.9                                  |
| Welding current range                | A    | -<br>-<br>TIG 10 ~ 180<br>MMA 10 ~ 160     | 115V - TIG 10 ~ 120<br>115V - MMA 10 ~ 100<br>230V - TIG 10 ~ 180<br>230V - MMA 10 ~ 160         | -<br>-<br>TIG 10 ~ 200<br>MMA 10 ~ 180     |
| No-load voltage                      | V    | 65   | 65   | 65   |
| Rated duty cycle (40°C)              | %    | -<br>-<br>TIG 180A @ 35%<br>MMA 160A @ 35% | 115V - TIG 120A @ 35%<br>115V - MMA 100A @ 35%<br>230V - TIG 180A @ 40%<br>230V - MMA 160A @ 40% | -<br>-<br>TIG 200A @ 35%<br>MMA 180A @ 35% |
| Downslope time                       | S    | 0 ~ 10                                     | 0 ~ 10   | 0 ~ 10                                     |
| Post gas time                        | S    | 0 ~ 15                                     | 0 ~ 15   | 0 ~ 15                                     |
| Arc ignition type                    | -    | HF   | HF   | HF   |
| Efficiency                           | %    | 81   | 81   | 81   |
| Idle State Power                     | W    | < 50                                       | < 50   | < 50                                       |
| Power factor                         | cosφ | 0.7  | 0.7  | 0.7  |
| Standard                             | -    | EN60974-1                                  | EN60974-1  | EN60974-1                                  |
| Protection class                     | IP   | IP21S                                      | IP21S  | IP21S                                      |
| Insulation class                     | -    | F  | F  | F  |
| Noise                                | Db   | <70  | <70  | <70  |
| Operating temperature                | °C   | -10 ~ +40                                  | -10 ~ +40  | -10 ~ +40                                  |
| Storage temperature                  | °C   | -25 ~ +55                                  | -25 ~ +55  | -25 ~ +55                                  |
| Overall size                         | mm   | 365 x 135 x 277                            | 365 x 135 x 277  | 365 x 135 x 277                            |
| Weight                               | Kg   | 5.94                                       | 5.94   | 6.12                                       |

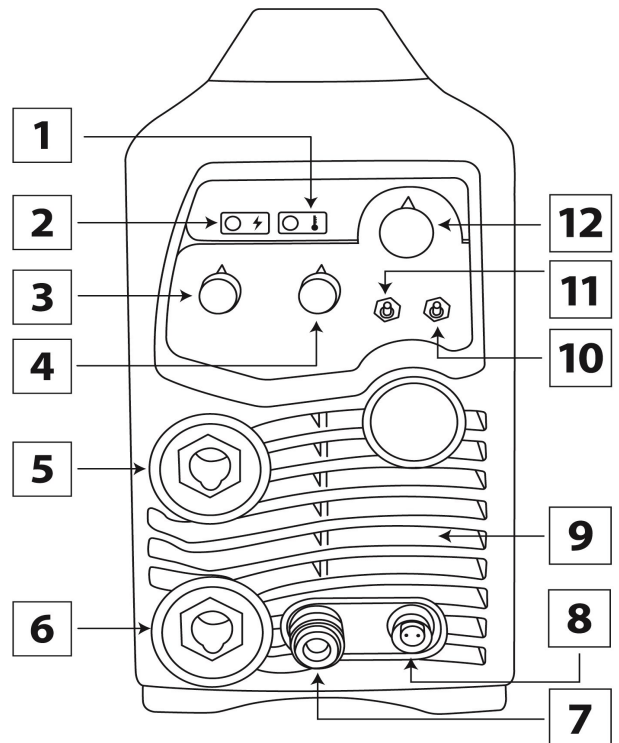
### Please Note

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.

# CONTROLS

## Front view Jasic TIG 180 & 200

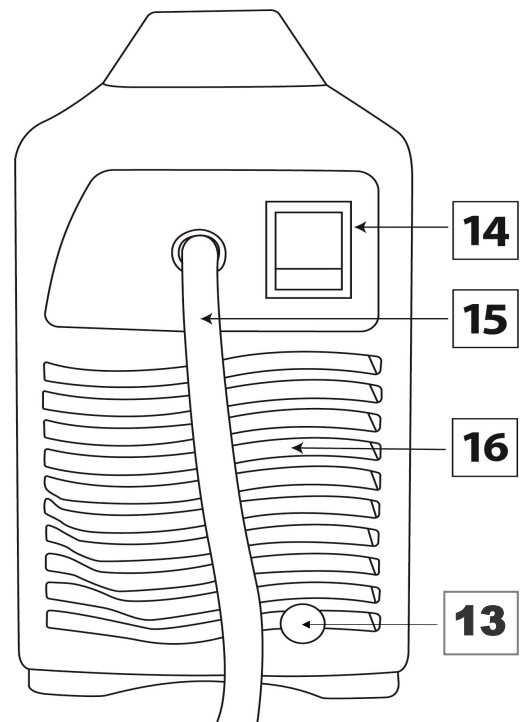
1. Overheating LED: Indicates overheating, when this LED is on it indicates that the temperature inside the machine is too high and the machine is under overheating protection status
2. Power LED: Indicates that power is present at the machine and that the power switch of the machine is on
3. Downslope time control: 1~10s
4. Post flow time control: 1~10s
5. "+" Output terminal\*: To connect the work clamp
6. "-" Output terminal\*: To connect the TIG torch
7. Gas terminal: To connect the gas hose of the TIG torch
8. Control terminal: To connect the trigger switch plug of the TIG torch trigger
9. Front grill for air intake
10. MMA/TIG switch: To toggle between MMA and TIG
11. 2T/4T switch: When the toggle switch is switched to 4T, self-lock function is available
12. Welding current knob: To adjust the output current



\* Panel socket size is 35/50mm

## Rear view Jasic TIG 180 & 200

13. Gas inlet connector
14. Power ON/OFF switch
15. Mains power cable
16. Rear panel grill and cooling fan



# INSTALLATION

## Unpacking

Check the packaging for any signs of damage.

Carefully remove the machine and retain the packaging until the installation is complete.

## 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.

## Input 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 parameters shown in the manual.

The equipment should be connected by a suitably qualified competent person. Always ensure the equipment has a proper grounding.

**Never connect the machine to the mains supply with the panels removed.**

## Output connections

Electrode polarity

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.

"+" output terminal: For MMA connect the electrode holder

"-" output terminal: For MMA connect the work return lead

Always consult the electrode manufacturer's data sheet if you have any doubts.

When using the machine for TIG welding the TIG torch should be connected to the negative terminal and the work return to the positive terminal.

"+" output terminal: For TIG connect the work return lead

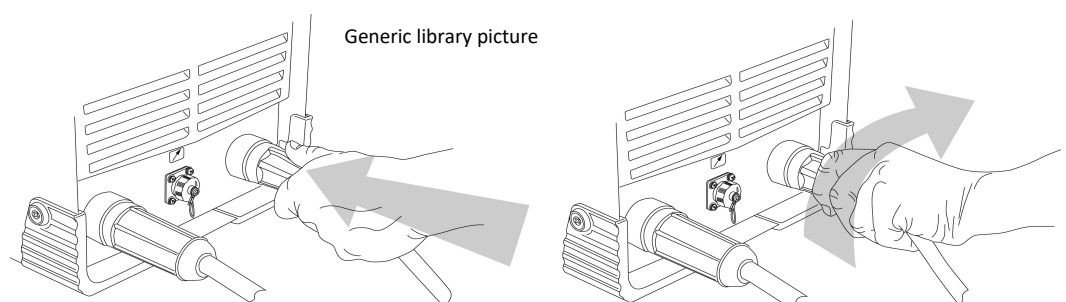
"-" output terminal: For TIG connect the TIG torch

## Gas connections

Connect the gas hose to the regulator/flowmeter located on the shield gas cylinder and connect the other end to the machine.

Please Note:

Check these power connections daily to ensure they have not become loose otherwise arcing may occur when used under load.

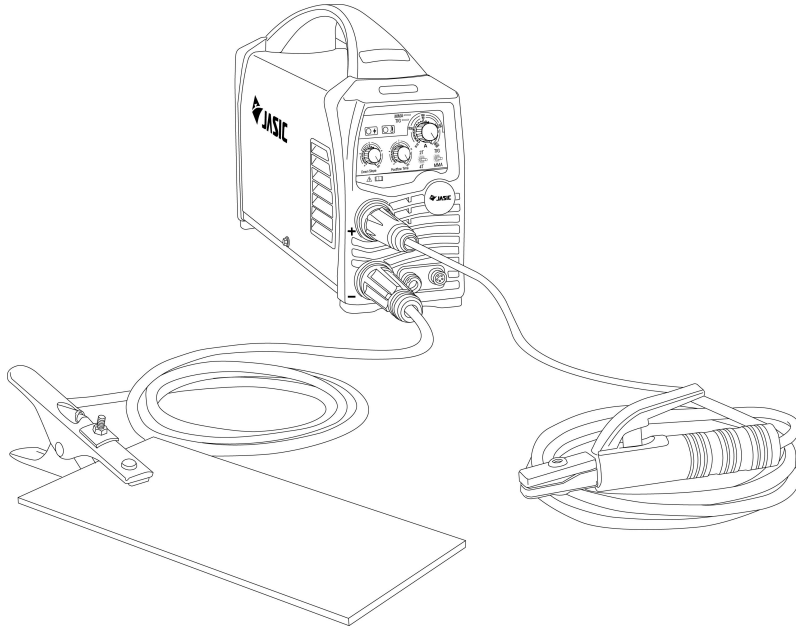


# INSTALLATION

## MMA welding

Insert the cable plug with electrode holder into the “+” socket on the front panel of the welding machine and tighten it clockwise.

Insert the cable plug of the work return lead into the “-” socket on the front panel of the welding machine and tighten it clockwise. Example shown below:



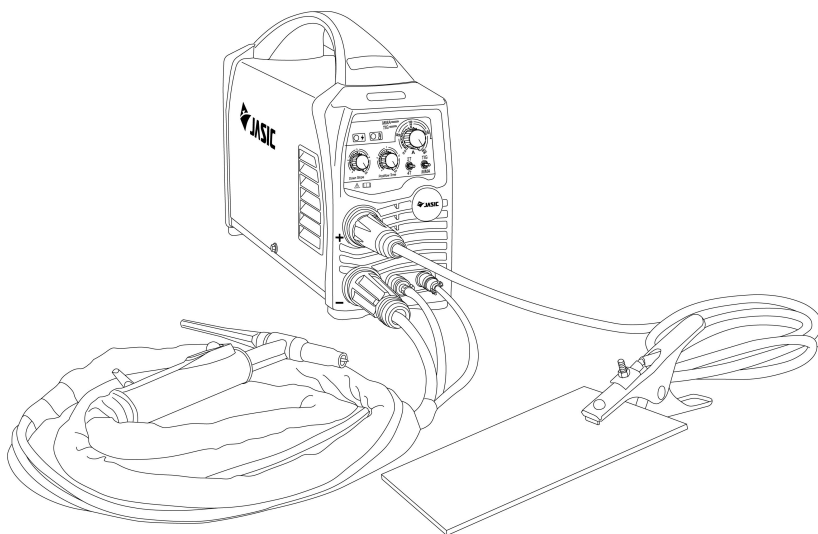
## TIG welding

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

Insert the cables plug of the TIG torch into the “-” socket on the front panel of the machine and tighten clockwise. Connect the gas quick connector into the outlet on the machine front.

Connect the torch switch plug into the socket on the front panel. Example shown below:

Connect the gas hose to the regulator/flowmeter located on the shield gas cylinder and connect the other end to the machine.



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

# 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.

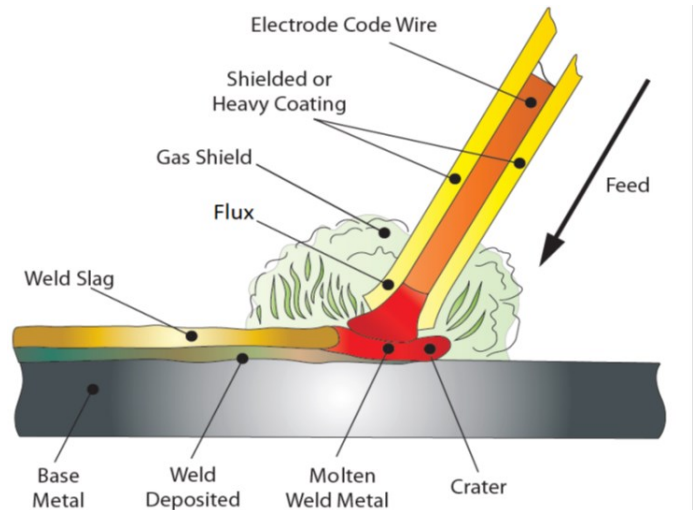
## MMA welding mode

MMA (Manual Metal Arc), SMAW (Shielded Metal Arc Welding) or just Stick Welding.

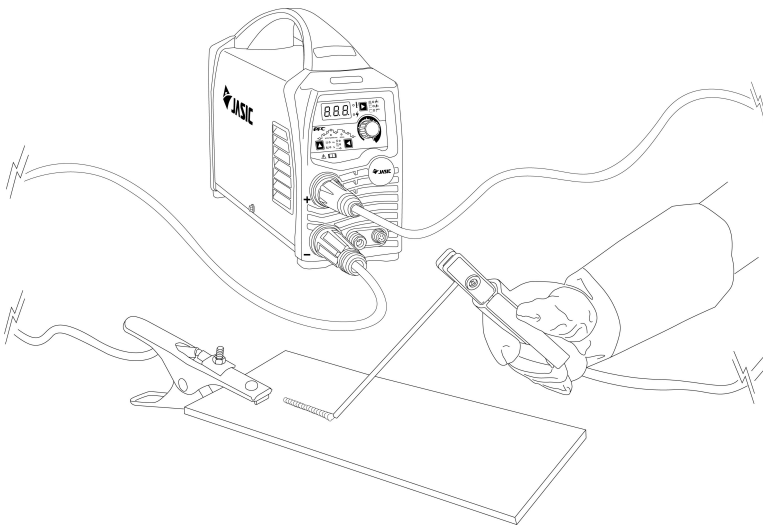
Stick welding is an arc welding process which melts and joins metals by heating them with an arc between a covered metal electrode and the work.

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 uniform layer called the weld bead.



After connecting the welding leads as detailed you will need to switch the power switch on the back panel to “ON”, the machines power LED comes on and the fan is working.

Select MMA by switching to the MMA welding mode. There is voltage output at both output terminals.

Ensure you check that you have the electrode polarity correct.

Set the amperage on the machine suitable for the electrode being used.

Please see the guide below to amperages required, although this MMA welding electrode guide can vary depending on material, work piece thickness, welding position and joint form.

| Electrode Diameter (mm) | Recommended Welding Current (A) | Recommended Welding Voltage (V) |
|-------------------------|---------------------------------|---------------------------------|
| 1.0                     | 20 ~ 60                         | 20.8 ~ 22.4                     |
| 1.6                     | 44 ~ 84                         | 21.76 ~ 23.46                   |
| 2.0                     | 60 ~ 100                        | 22.4 ~ 24                       |
| 2.5                     | 80 ~ 120                        | 23.2 ~ 24.8                     |
| 3.2                     | 108 ~ 148                       | 24.32 ~ 24.92                   |
| 4.0                     | 140 ~ 180                       | 24.6 ~ 27.2                     |

# 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 welding mode

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

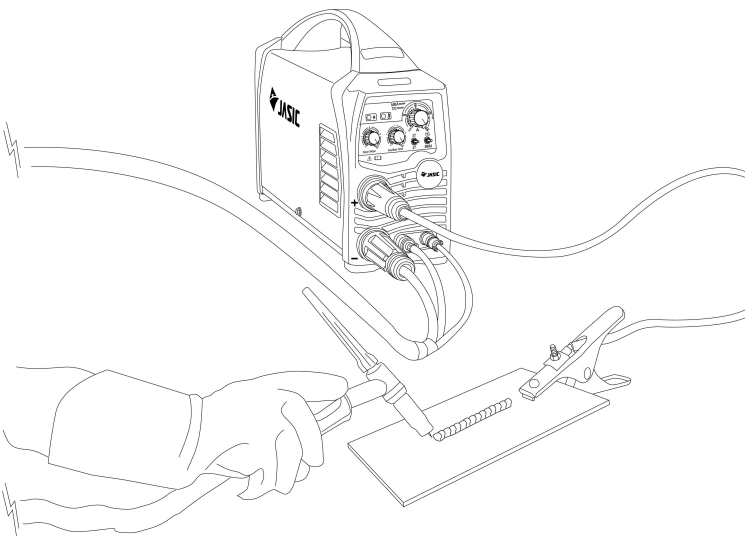
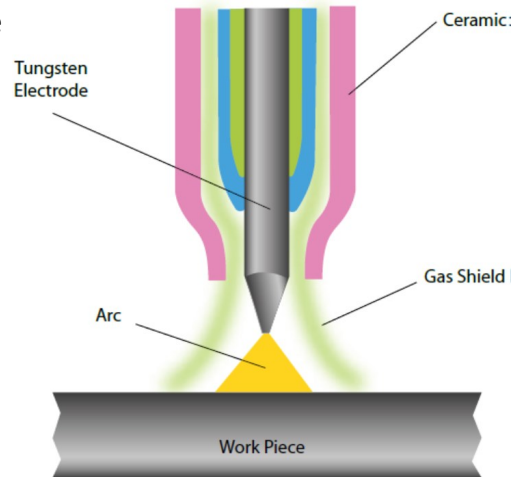
TIG welding is an arc welding process that uses a non-consumable tungsten electrode to produce the heat for welding.

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.

TIG Process can be either DC or AC modes:

DC - Direct current for welding steel, stainless steel, copper etc.

AC - Alternating current for welding aluminium and it's alloys.



Connect the TIG torch leads as shown.

Ensure that a suitable inert gas supply is connected.

Switch the power switch on the back panel to "ON" the machine is started with the power LED on and the fan working.

Switch the MMA/TIG switch to TIG mode.

Open the gas valve of the cylinder and adjust the gas regulator to obtain the desired flow rate.

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 then press the torch trigger. After the arc is ignited, the HF discharge will cease, the current will maintain the preset value and welding can be carried out.

After releasing the torch trigger, the welding arc stops but gas continues flowing for the post flow time and welding ends.

Adjust the downslope time potentiometer to change the time according to the welding process requirements.

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

| Tungsten Size | DC – Electrode Negative |
|---------------|-------------------------|
| 1.0mm         | 15 – 80A                |
| 1.6mm         | 70 – 150A               |
| 2.4mm         | 150 – 250A              |
| 3.2mm         | 250A – 400A             |
| 4.0mm         | 400A – 500A             |
| 6.0mm         | 750A – 1000A            |

# 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 previously 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 welded, otherwise you may experience a poor electrical circuit.

## Welding position

When welding, ensure you place yourself in a comfortable position for welding and your welding application before you begin to weld. This may be by 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 welders 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.



# GUIDE TO MMA WELDING

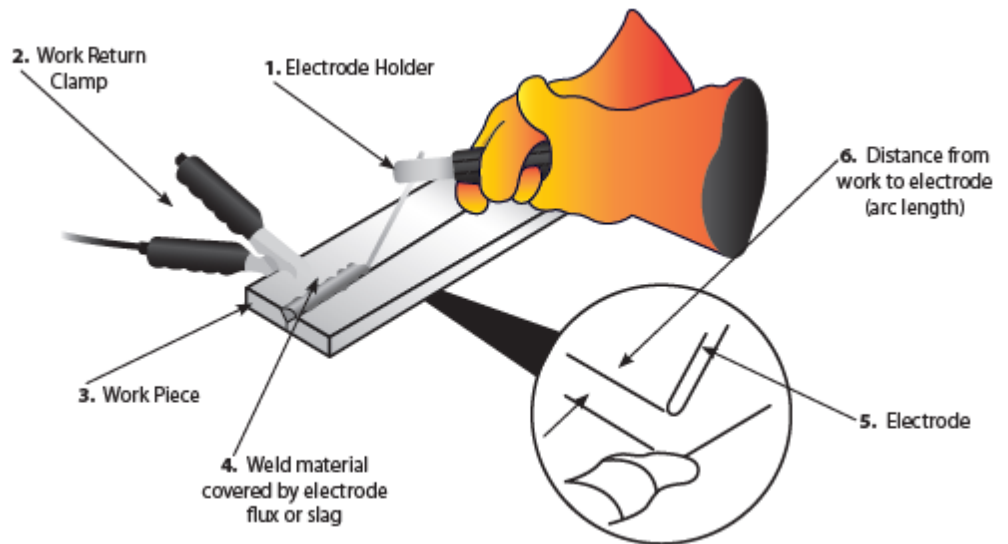


Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.

## 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)



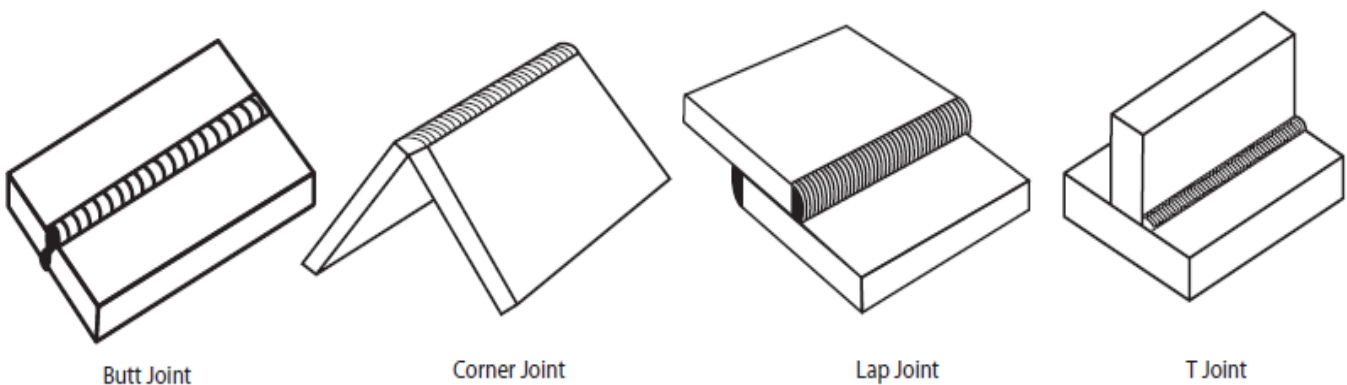
Welding current will flow in the circuit as soon as the electrode contacts the work piece. The welder should always ensure a good connection of the work clamp. The nearer the clamp is placed to the welding area the better.

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.



Butt Joint

Corner Joint

Lap Joint

T Joint

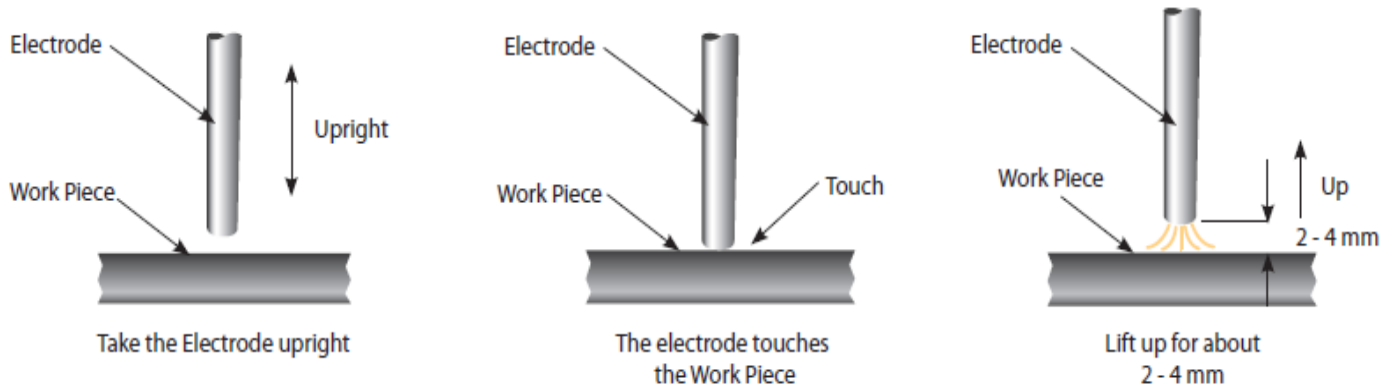
# GUIDE TO MMA WELDING



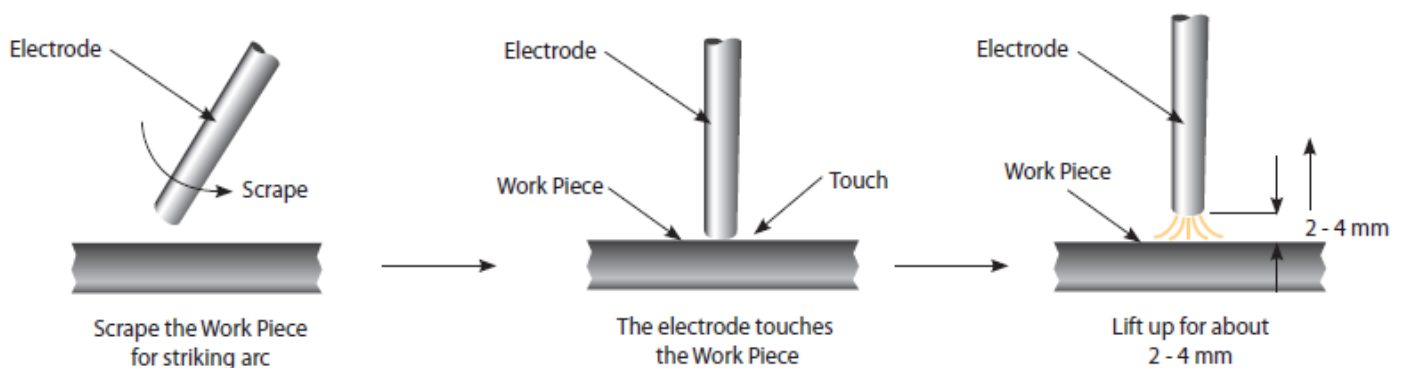
Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.

## MMA arc striking

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



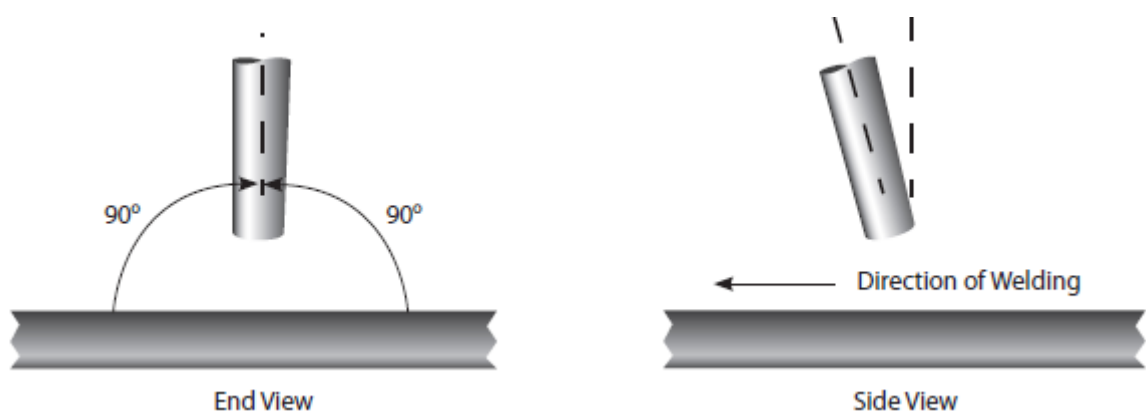
**Scratch technique** - Drag the electrode and scratch the work piece as if striking a match. Scratching the electrode may cause the arc to burn along the scratch path, so care should be taken to scratch in the weld zone. When the arc is struck adopt the correct welding position.



## 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 10°-30°.



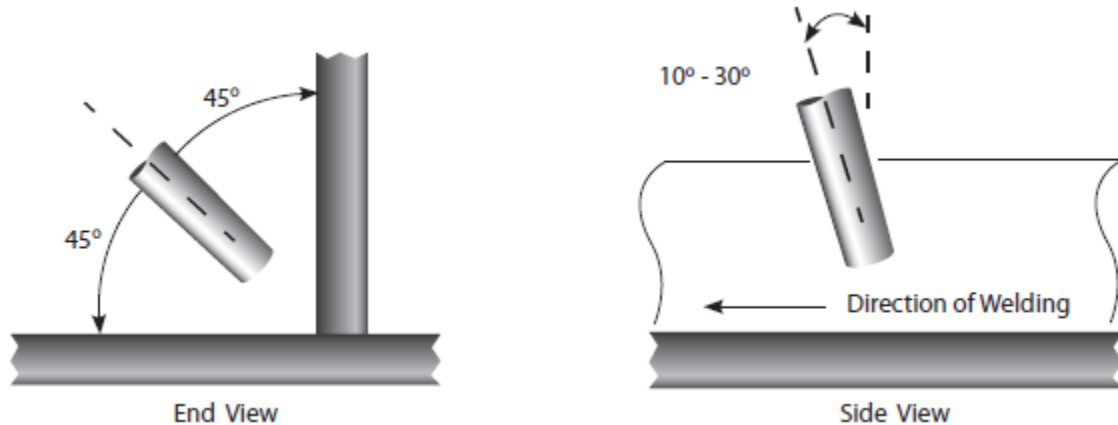
# GUIDE TO MMA WELDING



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

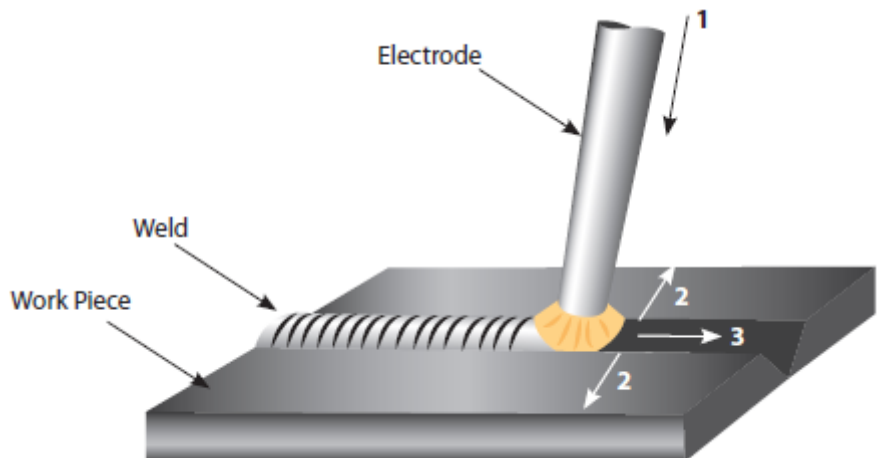
The electrode should be positioned to split the angle i.e.  $45^\circ$ . Again the electrode should be inclined in the direction of travel at around  $10^\circ$ - $30^\circ$ .



## 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 axis
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

# MMA WELDING PROBLEMS



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

| <u>Defect</u>   | <u>Possible cause</u>                                      | <u>Action</u>  |
|---|--|--|
| 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   |

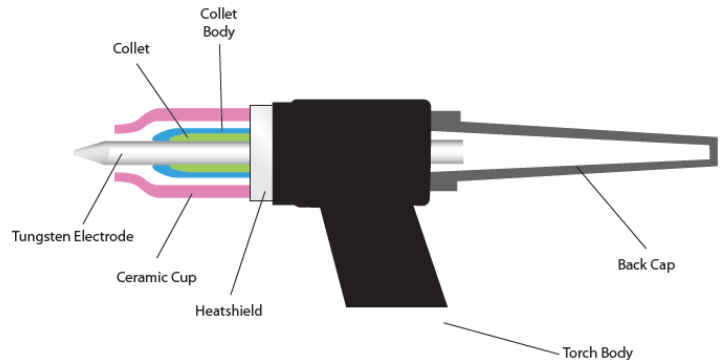
# GUIDE TO TIG WELDING



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 either a rigid phenolic or rubberised covering.



### Collet body



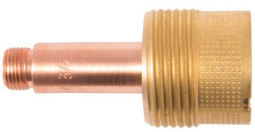
The collet body screws into the torch body. It is replaceable and is changed to accommodate the different sizes tungstens and their respective collets.

### 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

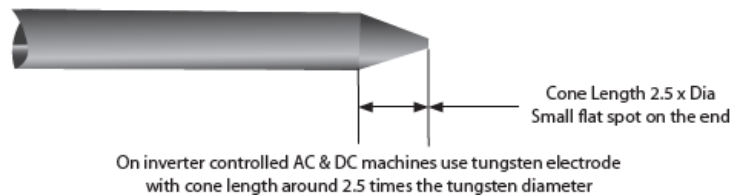
| Welding Mode | Tungsten Type    | Colour |
|--------------|------------------|--------|
| DC or AC/DC  | Ceriated 2%      | Grey   |
| DC or AC/DC  | Lanthanated 1%   | Black  |
| DC or AC/DC  | Lanthanated 1.5% | Gold   |
| DC or AC/DC  | Lanthanated 2%   | Blue   |
| DC           | Thoriated 1% 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

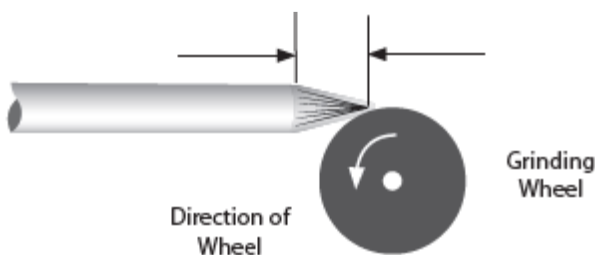
## Tungsten electrode preparation - DC

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

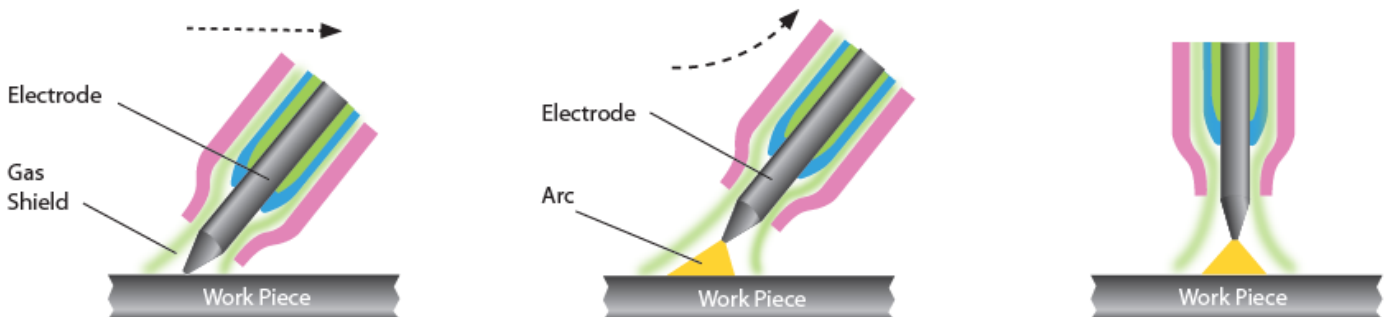
Shielding gas is required when welding to keep the weld pool free of oxygen. Whether you are welding mild steel or stainless steel the most commonly used shielding gas used in TIG welding is argon, for more specialised applications an argon helium mix or pure helium maybe used.

### 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

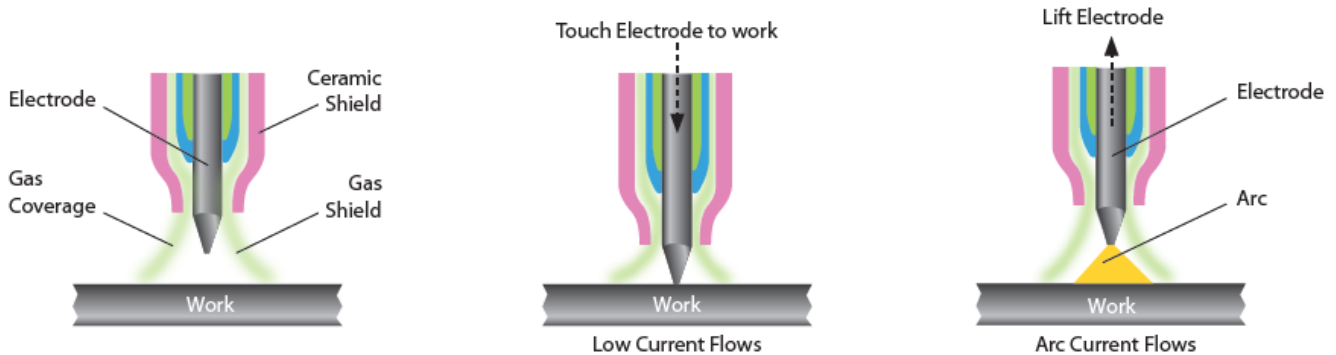


Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.

## Arc starting - 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.



## 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 touch-less 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 unless you need to weld aluminium, you don't have to use HF start steel/stainless.

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.





# 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.

## DC TIG welding

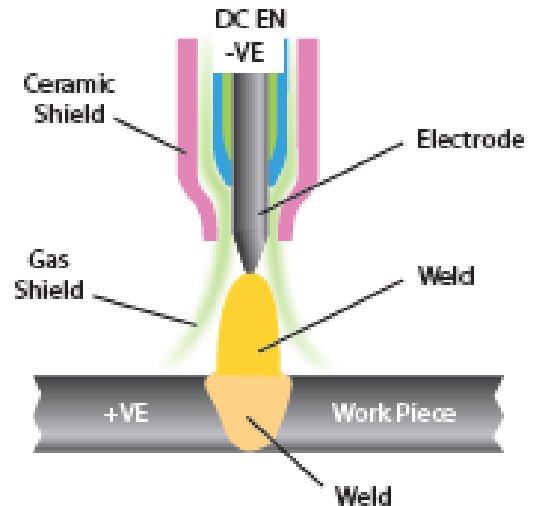
Direct current welding is when the current flows in one direction only. Compared with AC welding the current once flowing will not go to zero until welding has ended.

The Jasic TIG Series polarity should generally be set up for 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 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 method of connection is often referred to as straight polarity and is the most common connection used in DC welding.



## TIG welding techniques

- Before welding (especially with mild steel) 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 and contaminating it.
- The TIG welding arc melts the base material and the molten puddle melts the filler rod, it is 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 35).
- 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:

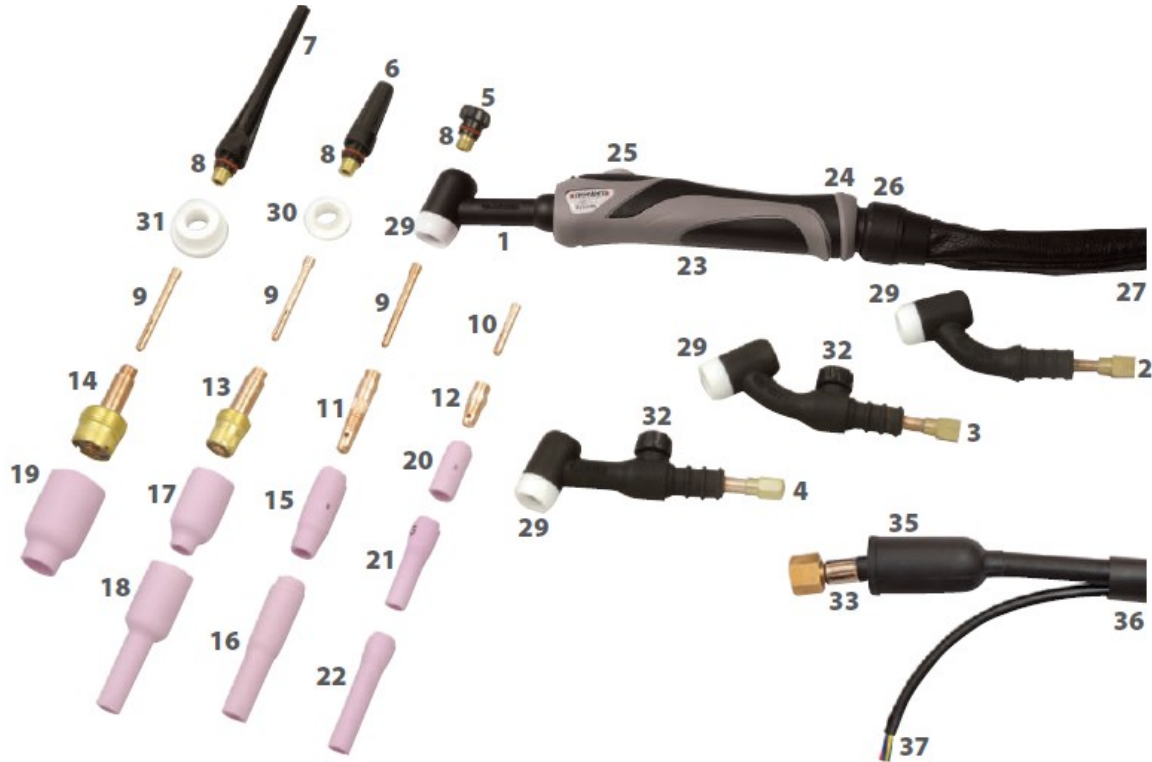
- All above guide settings are approximate and will vary depending on application, prep, passes and type of welding equipment used.
- The welds would need to be tested to ensure they comply to your welding specifications.

# TIG TORCH SPARE PARTS LIST



## TIG Welding Torch Air Cooled - Model TIG37ERGO

Rating 150A DC, 115A AC @ 60% Duty Cycle EN60974-7 • 0.5mm to 3.2mm Electrodes



### Main Consumables

| No | Code   | Description                   |
|----|--------|-------------------------------|
| 1  | WP17   | Rigid Torch Body              |
| 2  | WP17F  | Flexible Torch Body           |
| 3  | WP17FV | Flexible Torch Body c/w Valve |
| 4  | WP17V  | Torch Body c/w Argon Valve    |
| 5  | 57Y04  | Short Back Cap                |
| 6  | 300M   | Medium Back Cap               |
| 7  | 57Y02  | Long Back Cap                 |
| 8  | 98W18  | Back Cap 'O' Ring             |

### Collets

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

### Collet Bodies

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

### Gas Lens Bodies

|    |        |                        |
|----|--------|------------------------|
| 13 | 45V29  | Standard .020" (0.5mm) |
|    | 45V24  | Standard .040" (1.0mm) |
|    | 45V25  | Standard 1/16" (1.6mm) |
|    | 45V25M | Standard 5/64" (2.0mm) |
|    | 45V26  | Standard 3/32" (2.4mm) |
|    | 45V27  | Standard 1/8" (3.2mm)  |

### Gas Lens Bodies

| No     | Code    | Description                          |
|--------|---------|--------------------------------------|
| 14     | 45V0204 | Large Dia .020"- .040" (0.5 - 1.0mm) |
| 45V116 | 45V116  | Large Dia 1/16" (1.6mm)              |
|        | 45V64   | Large Dia 3/32" (2.4mm)              |
|        | 995795  | Large Dia 1/8" (3.2mm)               |

### Ceramic Cups

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

### Gas Lens Cups

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

### Ceramic Cups for use with item 12

| No | Code   | Description             |
|----|--------|-------------------------|
| 20 | 13N08  | Standard Cup 1/4" Bore  |
|    | 13N09  | Standard Cup 5/16" Bore |
|    | 13N10  | Standard Cup 3/8" Bore  |
|    | 13N11  | Standard Cup 7/16" Bore |
|    | 13N12  | Standard Cup 1/2" Bore  |
|    | 13N13  | Standard Cup 5/8" Bore  |
| 21 | 796F70 | Long Cup 3/16" Bore     |
|    | 796F71 | Long Cup 1/4" Bore      |
|    | 796F72 | Long Cup 5/16" Bore     |
| 22 | 796F73 | Long Cup 3/8" Bore      |
|    | 796F74 | X - Long Cup 3/16" Bore |
|    | 796F75 | X - Long Cup 1/4" Bore  |
|    | 796F76 | X - Long Cup 5/16" Bore |
|    | 796F77 | X - Long Cup 3/8" Bore  |

### Secondary Consumables

|        |                 |                                     |
|--------|-----------------|-------------------------------------|
| 23     | SP9110          | LH & RH Handle Shell                |
| 24     | SP9111          | Handle Screw                        |
| 25     | SP9120          | Single Button Switch                |
|        | SP9121          | 2 Button Switch                     |
|        | SP9122          | 5K Potentiometer Switch             |
|        | SP9123          | 10K Potentiometer Switch            |
|        | SP9128          | 47K Potentiometer Switch            |
| SP9129 | 4 Button Switch |                                     |
| 26     | SP9113          | Handle Ball Joint                   |
| 27     | SP9116          | Leather Cover 800mm                 |
| 28     | SP9118          | Cable Cover Joint (not illustrated) |
| 29     | 18CG            | Standard Heat Shield                |
|        | 54N01           | Gas Lens Heat Shield                |
| 31     | 54N63           | Large Gas Lens Insulator            |
|        | VS-2            | Valve Stem WP17V & WP17FV           |
| 33     | 57Y01           | Mono Power Cable 12.5ft - 3/8"      |
|        | 57Y03           | Mono Power Cable 25ft - 3/8" Bsp    |
| 34     | 57Y01-2D        | 2 Piece Power Cable Assy 12.5ft     |
|        | 57Y03-2D        | 2 Piece Power Cable Assy 25ft       |
| 35     | 0315071         | Insulation Boot                     |
| 36     | SP9002          | Neoprene Protective Cover 1m        |
| 37     | SP9126          | 4m Switch Cable                     |
|        | SP9127          | 8m Switch Cable                     |
| --     | JSP-01          | 2 Pin Control Plug (TIG Torch)      |

# TIG WELDING PROBLEMS



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

| <u>Defect</u>                              | <u>Possible cause</u>                       | <u>Action</u>  |
|--|---|--|
| 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 fittings   |
|  | 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 PROBLEMS



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

| <u>Defect</u>   | <u>Possible cause</u>  | <u>Action</u>   |
|---|--|---|
| 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 |

## 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 the arc welding machine.

### Period

### Maintenance item

|                            |  |
|----------------------------|--|
| <b>Daily examination</b>   | <ul style="list-style-type: none"> <li>• Check the condition of the machine, mains cables, welding cables and connections.</li> <li>• Check for any warnings LEDs and machine operation.</li> </ul>  |
| <b>Monthly examination</b> | <ul style="list-style-type: none"> <li>• Disconnect from the mains supply and wait for at least 5 minutes before removing the cover.</li> <li>• Check internal connections and tighten if required.</li> <li>• Clean the inside of the machine with a soft brush and vacuum cleaner.</li> <li>• Take care not to remove any cables or cause damage to components.</li> <li>• Ensure that ventilation grills are clear.</li> <li>• Carefully replace the covers and test the unit.</li> </ul> <p><b>This work should be carried out by a suitably qualified competent person.</b></p> |
| <b>Yearly examination</b>  | <ul style="list-style-type: none"> <li>• Carry out an annual service to include safety check in accordance with the manufacturers standard (EN 60974-1).</li> </ul> <p><b>This work should be carried out by a suitably qualified competent person.</b></p>  |

⇒ Ensure the power is disconnected before working on the machine.

⇒ Always wait 5 minutes after power switch off before opening the case.

## SERVICE SCHEDULE RECORD

| Date | Type of service and work carried out | Serviced by | Due date for next check |
|------|--------------------------------------|-------------|-------------------------|
|      |                                      |             |                         |
|      |                                      |             |                         |
|      |                                      |             |                         |
|      |                                      |             |                         |
|      |                                      |             |                         |

## TROUBLESHOOTING



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.

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 the user!

Only professional maintenance personnel should repair the machine!

Ensure the power is disconnected before working on the machine. Always wait 5 minutes after power switch off before removing the panels.

| Description of fault                                       | Possible cause   |
|--|--|
| The power LED is OFF and the fan is not functioning        | The primary supply voltage has not been switched ON or input fuse has blown<br>The welding power source input switch is switched OFF<br>Loose connections internally                       |
| The fault LED is ON and the fan is running                 | The machine is under over-heating protection status and will recover automatically after the welding machine has cooled<br>Check incoming mains supply to ensure it is within 230V +/- 15% |
| No high frequency is produced                              | Process selection switch is set to manual metal arc (MMA)<br>Torch trigger switch lead is disconnected or switch/lead is faulty<br>High frequency spark gap too wide or short circuited    |
| Welding current reduces when welding                       | Poor work lead connection to the work piece  |
| TIG electrode melts when arc is struck                     | TIG torch is connected to the (+) VE terminal  |
| No gas flow when the TIG torch trigger switch is depressed | Empty gas cylinder<br>Gas regulator is turned off<br>Gas hose is blocked or cut<br>Torch trigger switch lead is disconnected or switch/lead is faulty                                      |
| Difficult to ignite the arc                                | The arc ignition current is too low or the arc ignition time is too short  |
| The electrode holder becomes very hot                      | The rated current of the electrode holder is smaller than its actual working current, replace it with a higher rated current capacity  |
| Excessive spatter in MMA welding                           | The output polarity connection is incorrect, exchange the polarity   |
| Other malfunction  | Contact your supplier  |

## 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.

## UKCA Declaration of Conformity

The manufacturer, or its legal representative Wilkinson Star Limited, declares that the equipment described below is designed and produced according to following UK legislation:

- Electrical equipment safety 2016
- Electromagnetic compatibility (EMC) regulations 2016
- The restrictions of the use of certain hazardous substances in electrical and electronic equipment regulations 2012

And inspected according to following designated standards:

- EN 60 974-1:2018+A1:2019
- EN 60 974-10:2014+A1:2015

Any alteration or change to these machines by any unauthorized person makes this declaration invalid.

### Models:

**JT-180**

**JT-180DV**

**JT-200**

### Authorised Representative:

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

### 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

## EC DECLARATION OF CONFORMITY

The manufacturer, or its legal representative **Wilkinson Star Limited**, declares that the equipment described below is designed and produced according to following EU Directives:

- Low Voltage Directive (LVD), No.: 2014/35/EU
- Electromagnetic compatibility (EMC) Directive, No.: 2014/30/EU

And inspected according to following

EU - Norms:

- EN 60 974-1:2012
- EN 60 974-10:2014+A1

Any alteration or change to these machines by any unauthorized person makes this Declaration invalid.

### **Wilkinson Star model**

JT-180  
JT-180 DV  
JT-200

### **Jasic Model**

TIG 180 DC (W206)  
TIG 180 DV DC (208)  
TIG 200 DC (W207)

### **Authorised Representative**

Wilkinson Star Limited  
Shield Drive, Wardley Industrial Estate,  
Worsley, Manchester M28 2WD  
Tel 0161 793 8127

### **Manufacturer**

Shenzhen Jasic Technology Co LTD  
No3 Qinglan, 1st Road  
Pingshan District  
Shenzhen, China

Signature

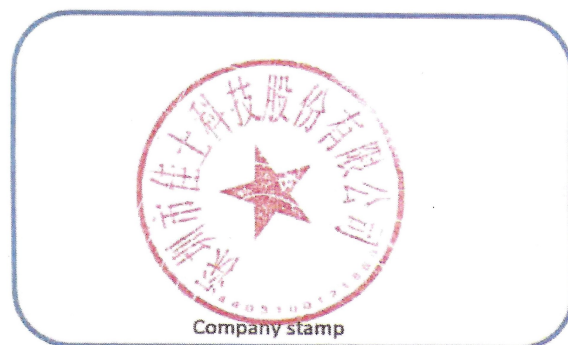
Dr John A Wilkinson OBE

Position Chairman

Signature

Shenzhen Jasic Technology Co LTD

Position



# STATEMENT OF WARRANTY

All new JASIC welders, plasma cutters and multi-process units sold through our partner Wilkinson Star Limited within the United Kingdom and Ireland shall be warranted to the original owner, non transferable, against failure due to defective materials or production. The warranty period is 2 years following the date of purchase or 5 years if you register 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.

Units purchased for rental or hire are subject to separate warranty terms and conditions.

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.

In the unlikely event of a problem, this should be reported to Jasic 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

**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.

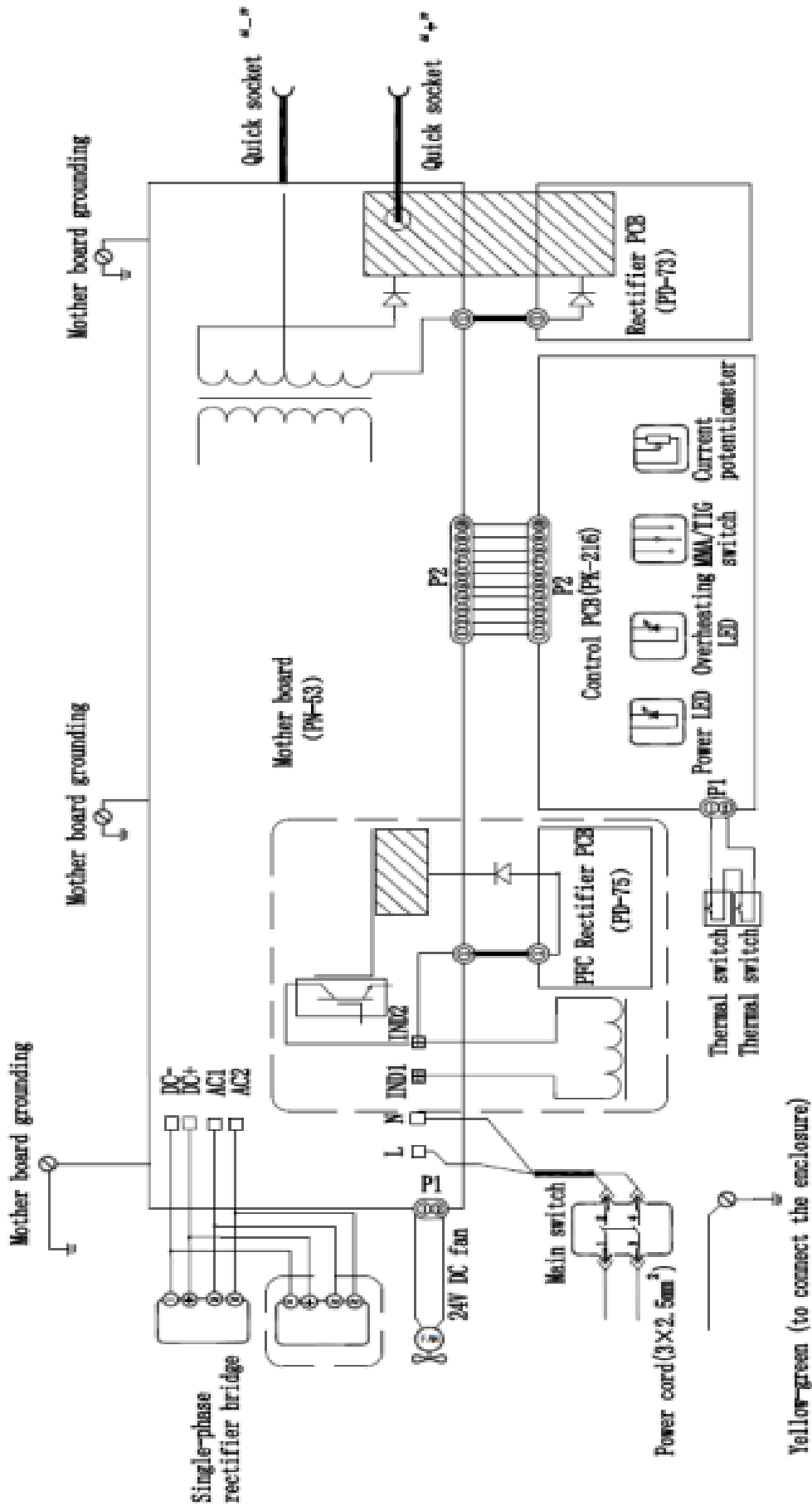
Warranty extends only to the machine, its accessories and parts contained inside. No other warranty is expressed or implied. No warranty is expressed or implied in regards to the fitness of the product for any particular application or use.

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

**[www.jasic-warranty.co.uk/terms](http://www.jasic-warranty.co.uk/terms)**

**[www.jasic-warranty.co.uk](http://www.jasic-warranty.co.uk)**

# SCHEMATIC



## OPTIONS AND ACCESSORIES

| Part Number    | Description   |
|----------------|---|
| TIG-37ERGO     | Titanium 17 TIG Torch 12.5ft c/w Dinse Adaptor and Switch Plug                    |
| TIG-37FERGO    | Titanium 17F TIG Torch 12.5ft c/w Flexi Torch Head, Dinse Adaptor and Switch Plug |
| TIG-37-8MERGO  | Titanium 17 TIG Torch 25ft c/w Dinse Adaptor and Switch Plug                      |
| TIG-37F-8MERGO | Titanium 17F TIG Torch 25ft c/w Flexi Torch Head, Dinse Adaptor and Switch Plug   |
| JSP-01         | TIG Torch Switch Plug (2 Pin)   |
| WCS25-3WEL     | Welding Cable Set (MMA) 3m  |
| WC-2-03LD      | Electrode Holder and Lead 3m  |
| EC-2-03LD      | Work Return Lead and Clamp 3m   |
| CP3550         | Cable Plug 35-50mm  |
| JSS-01         | Jasic Carry Strap   |
| JSB-01         | Jasic Site Bag  |
| JIT-01         | Trolley   |
| JH-HDX         | Jasic HD True Colour Auto Darkening Welding Helmet                                |
| SSARG2G        | Single Stage 2 Gauge Argon Regulator  |
| WTLHK2         | 2m Gas Hose and Quick Gas Connector   |

Jasic Trolley  
JIT-01



Jasic Auto Darkening HD  
Welding Helmet  
with True Colour Techno-  
logy



Jasic Shoulder Strap  
JSS-01

Jasic Site Bag  
JSB-01





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