

## MIG Series

MIG 270 Separate (JM-272S)

MIG 350 Separate (JM-352S)

MIG 450 Separate (JM-452S)

# Operator Manual



# 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.

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# 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					
175				12				
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 MIG inverter range of welding machines have been designed as integrated and portable welding power supplies units incorporating the most advanced IGBT inverter technology in power electronics with easy operation and adjustment due to friendly user interface.

The Jasic MIG separate range offer single and three phase inverter power sources with separate wire feed unit it is a range that can provide MIG, MMA and gasless self-shielded welding options. With the wire feed interconnections it can be used to weld in a wide radius. The IGBT power device with unique control provides excellent reliability with a high duty cycle.

The system has a closed loop feedback control constant voltage output which allows it to operate with a wide tolerance to mains fluctuation within  $\pm 15\%$ .

They have continuously adjustable welding voltage and current to provide excellent welding characteristics. Adopting a unique welding dynamic characteristic control circuit in MIG, provides a stable arc, low spatter, excellent weld appearance and high welding efficiency.

By removing the ball at the end of the wire after welding, a high no-load voltage and slow wire feed at the start presents exceptional arc starting.

The machines also have a very stable welding current in MMA, excellent arc ignition and can be used with a wide variety of welding electrodes.

The inbuilt high inverter frequency greatly reduces the volume and weight of the welder and the great reduction in magnetic and resistance loss obviously enhances the welding efficiency and energy saving effect. Switching frequency is beyond audio range which almost eliminates noise pollution.



### Jasic MIG JM-272S, JM-352S and JM-452S Product Features:

- IGBT MIG/MAG MMA inverter welder
- Advanced IGBT 40khz inverter technology for high efficiency
- Digital amp and voltmeter with power and status LED's
- High duty cycle
- 4 roll drive separate wire feed unit
- Advanced control circuitry
- Suitable for 0.6/0.8/1.0/1.2/1.6mm wires
- Useful features such as gas check function, wire inch control and burn back adjustment
- 2T/4T trigger function
- Variable inductance
- Crater control feature
- Inverter trolley takes full size gas bottle
- Excellent weld characteristics
- Suitable for a wide range of electrodes in MMA
- Easy arc starting, low spatter, stable current which offers good weld bead shape
- High quality finish to mouldings and handle
- Air cooled models easily upgradable to water cooled (JM-352S and JM452S only)
- All packages supplied with 5m interconnecting lead (other length options are available)

## TECHNICAL SPECIFICATIONS

Parameter	Unit	Jasic MIG JM-272S	Jasic MIG JM-352S	Jasic MIG JM-452S
Rated input voltage	V	AC230V±15% 50/60Hz	AC400V±15% 50/60Hz	AC400V±15% 50/60Hz
Rated input power	kVA	12.1	15	18.7
Rated input current I max	A	52.7	20.9	28
Rated input current I eff	A	28.9	13.2	27
Welding current range	A	MIG 30 ~ 270 MMA 20 ~ 250	MIG 50 ~ 350 MMA 20 ~ 350	MIG 60 ~ 450 MMA 30 ~ 400
No-load voltage	V	54	65	65
Rated duty cycle (40°C)	%	MIG 270A @ 30% MMA 270A @ 30%	MIG 350A @ 40% MMA 350A @ 40%	MIG 400A @ 100% MMA 400A @ 80%
Wire feed type	-	4 Roll - Geared	4 Roll - Geared	4 Roll - Geared
Wire feed speed range	m/min	1 ~ 18	1 ~ 18	1 ~ 18
Suitable wire size	mm	0.6 ~ 1.6	0.6 ~ 1.6	0.6 ~ 1.6
Efficiency	%	85	85	85
Power factor	cosφ	0.91	0.91	0.91
Standard	-	EN60974-1	EN60974-1	EN60974-1
Protection class	IP	IP21S	IP21S	IP21S
Insulation class	-	F	F	F
Noise	db	<70	<70	<70
Temperature range	°C	-10 ~ +40	-10 ~ +40	-10 ~ +40
Storage temperature	°C	-25 ~ +55	-25 ~ +55	-25 ~ +55
Overall size LxWxH	mm	1020 X 505 X 1460	1020 X 505 X 1460	1020 X 505 X 1460
Power source size LxWxH	mm	595 X 280 X 440	595 X 280 X 440	595 X 280 X 440
Wire feed unit size LxWxH	mm	630 X 235 X 420	630 X 235 X 420	630 X 235 X 420
Weight (air cooled)	Kg	101	104	108
Weight (water cooled)	Kg	n/a	125	129

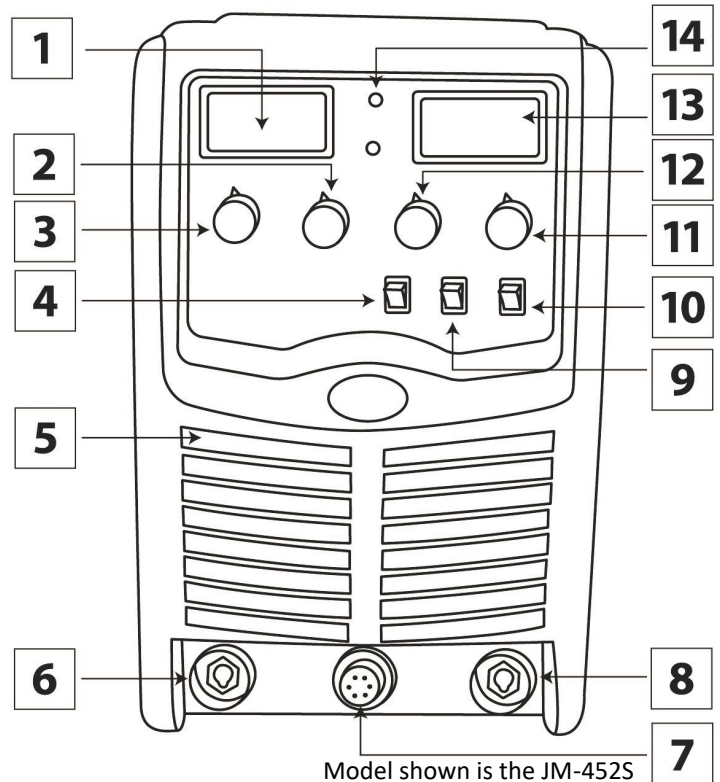
### Please Note

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

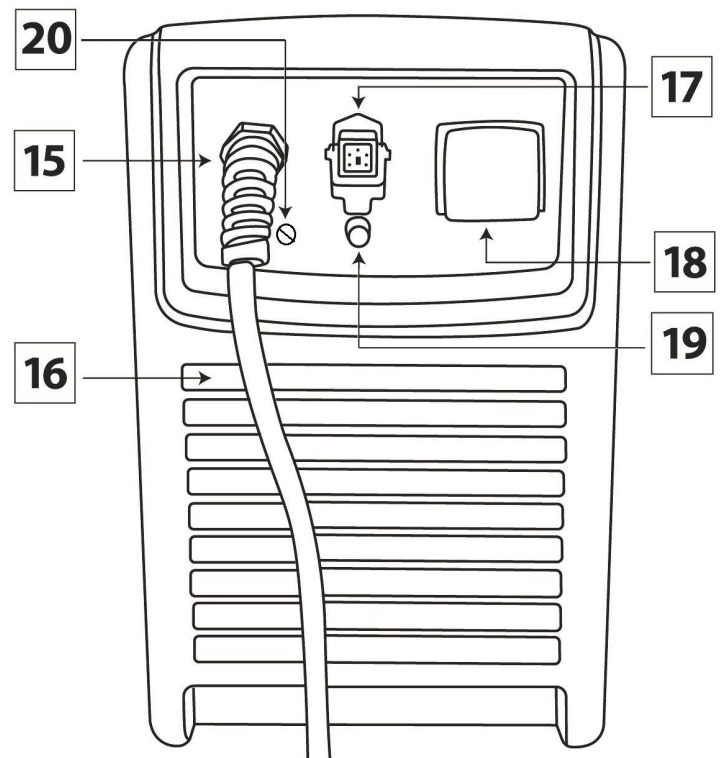
## Front view Jasic MIG JM-272S, JM-352S and JM-452S Power Source

1. Digital ammeter
2. Crater current control
3. Current control for MMA mode
4. 2T/4T selector
5. Air vent
6. "+" Output terminal: The welding connection for the interconnection cable for the WFU
7. Control cable socket: For connecting the wire feed unit
8. "-" Output terminal: To connect the work clamp
9. Gas purge switch
10. MMA/MIG MAG selector switch
11. Inductance control
12. Crater voltage control
13. Digital voltmeter
14. Mains indicator and overheat indicator



## Rear view Jasic MIG 272S, 352S and 452S

15. Main input power cable
16. Air vents
17. Auxiliary socket: For connecting the optional Jasic water cooler unit (only fitted to the JM-352S and JM452S)
18. Mains ON/OFF switch
19. Control fuse: Rating 5 amp 32mm x 6.3mm (only fitted to the JM-352S and JM452S)
20. Burnback control: Used to set the amount of wire to burn back after you release the MIG torch trigger



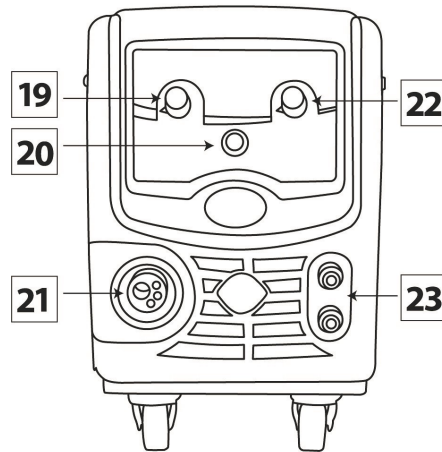
Model shown is for JM-352S and JM-452S only

# CONTROLS

## Jasic MIG JM-272S, JM-352S and JM-452S wire feed unit

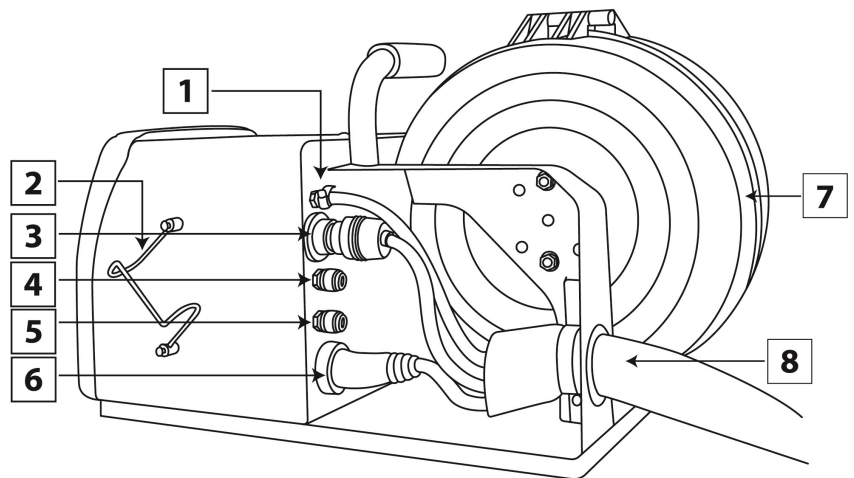
### Front view

- 19. Wire speed control
- 20. Wire inch button
- 21. Euro style MIG torch connector
- 22. Voltage control
- 23. MIG torch coolant connections  
(Red - coolant return) (Blue - coolant supply)



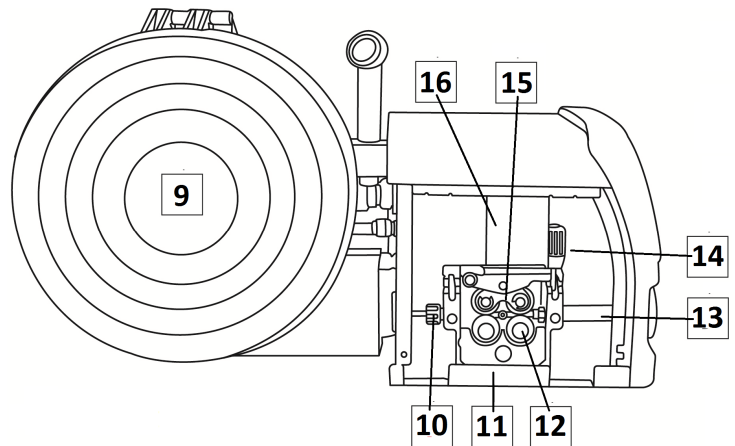
### Side view

- 1. Shield gas connection
- 2. MIG torch holder
- 3. Control cable from power source
- 4. Coolant connection (Red - coolant return)
- 5. Coolant connection (Blue - coolant supply)
- 6. '+' Welding cable connection
- 7. Welding wire spool cover
- 8. Interconnection cable



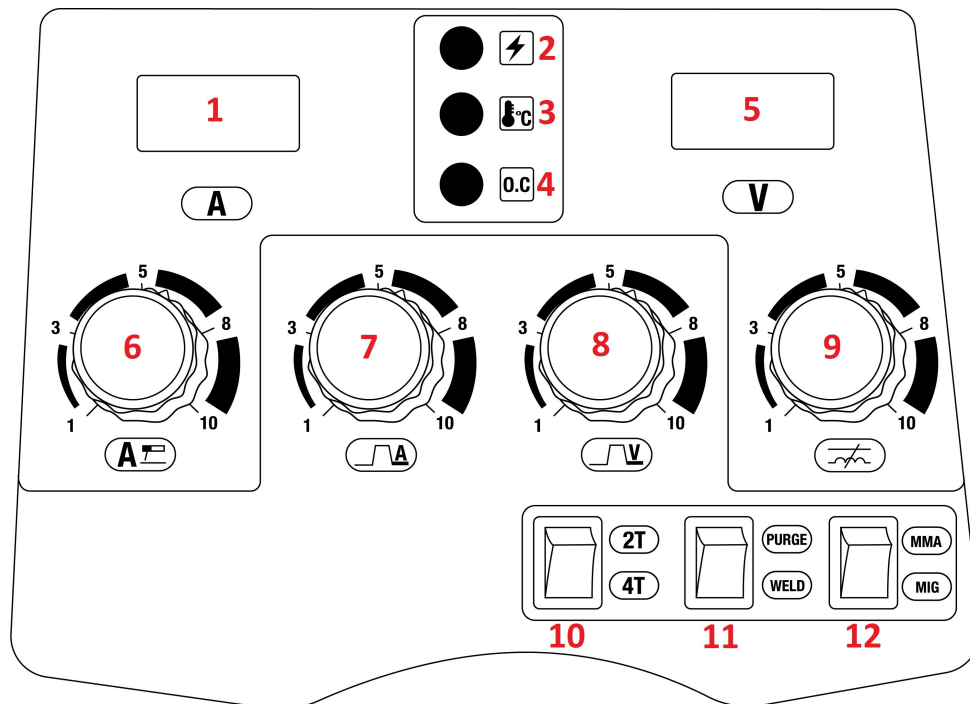
### Side view

- 9. Wire spool holder and tensioner: Located inside the spool cover is the spool holder that allows a 15Kg (300mm dia) reel of wire to be located in place via an alignment pin and then locked in position with a locking nut. The spool holder also has a brake arrangement to ensure correct tension of the wire, this is done by turning the central bolt with a key either clockwise (to tighten) or anti clockwise (to loosen)
- 10. Inlet wire guide: The welding wire is fed through the inlet guide prior to feeding through the drive rollers
- 11. 4 Roll drive wire feed assembly
- 12. Wire feed roller and retaining nut: Secures and holds the grooved drive roller in place
- 13. Outlet feed adaptor: Part of the Euro outlet connector which contains the inner outlet guide which ensures smooth wire feed from the drive assembly through to the MIG torch
- 14. Drive roll tensioner: Allows the correct amount of tension to be applied to the top roller to ensure good feed of the wire through the MIG torch
- 15. Pressure roll assembly: Holds the upper drive roll in place which applies pressure to the welding wire onto the grooved drive roller
- 16. Wire feed motor and gearbox



# CONTROLS

## Front control panel view Jasic MIG JM-272S, JM-352S and JM-452S



JM-272S and JM-352S shown

1. Digital ammeter
2. Power LED: Indicates that power is present to the machine and that the power switch of the machine is turned on
3. 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 (This LED is not present on the JT-452S machine \*)
4. Overcurrent LED: When the "OC" LED illuminates it indicates that over current occurs. Restart the machine and welding can be continued
5. Digital voltmeter
6. Current control dial: The amperage dial used with MMA only and adjusts the amount of welding current delivered by the power source
7. Crater current control dial: For function, please see page 29
8. Crater voltage control dial: For function, please see page 29
9. Inductor control: A variable inductance control to give the operator a more precise output in MIG
10. \*\* 2T/4T selection switch: This option allows the user to switch between 2T (2 stroke) 4T (4 stroke/latch). In 2T mode the weld will start and continue while the trigger is pressed. In 4T mode once the welding arc has started can you then release the trigger and welding will continue until the trigger is activated again
11. \*\* Gas purge switch: This switch allows you to activate the gas which allows the operator to check and measure the gas flow
12. Mode selector switch: To switch between MIG and MMA welding modes

### Please Note.

On the JT-452S front control panel the following applies:

\* The overheat LED (3) is not present.

\*\* The 2T/4T (10) and the gas purge switch (11) are the opposite way round (10 and 11).

# 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 specifications table found on page 10 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.

## Gas selection

Metal active gas welding (MAG): Uses Argon (Ar) mixed with a certain amount of CO<sup>2</sup>/O<sup>2</sup> as the shield gas and it is usually used in short circuit transfer and spray transfer. It can be applicable to flat position welding, vertical position welding, overhead position welding and all-position welding and is mainly used for welding carbon steel, high strength low alloy steel and stainless steel. Welding robots mostly use the MAG process.

Metal inert gas welding (MIG): Uses Argon (Ar), Helium (He) or Ar-He mixtures as the shield gas and it is mainly used for welding aluminium and its alloys.

CO<sup>2</sup> (carbon dioxide) gas shielded arc welding (CO<sup>2</sup> welding): It uses CO<sup>2</sup> as the shield gas and is usually used in globular transfer and short circuit transfer to implement welding. It can be used to weld in different positions. As compared with other welding methods, CO<sup>2</sup> welding has many advantages, though it produces more spatters, CO<sup>2</sup> welding is widely used for general metal structure welding.

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

If using the machine for TIG welding, the gas valve type TIG torch should be connected to the negative terminal and the work return to the positive terminal.

## 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.



# Installation

## Trolley assembly instruction

Check the trolley packaging for any signs of damage.

Carefully remove all the components, check and retain the packaging until the assembly is complete.

### Trolley Kit Comprises

1 x Base Unit (assembled)	2 x Cylinder Straps	4 x M6 Screw
1 x Cylinder Support	2 x Shelf Brackets	2 x M4 Screw
1 x Wire Feed Support Arm	12 x M10 Screw	8 x M5 Screw
1 x Wire Feed Swivel support	1 x Wire feed ext bracket	

### Assembly

- 1 Place the base unit on a flat surface
- 2 Locate cylinder support and use M10 screw to fix to base unit



- 3 Place the power source on the base unit and locate the brackets on the base to the brackets on the base assembly. Use 4 x M5 screws to secure the power source to the base assembly.



- 4 Remove the handles from the power source





# Installation

## Trolley assembly instruction continued

- 5 Fit shelf brackets to top of power source along with the handles using the original bolts.



- 6 Place the wire feed support shelf on top of the shelf brackets and use 4 x M5 screws to connect the shelf to the brackets. Then use 8 x M10 screws to fix the shelf to the cylinder support.



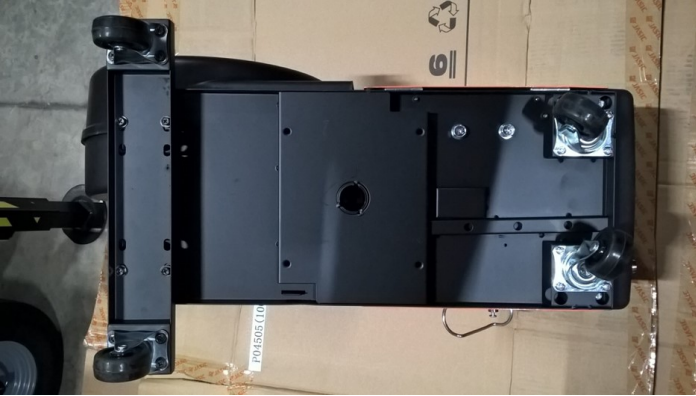
- 7 Place swivel support on shelf and use 4 x M6 screws to fix to shelf



# Installation

## Trolley assembly instruction continued

8. Fix swivel castors to front of wire feed unit and attach fixed castors to the extension bracket fixing it to back end of wire feed unit as shown below.



9. Attach torch holder to either left or right side of shelf as shown and use 2 x M4 screws to attach it.



10. Finally locate wire feed unit onto swivel support, make sure all screws are tightened correctly and connect the interconnection cable.



Assembly is now complete.

# Installation

## MIG welding

Insert the welding torch into the “Euro connector for torch in MIG” output socket on the front panel of the wire feed unit and tighten it.

Insert the quick plug of the interconnection cable set into the “+” output terminal of the welding machine and tighten it clockwise (ensure to connect the other end connection to the rear of the wire feed unit).

Insert the work return lead cable plug into the “-” output terminal on the front panel of the welding machine and tighten it clockwise.

Select your wire size and place the reel of wire onto the spindle adapter of the wire feed unit. The wire spindle incorporates a friction brake which is adjustable to ensure optimum braking. If necessary, you can adjust by turning the large allen key inside the open end of the wire reel hub. Clockwise rotation will tighten the brake. Correct adjustment will result in the reel circumference continuing no further than 15-20mm after releasing the torch trigger so the wire on the reel is slack but not too much where it will fall off the reel.

The gas cylinder should be equipped with the appropriate gas regulator. Connect the supplied gas hose to the gas inlet on the back panel of the machine and then to the outlet of the gas regulator. Shielding gas offers protection to the weld area, so ensuring you have enough gas flow is very important.

Ensure that the feed roll groove size that will be feeding the welding wire on the drive roll matches the contact tip size of the welding torch and the welding wire size being used.

Release the pressure arm of the wire feeder to thread the wire through the guide tube and into the drive roll groove and then adjust the pressure arm, ensuring no slipping of the wire when feeding through the torch. (Too much pressure will lead to wire distortion which will affect wire feeding).

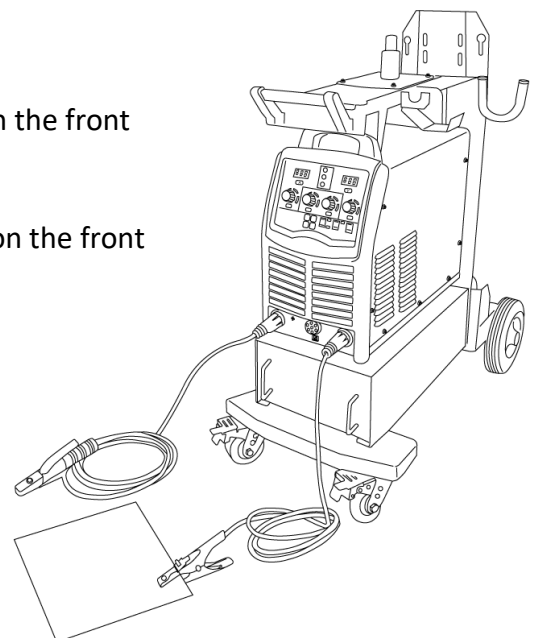
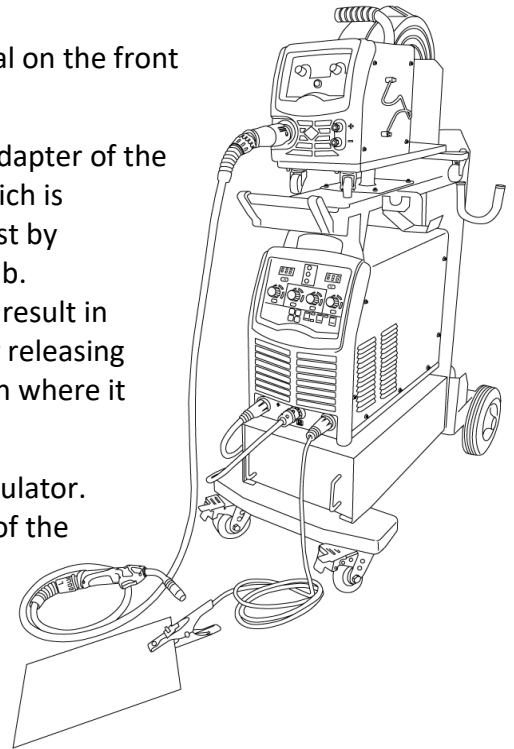
Press the wire inch button to thread the wire out of the torch through the contact tip.

You are now ready to start MIG welding.

## 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.



# OPERATION



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.

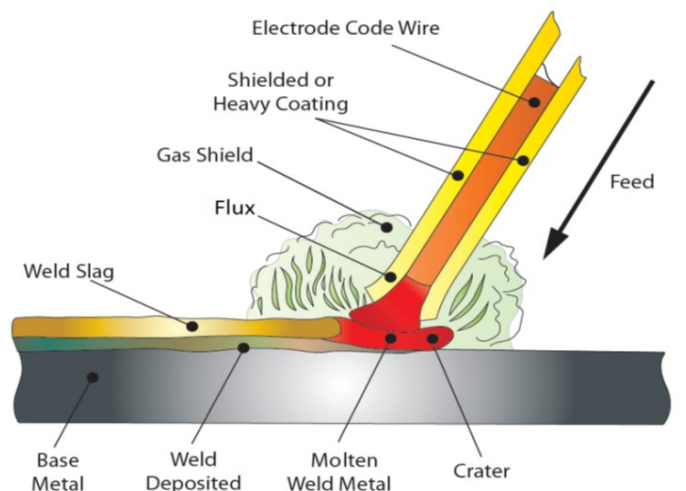
## MMA Welding Mode

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.



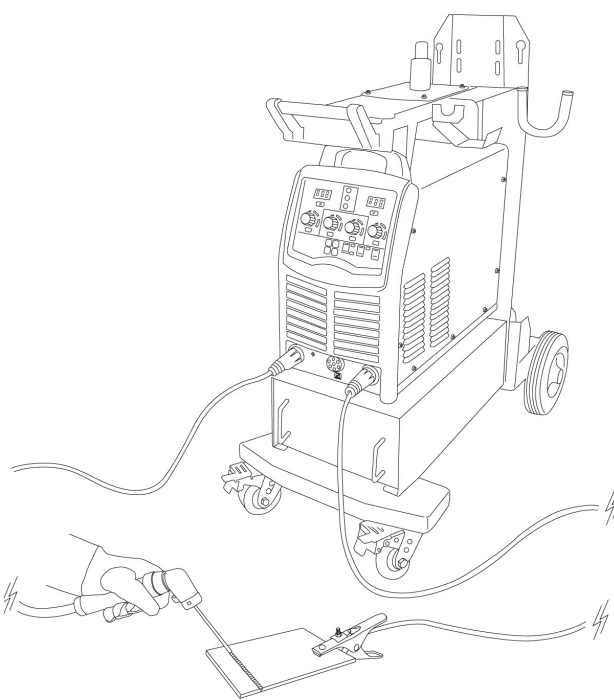
When the electrode is moved along the work piece at the correct speed the metal core deposits a uniform layer called the weld bead.

After connecting the welding leads as detailed you will need to switch the power switch on the back panel to "ON".

Select the MIG/MMA by switching to the MMA welding mode. There is now open circuit voltage output at both output terminals.

Ensure you check that you have the electrode polarity correct and set the amperage on the machine suitable for the electrode being used.

Please see the guide to amperages required below, 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)
1.6	25 ~ 45
2.0	35 ~ 65
2.5	50 ~ 90
3.2	60 ~ 130
4.0	100 ~ 180
5.0	150 ~ 250
6.0	200 ~ 310



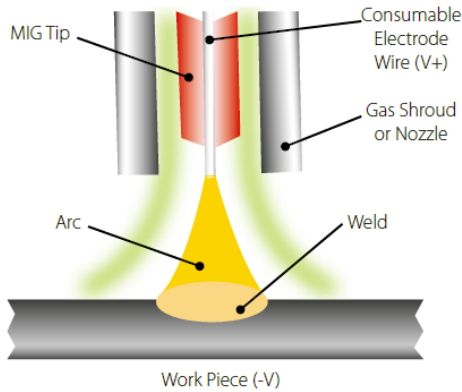
## OPERATION



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.

### MIG/MAG Welding Mode

MIG - Metal Inert Gas Welding, MAG - Metal Active Gas Welding, GMAW - Gas Metal Arc Welding



MIG welding was developed to help meet production demands of the war and post war economy which is an arc welding process in which a continuous solid wire electrode is fed through a MIG welding gun and into the weld pool, joining the two base materials together.

A shielding gas is also sent through the MIG welding gun and protects the weld pool from contamination which also enhances the arc.

Connect the MIG torch leads as detailed on page 12.

Ensure that a suitable inert gas supply is connected.

### Machine switch ON

Switch the power switch on the back panel to “ON”, the machine is started with the power LED on and the cooling fans are running.

### MIG selection

Switch the MMA/MIG switch to MIG mode.

### Gas

Open the gas valve of the cylinder, then by pressing the gas purge switch on the front panel of the power source you can accurately adjust the gas regulator to obtain the desired flow rate.

### Digital displays

At this time, for the JM-272S and JM-352S the ammeter displays zeros (although for the JM-452S the ammeter displays the preset wire feed speed value) and the voltmeter for all models displays the preset voltage value. These parameters can be adjusted by using the voltage control knob as well as the wire feed speed control knob from the front panel of the wire feed unit to get the correct welding voltage and welding current. During welding the actual current and actual voltage values are displayed on the digital displays of the machine.

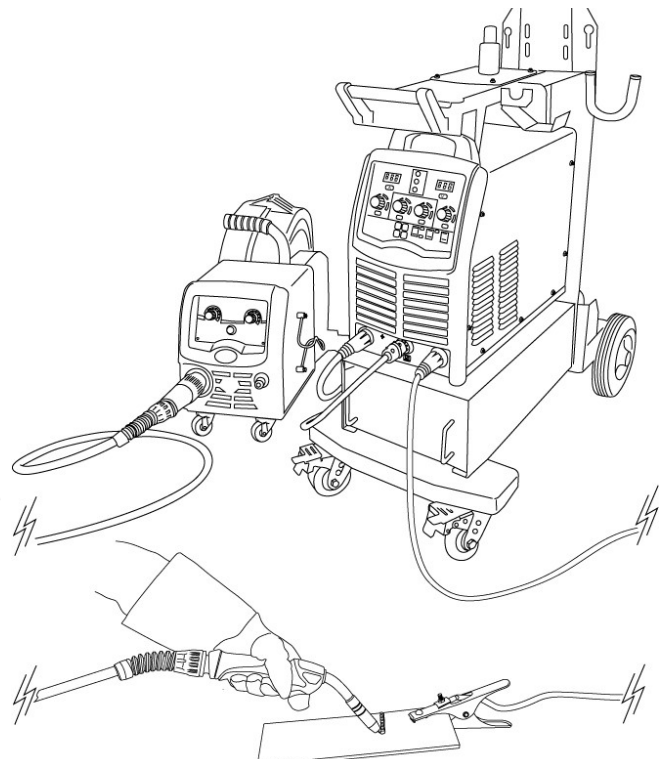
### Torch trigger control

Select 2T or 4T operation for different torch trigger modes.

In 2T mode, arc is ignited by pushing the torch trigger and the arc stops by releasing the torch trigger.

In 4T mode, welding can be continued when releasing the torch trigger after arc is ignited and at this time, welding parameters can be adjusted using the current control knob (wire feed speed) and voltage control dials on the wire feed unit.

When pushing the torch trigger again, the machine then enters into crater welding and at this time, the crater parameters can be set by adjusting the crater current or voltage control dials on the front panel of the power source.



# GUIDE TO MMA WELDING



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

## Notes for the welding beginner

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

## Welding position

When welding, ensure you place yourself in a comfortable position for welding and your welding application before you begin to weld. This maybe sitting at a suitable height which often is the best way to weld ensuring you're relaxed and not tense. A relaxed posture will ensure the welding task becomes much easier.

Please ensure you always wear suitable PPE and use suitable fume extraction when welding.

Place the work so that the direction of welding is across, rather than to or from your body. The electrode holder lead should always be clear of any obstruction so that you can move your arm freely along as the electrode burns down. Some elders prefer to have the welding lead over their shoulder, this allows greater freedom of movement and can reduce the weight from your hand.

Always inspect your welding equipment, welding cables and electrode holder before each use to ensure it's not faulty or worn as you may be at risk of an electric shock.

## MMA process features and benefits

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

The MMA process can be used to weld a wide variety of materials and is normally used in the horizontal position but can be used in vertical or overhead with the correct selection of electrode and current. In addition, it can be used to weld at long distances from the power source subject to the correct cable sizing. The self shielding effect of the electrode coating makes the process suitable for welding in external environments. It is the dominant process used in maintenance and repair industries and is used extensively in structural and fabrication work.

The process is well able to cope with less than ideal material conditions such as dirty or rusty material. Disadvantages of the process are the short welds, slag removal and stop/starts which lead to poor weld efficiency which is in the region of 25%. The weld quality is also highly dependent on the skill of the operator and many welding problems can exist.

# GUIDE TO MMA WELDING

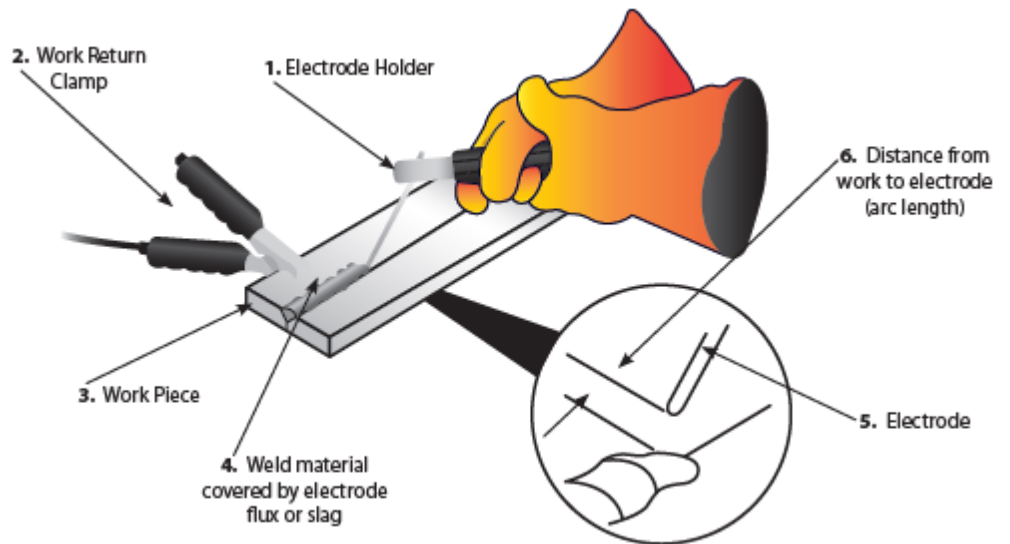


Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.

## 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)



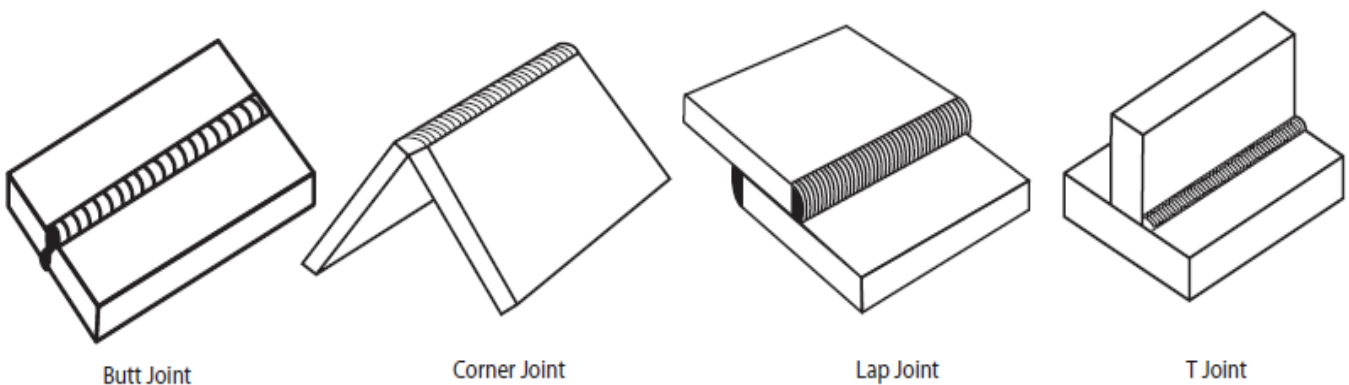
Welding current will flow in the circuit as soon as the electrode contacts the work piece. The welder should always ensure a good connection of the work clamp. The nearer the clamp is placed to the welding area the better.

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



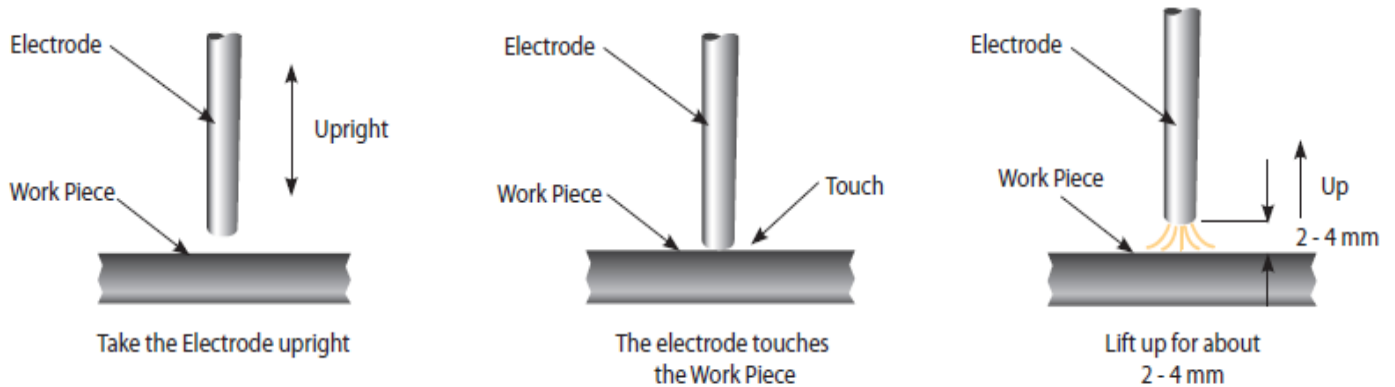
# GUIDE TO MMA WELDING



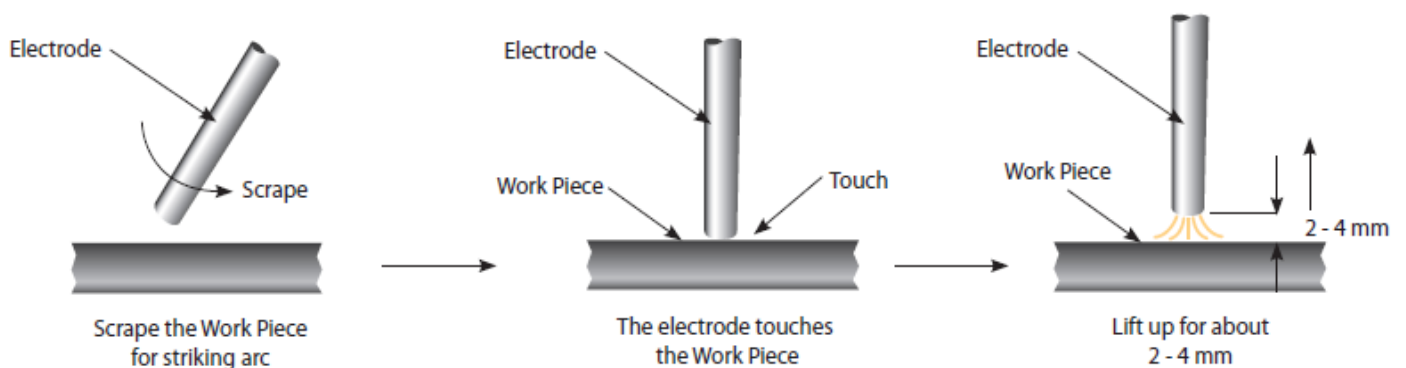
Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the welding area.

## 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.



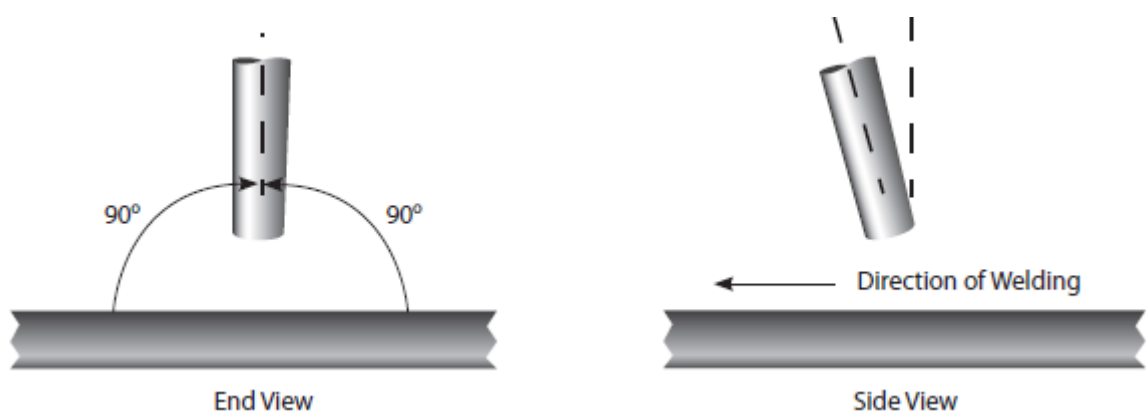
**Scratch technique** - Drag the electrode and scratch the work piece as if striking a match. Scratching the electrode may cause the arc to burn along the scratch path, so care should be taken to scratch in the weld zone. When the arc is struck adopt the correct welding position.



## 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°.



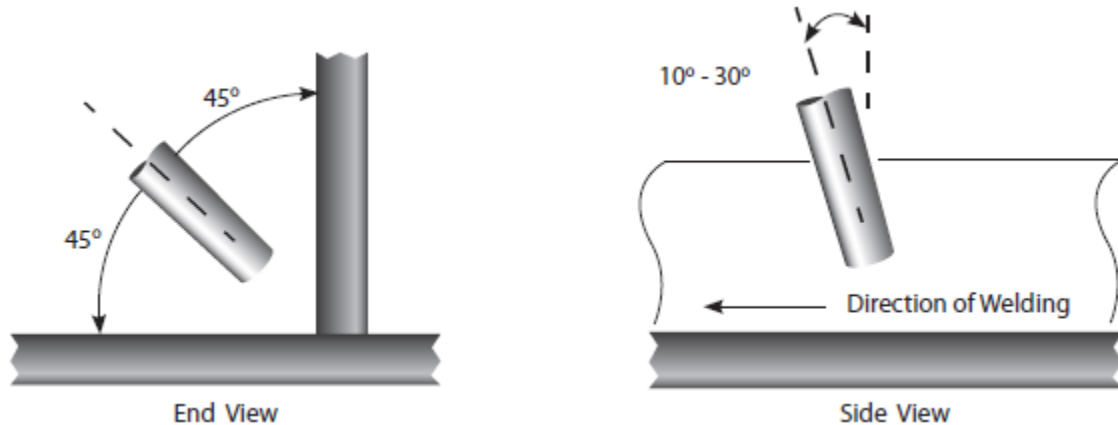
# GUIDE TO MMA WELDING



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

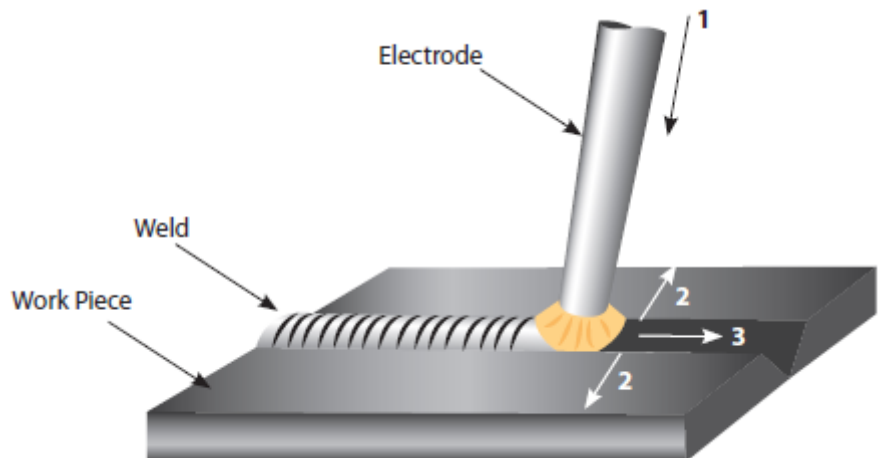
The electrode should be positioned to split the angle i.e.  $45^\circ$ . Again the electrode should be inclined in the direction of travel at around  $10^\circ$ - $30^\circ$ .



## 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 axes
2. The electrode swing right and left
3. The electrode moving in the weld direction



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

## Weld characteristics

A good weld bead should exhibit the following characteristics:

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

A poor weld bead should exhibit the following characteristics:

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

# 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 Increase the amperage or increase the electrode size and amps
	Poor weld technique	Reduce travel speed 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 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 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 MIG/MAG WELDING



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

## Notes for the welding beginner

This section is designed to give the beginner who has not yet done any welding some information to get them going. The simplest way to start is to practice by running weld beads on a piece of scrap plate. Start by using mild steel (paint free) plate of 6.0mm thick and using 0.8mm wire. 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 a poor electrical circuit may create itself.

## MIG/MAG process features and benefits

Terms used: MIG - Metal Inert Gas Welding  
MAG - Metal Active Gas Welding  
GMAW - Gas Metal Arc Welding

MIG welding was developed to help meet production demands of the war and post war economy which is an arc welding process in which a continuous solid wire electrode is fed through a MIG welding gun and into the weld pool, joining the two base materials together. A shielding gas is also sent through the MIG welding gun and protects the weld pool from contamination which also enhances the arc.

The MIG/MAG 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 machine, wires and current. In addition, it can be used to weld at long distances from the power source subject to the correct cable sizing.

It is the dominant process used in maintenance and repair industries and is used extensively in structural and fabrication work.

Weld quality is also highly dependent on the skill of the operator and many welding problems can exist due to incorrect installation application and use.

## Welding position

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

# GUIDE TO MIG/MAG 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.

## MIG process description

The MIG process was first patented for the welding of aluminium in 1949 in the USA.

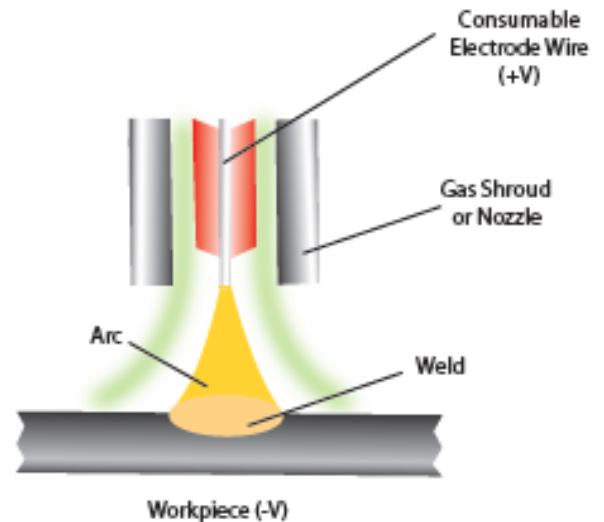
The process uses the heat that is generated by an electric arc formed between a bare consumable wire electrode and the work piece.

This arc is shielded by a gas to prevent oxidation of the weld.

In the MIG process an inert shielding gas is used to protect the electrode and weld pool from contamination and enhance the arc. Originally this gas was helium.

In the early 1950's the process became popular in the UK for welding aluminium using argon as the shielding gas.

Development in the use of different gases resulted in the MAG process. This is where other gases were used, for example, carbon dioxide and sometimes users refer to the process as CO2 welding. Gases such as oxygen and carbon dioxide were added and are active constituents to the inert gas to improve the welding performance. Although the MAG process is in common use today it is still referred to as MIG welding although technically this is not correct. The process began to prove itself as an alternative to stick electrode (MMA) and TIG (GTAW) offering high productivity and deposition rates. The process also helps reduce any weld defects from the increased stop/starts used in MMA. However, the welder must have a good knowledge of the system set up to achieve satisfactory welds.



The electrode MIG gun is normally +VE and the work return is normally -VE. However, certain consumable wires sometimes require what is called reverse polarity i.e. Electrode -VE work +VE. Typical of these types of wire are cored wires used in hard facing or high deposition and gasless applications.

## Typical welding ranges

Wire Diameter (mm)	DIP Transfer		Spray Transfer	
	Current (A)	Voltage (V)	Current (A)	Voltage (V)
0.6	30 ~ 80	15 ~ 18	n/a	n/a
0.8	45 ~ 180	16 ~ 21	150 ~ 250	25 ~ 33
1.0	70 ~ 180	17 ~ 22	230 ~ 300	26 ~ 35
1.2	60 ~ 200	17 ~ 22	250 ~ 400	27 ~ 35
1.6	100 ~ 280	18 ~ 22	250 ~ 500	30 ~ 40

# GUIDE TO MIG/MAG 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.

## MIG controls description

The controls for the MIG/MAG system are as follows. Controls can be electro mechanical or electronic but the effects will be the same.

## Wire feed speed

The wire speed is directly related to the current. The higher the wire speed the more wire is deposited and hence more current is required to burn off the consumable wire.

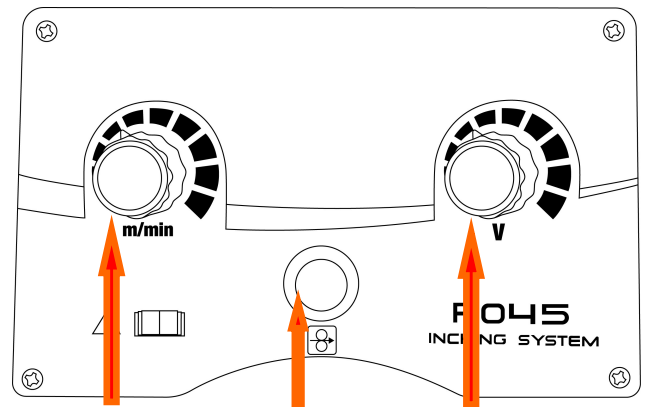
Wire speed is measured in m/min (metres per min) or sometimes in ipm (inches per minute).

The diameter of the wire also forms part of the current demand e.g. a 1.0mm wire feeding at 3m per min will require less current than a 1.2mm wire feeding at the same rate.

The wire feed is set according to the material to be welded.

If the wire feed rate is too high in comparison to the voltage then a “stubby” effect happens where unmelted consumable contacts the work piece creating large amounts of weld spatter.

Too little wire feed comparison to the voltage will result in a long arc being created with poor transfer and eventual burning back of the wire onto the contact tip.



Wire Speed    Inch Switch    Welding Voltage

## Voltage setting

The voltage polarity in MIG/MAG welding is in the majority of cases with the positive (+). This means that the majority of the heat is in the electrode wire. Certain special wires may require the polarity to be reversed i.e. electrode wire negative (-) polarity. Always consult the manufacturer's data sheet for the best operating parameters.

The voltage is often referred to as the “heat setting”. This will be altered dependent on the material type, thickness, gas type, joint type and position of the weld. Combined with the wire speed it is the main control adjusted by the welder. The voltage setting varies depending on the type and size of electrode wire being used.

Most MIG/MAG welders are Constant Voltage (CV) power sources which means the voltage does not vary much during welding. Modern inverter power sources also have control circuits to monitor conditions to ensure voltage remains constant.

The voltage determines height and width of the weld bead. If the operator has no reference to settings required the best method of set up is to use scrap material of the same thickness to obtain the correct setting. If there is too much voltage the arc will be long and uncontrollable and cause the wire to fuse to the contact tip. If the voltage is too low then there will not be enough heat to melt the wire and then stubbing occurs.

To obtain a satisfactory weld a balance needs to be made between voltage and wire speed.

Characteristics of the voltage are that the higher voltage produces a flatter and wider weld bead but care must be taken to avoid undercut. The lower the voltage the weld bead becomes narrow and higher.

# GUIDE TO MIG/MAG WELDING



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## Crater Current Control Setting

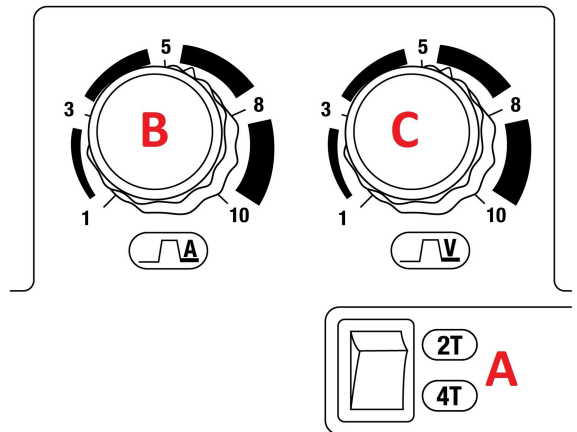
Crater control is the ability to reduce or eliminate the crater that is left behind at the end of the weld. The crater current controls effectively allow you to set an independent setting for wire feed speed and voltage to be used at the end of the weld, (these settings will typically be set to lower values than the main welding wire feed and voltage set via the wire feed unit) to allow filling in of the crater at the finishing of the weld. Typically the values are set at around 55% ~ 65% of the main welding current values.

**The crater current control only works in 4T torch trigger function.**

The following steps explain how to set and use the crater current controls.

1. Select 4T on the Trigger Select Mode switch (A)
2. Set a value using the crater current dial on the front panel of the power source (B). This dial controls the amount of wire feed speed delivered at the finish of the weld.
3. Set a value using the crater voltage dial on the front panel of the power source (C). This dial controls the amount of voltage applied at the finish of the weld.

Test the crater current settings by welding until the desired crater setting is found.



### Please Note:

Remember to pay attention to the 4T trigger selection.

This means that pushing in the MIG torch switch (1st touch) will start the welding cycle, releasing the torch switch (2nd touch) will allow you to continue welding without holding down the torch switch, pulling the switch again (3rd touch) and holding it down will allow the crater current settings to become active and allow you fill in the weld crater, releasing the torch switch (4th touch) will end the welding.

- \* If the crater current setting is too much, i.e. too hot and not filling the crater then reduce the setting and test again.
- \* If the crater current setting is not hot enough and the welding is too cold with stabbing and spatter, then increase the settings and test again.



# GUIDE TO MIG/MAG 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.

## Wire inch switch

The wire inch button when pressed and held allows the operating to activate the feed motor which in turn feeds the welding wire through the MIG torch cable, torch head and tip.

## Burn back control dial:

In the event that the welder was to stop welding and all functions of the machine stopped simultaneously then the consumable filler wire would in all likelihood freeze in the weld pool. In order to avoid this happening the burn back feature is present on this machine.

The burnback control is used to adjust and set the amount of 'stick out' MIG wire that protrudes from the MIG torch tip after the torch trigger has been released and welding has stopped.

To decrease burnback time (or lengthen the amount of wire sticking out from the MIG torch tip at the end of welding), turn the burnback control knob anti clockwise.

To increase burnback time (or shorten the amount of wire sticking out from the torch at the end of welding), turn the burnback control knob clockwise.

The burn back control dial is located on the rear panel of the power source

## Inductance control

Variable inductance control allows you to tune the welding arc to suit your welding application, this is used to minimise spatter and to control the arc from crisp through to soft.

Lowering the inductance is ideal when welding with smaller diameter wires for a crisp stable arc with maximum deposition and minimum heat into the work piece.

Increasing inductance softens the arc giving more penetration, reduces spatter and increases heating of the work piece

## Some quick reference handy tips for the MIG/MAG welding process are:

- When welding, try to use an electrode stick out (the distance between the weld and the contact tip) of around 6-8mm
- When welding thin materials try and use smaller MIG wire diameters and for thicker materials use thicker wires
- Make sure you select the correct MIG wire type for the material to be welded
- Ensure the MIG welding gun has the correct sized contact tip and type of liner
- Always ensure you have the correct size drive rolls and torch liner for the wire size selected
- Select the correct gas to achieve the correct weld characteristics and finish
- For optimum control of the weld keep the wire at the leading edge of the weld pool
- Before commencing welding, ensure a comfortable and stable position
- Try to keep the welding torch as straight as possible when welding to ensure the best feed
- Carry out daily housekeeping on the condition of the welding torch and drive rolls
- Keep any consumables clean and dry to avoid contamination such as oxidation and damp

# MIG WELDING GUIDE

## MIG Set-Up Guide

Please Note: This information is intended to act as a guide only

Material	Wire Type	Polarity	Shielding Gas (20-30 CFH Flow Rate)	Wire Dia.	0.5mm	0.6mm	0.8mm	1.0mm	1.2mm	1.6mm	3.0mm	4.5mm	6.0mm	6.0mm	8.0mm	10.0mm	
Steel	Solid Wire ER70S-6	DCEP	C25	0.6	15.5/3.2	15.5/3.6	16/4.3	16.5/5.6	17/6.4	17.5/7.8	18/9.7	18.5/10.5	-	-	-	-	
				0.8	15.5/2.3	15.5/2.4	16/2.8	16.5/3.8	17/5.1	17.5/5.7	18.5/6.4	19/7	19.5/7.9	19.5/7.9	20/8.9	21.5/10.5	
				1.0	15.5/1.8	15.5/2	16/2	16.5/2.8	17/3.6	17.5/4.2	18.5/4.5	19.5/5.1	19.5/7.9	19.5/7.9	20/5.7	21/7.6	
	Flux-Cored E71T-11	DCEN	-	0.6	16.5/3.2	16.5/3.6	17/4.3	18/5.6	18.5/6.4	19/8.6	19.5/9.9	20/10.5	20/10.5	-	-	-	-
				0.8	16.5/2.3	16.5/2.4	17/2.8	18/3.8	18.5/5.1	19/5.7	19.5/6.4	20/5.7	22/7.9	22/7.9	23.5/8.6	25/9.2	
				1.0	16.5/1.8	16.5/2	17/2	18/2.8	18.5/3.6	20/4.2	21/4.1	22/5.5	22/6	22/6	23.5/7	24.5/8	
	Stainless Steel	DCEP	Tri-Mix	0.6	-	18/4.1	18.5/4.6	19/5.6	19.5/6.4	20/8.3	20/8.3	21.5/10.2	21.5/10.2	-	-	-	-
				0.8	-	18/2.7	18.5/3.0	19/3.8	19.5/4.1	20/5.1	21.5/6.6	22/8.1	22/9.2	22/9.2	22.5/9.6	23/10.2	
				1.0	-	18/2	18.5/2.2	18.5/2.8	19/3.1	19.5/4.1	21/4.8	21.5/5.6	22/6.1	22/6.1	22.5/6.6	23/7	
Aluminium	Aluminium ER4043	DCEP	Argon	0.8	-	-	-	13/7.6	14/8.1	14.5/10.2	20/8.9	21/9.3	-	-	-	-	
				1.0	-	-	-	14.5/6.1	16/7.1	17/8.6	22/9.2	22/9.2	22/9.2	23/9.7	-	-	

# MIG 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.

## MIG welding defects and prevention methods

<u>Defect</u>	<u>Possible cause</u>	<u>Action</u>
Porosity (within or outside the bead)	Poor material	Check the material is clean
	Insufficient shield gas flow	Check hoses and MIG torch for blockages
	Gas flow too low/high	Check the regulator setting or that it is not frozen due to a high flow
	Leaking hoses	Check all hoses for leaks
	Faulty gas valve	Call a service engineer
	Working in open area with drafts	Put screens up around the weld area
Poor or inconsistent wire feed	Incorrect pressure on wire drive causing burn back to contact tip or bird nesting at the feed roll	Readjust the upper feed pressure  Increase the pressure to eliminate burn back to tip  Decrease pressure to eliminate bird nesting
	Damage to torch liner	Replace torch liner
	Welding wire contaminated or rusty	Replace wire
	Worn welding tip	Check and replace welding tip
No operation when the torch switch is operated	Torch switch faulty	Check the torch switch continuity and replace if faulty
	Fuse blown	Check fuses and replace if necessary
	Faulty PCB inside the equipment	Call a service engineer
Low output current	Loose or defective work clamp	Tighten/replace clamp
	Loose cable plug	Re-fix plug
	Power source faulty	Call a service engineer
No operation	No operation and mains lamp not lit	Check mains fuse and replace if required
	Faulty power source	Call a service engineer
Excessive spatter	Wire feed speed too high or welding voltage too low	Reset the parameters according to the weld to be made
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

# MIG 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.

## MIG welding defects and prevention methods

<u>Defect</u>	<u>Possible cause</u>	<u>Action</u>
Burning through – Holes within the material where no weld exists	Heat input too high	Use lower amperage or smaller electrode 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 Poor welding technique Work piece dirty	Increase the amperage or increase the electrode size and amperage Joint design must allow for full access to the root of the weld Alter welding technique to ensure penetration such as weaving, arc positioning or stringer bead technique Remove all contaminant from the material i.e. oil, grease, rust, moisture prior to welding
Irregular weld bead and shape	Incorrect voltage/wire feed settings, if the bead is convex then the voltage is too low and if it is concave then the voltage is too high Insufficient or excessive heat input Wire is wandering Incorrect shielding gas	Adjust voltage and/or wire feed speed Adjust the wire feed speed dial or the voltage control Replace contact tip Check and change the shielding gas as required
Your weld is cracking	The weld beads too small Weld penetration narrow and deep Excessive voltage Weld/material cooling rate too fast	Try decreasing the travel speed Try reducing the wire feed speed current and voltage or increase MIG torch travel speed Decrease voltage control dial Slow the cooling rate by preheating part to be welded or cool slowly
The welding arc does not have a crisp sound that short arc exhibits when the wire feed speed or voltage are adjusted correctly	The MIG torch may have been connected to the wrong output voltage polarity on the front panel	Ensure that the MIG torch polarity lead is connected to the positive (+) welding terminal for solid wires and gas shielded flux cored wires

# MIG TORCH SPARE PARTS LIST

JM-272S, JM-352S and JM-452S Air Cooled

MIG Welding Torch Air Cooled - Model: T360

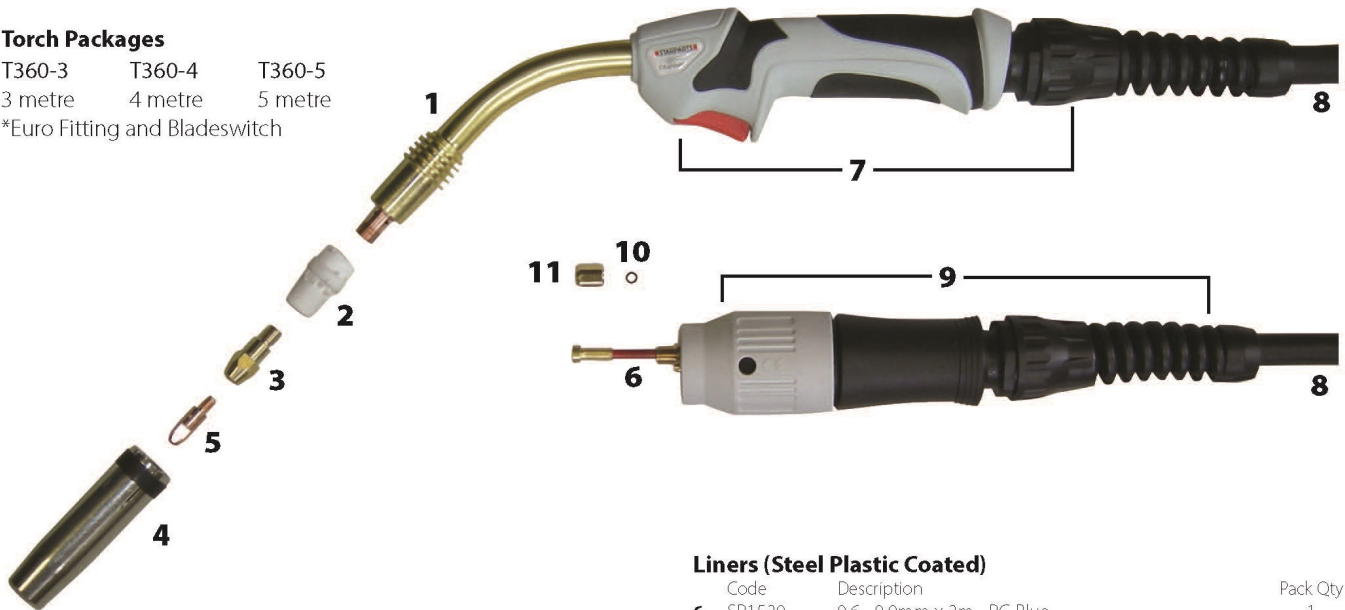
T360 Rating 340A Co2 / 300A Mixed Gases @ 60% Duty Cycle EN60974-7 Wire Size 0.8mm to 1.6mm



## Torch Packages

T360-3    T360-4    T360-5  
3 metre    4 metre    5 metre

\*Euro Fitting and Bladeswitch



## Main Consumables

Code	Description	Pack Qty
<b>1</b> SP3654	Swan Neck Complete	1
<b>2</b> SP3658	Diffuser Black	5
SP3658W	Diffuser White	5
SP3658C	Diffuser Ceramic	5
<b>3</b> SP3681	Tip Adaptor Short M6 Tips	5
SP3683 *	Tip Adaptor Short M8 Tips	5
SP3682	Tip Adaptor Long M6 Tips	5
SP3684 *	Tip Adaptor Long M8 Tips	5
<b>4</b> SP3670	Nozzle Conical	5
SP3671	Nozzle Cylindrical	5
SP3672	Nozzle Tapered	5
SP3673	Nozzle Bottle	5
SP3674	Spot Welding Nozzle	5

## Contact Tips (ECU M6 x 28mm)

<b>5</b> SP2408	0.8mm Steel / 0.6mm Alum Wire	25
SP2409	0.9mm Steel Wire	25
SP2410	1.0mm Steel / 0.8mm Alum Wire	25
SP2412	1.2mm Steel / 1.0mm Alum Wire	25
SP2414	1.4mm Steel / 1.2mm Alum Wire	25
SP2416	1.6mm Steel Wire	25

\* For specifically marked ALU Tips add 'A' after the part number eg: SP2410A

## Contact Tips (CuCrZr M6 x 28mm)

SP2508	0.8mm Steel / 0.6mm Alum Wire	25
SP2509	0.9mm Steel Wire	25
SP2510	1.0mm Steel / 0.8mm Alum Wire	25
SP2512	1.2mm Steel / 1.0mm Alum Wire	25
SP2516	1.6mm Steel Wire	25

## Liners (Steel Plastic Coated)

Code	Description	Pack Qty
<b>6</b> SP1539	0.6 - 0.9mm x 3m - PC Blue	1
SP1549	0.6 - 0.9mm x 4m - PC Blue	1
SP1559	0.6 - 0.9mm x 5m - PC Blue	1
SP2432	1.0 - 1.2mm x 3m - PC Red	1
SP2442	1.0 - 1.2mm x 4m - PC Red	1
SP2452	1.0 - 1.2mm x 5m - PC Red	1
SP2436	1.6mm x 3m - PC Yellow	1
SP2446	1.6mm x 4m - PC Yellow	1
SP2456	1.6mm x 5m - PC Yellow	1

## Liners (PTFE)

SP1538T	0.6 - 0.8mm x 3m - Blue	1
SP1548T	0.6 - 0.8mm x 4m - Blue	1
SP1558T	0.6 - 0.8mm x 5m - Blue	1
SP2432T	1.0 - 1.2mm x 3m - Red	1
SP2442T	1.0 - 1.2mm x 4m - Red	1
SP2452T	1.0 - 1.2mm x 5m - Red	1
SP2436T	1.6mm x 3m - Yellow	1
SP2446T	1.6mm x 4m - Yellow	1
SP2456T	1.6mm x 5m - Yellow	1
SP1511	Liner Collet 0.6-1.2mm	5
SP1511-47	Liner Collet 1.6mm	5
SP1517	Liner 'O' Ring	10

## Secondary Consumables

<b>7</b> SP1625	Complete Bladeswitch Handle c/w Cable Support	1
<b>8</b> SP3603	Cable Assy 3m	1
SP3604	Cable Assy 4m	1
SP3605	Cable Assy 5m	1
<b>9</b> SP8003	Complete Euro Connection Kit c/w Support	1
<b>10</b> SP1596	Gun Plug 'O' Ring	10
<b>11</b> SP1597	Liner Retaining Nut	5

\* For 8mm Threaded Tips Use SP38 / SP40 Series See Page 194 Item No. 6

# MIG TORCH SPARE PARTS LIST

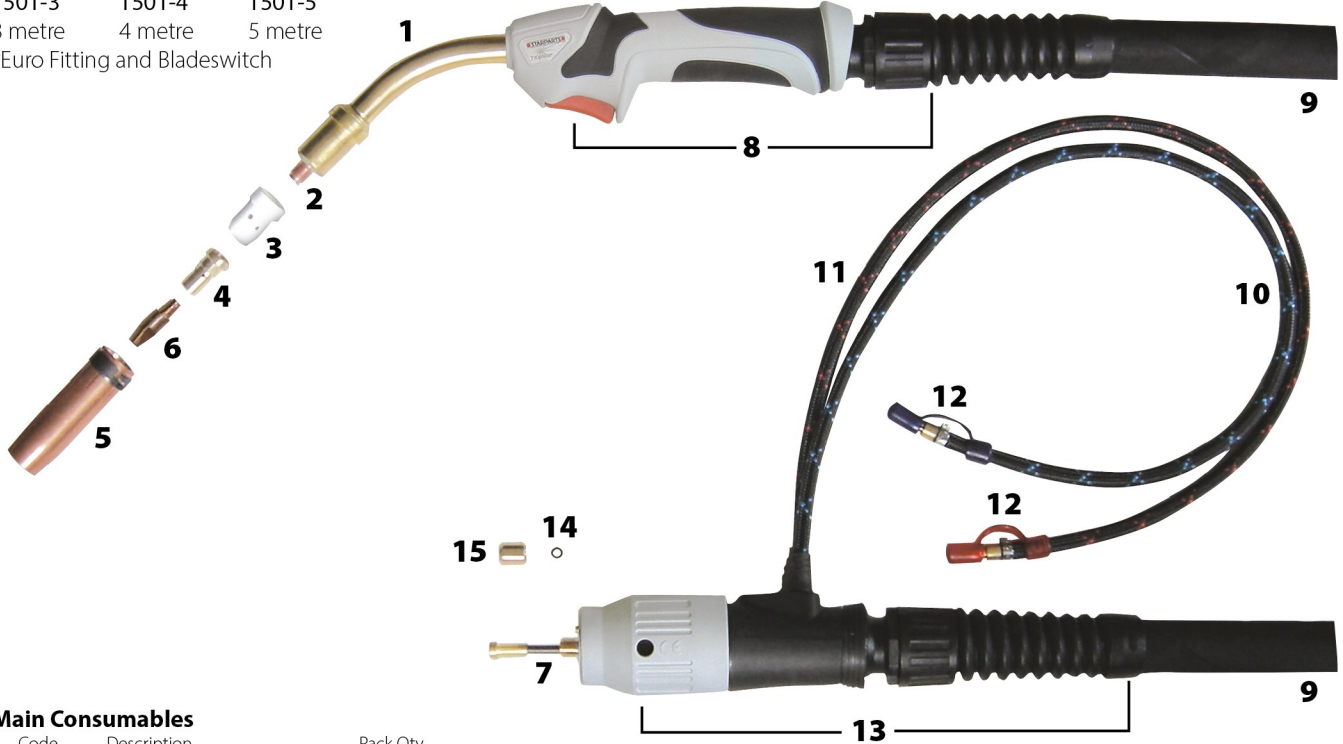
JM-272S, JM-352S and JM-452S Water Cooled  
MIG Welding Torch Water Cooled - Model: T501

Rating 500A Co2 / 450A Mixed Gases @ 100% Duty Cycle EN60974-7 Wire Size 1.0mm to 1.6mm



## Torch Packages

T501-3    T501-4    T501-5  
3 metre    4 metre    5 metre  
\*Euro Fitting and Bladeswitch



## Main Consumables

Code	Description	Pack Qty
1	SP5054 Swan Neck	1
2	SP4055 Insulating Washer	10
3	SP3858 Diffuser Black	5
	SP3858W Diffuser White	5
	SP3858C Diffuser Ceramic	5
4	SP4081 Tip Adaptor Short M8 Tips	5
	SP4082* Tip Adaptor M6 Tips	5
	SP4083 Tip Adaptor Long M8 Tips	5
5	SP2670 Nozzle Conical	5
	SP2671 Nozzle Cylindrical	5
	SP2672 Nozzle Tapered	5

## Contact Tips (ECU M8 x 30mm)

6	SP3810 1.0mm Steel / 0.8mm Alum Wire	25
	SP3812 1.2mm Steel / 1.0mm Alum Wire	25
	SP3814 1.4mm Alum / 1.2mm Alum Wire	25
	SP3816 1.6mm Steel Wire	25

\* For specifically marked ALU Tips add 'A' after the part number  
eg: SP3810A

## Contact Tips (CuCrZr M8 x 30mm)

	SP4008 0.8mm Steel / 0.6mm Alum Wire	25
	SP4010 1.0mm Steel / 0.8mm Alum Wire	25
	SP4012 1.2mm Steel / 1.0mm Alum Wire	25
	SP4014 1.4mm Alum Wire	25
	SP4016 1.6mm Steel Wire	25

## Liners (Steel)

Code	Description	Pack Qty
7	SP3531 0.8 - 1.0mm x 3m	1
	SP3541 0.8 - 1.0mm x 4m	1
	SP3551 0.8 - 1.0mm x 5m	1
	SP3532 1.0mm-1.2mm x 3m	1
	SP3542 1.0mm-1.2mm x 4m	1
	SP3552 1.0mm-1.2mm x 5m	1
	SP3536 1.6mm x 3m	1
	SP3546 1.6mm x 4m	1
	SP3556 1.6mm x 5m	1

## Liners (PTFE)

	SP2432T 1.0 - 1.2mm x 3m	1
	SP2442T 1.0 - 1.2mm x 4m	1
	SP2452T 1.0 - 1.2mm x 5m	1
	SP2436T 1.6mm x 3m	1
	SP2446T 1.6mm x 4m	1
	SP2456T 1.6mm x 5m	1
	SP1511 Liner Collet 0.6mm-1.2mm	5
	SP1511-47 Liner Collet 1.6mm	5
	SP1517 Liner 'O' Ring	10

## Secondary Consumables

Code	Description	Pack Qty
8	SP1626 Bladeswitch Handle c/w Cable Support	1
9	SP3503 Complete Cable Assy 3m	1
	SP3504 Complete Cable Assy 4m	1
	SP3505 Complete Cable Assy 5m	1
	SP3535 Power Cable Assy 3m	1
	SP3545 Power Cable Assy 4m	1
	SP3555 Power Cable Assy 5m	1
	SP3537 Outer Liner Assy 3m	1
	SP3547 Outer Liner Assy 4m	1
	SP3557 Outer Liner Assy 5m	1
	SP3530 Gas Hose 3m	1
	SP3540 Gas Hose 4m	1
	SP3550 Gas Hose 5m	1
	SP3533 Trigger Cable Per m	1
	SP3513 Canvas Cover Per m	1
10	SP3523 Water Inlet Hose Per m	1
11	SP3515 Water Outlet Hose 0.5m	1
12	SP3526 Hose Nipple	10
13	SP8004 Euro Connector Kit c/w Cable Support 1	1
14	SP1596 Gun Plug 'O' Ring	10
15	SP1597 Liner Retaining Nut	5

\* For 6mm Threaded Tips Use SP24 / SP25 Series  
See Page 192 Item No. 5

## 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 MIG welding machine.

<u>Period</u>	<u>Maintenance item</u>
<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.

<u>Description of fault</u>	<u>Possible cause</u>
The digital display is OFF and the fan is not functioning	The primary supply voltage has not been switched ON or input fuse has blown The welding power source input switch is switched OFF Loose connections internally
The digital display is ON but the fan is not running	The machine fan blades may be jammed The machine fan may not be functional Check the wiring and the supply voltage to the fan
Wire feed motor does not rotate when the MIG torch trigger switch is depressed	Check wire feed speed, to ensure its not set to zero Check supply to wire feed motor Possible motor PCB fault
Output 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 MIG torch trigger switch is depressed	Empty gas cylinder Gas regulator is turned off Gas hose is blocked or cut Torch trigger switch lead is disconnected or switch/lead is faulty
Difficult to ignite the arc	The welding voltage is too low or the wire feed speed is set too high
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
Overheat error code lights up	Let the machine cool, it will automatically start again Insufficient cooling air Cooling fan is not running
Wire continues to feed through when the MIG torch switch is released	The trigger mode switch is set to 4T rather than 2T Faulty MIG torch switch

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

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

## EC Declaration of Conformity

The manufacturer, or its legal representative supplier in the European Community Jasic, declares that the equipment described below is designed and produced according to following EU - Directives:

- Low Voltage Directive No: 2014/35/EU
- EMC Directive No: 2014/30/EU with their amendments

Inspected according to following EU - Norms:

- EN 60 974-1
- EN 60 974-10

Type: Jasic MIG JM-272S  
Jasic MIG JM-352S  
Jasic MIG JM-452S

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

## 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 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.

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/EC in concentrations above the limits as specified therein.

Disclaimer:

Please note that this confirmation is given to the best of our present knowledge and belief.

Nothing herein represents and/or may be interpreted as warranty within the meaning of the applicable warranty law.

## 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)**

## OPTIONS AND ACCESSORIES

Part Number	Description
----	<b>MIG torch options for air cooled packages</b>
T360-3	Titanium 360 MIG Torch Air Cooled 3mtr Euro
T360-4	Titanium 360 MIG Torch Air Cooled 4mtr Euro
T360-5	Titanium 360 MIG Torch Air Cooled 5mtr Euro
----	<b>MIG torch options for water cooled packages</b>
T501-3	Titanium 501 MIG Torch Water Cooled 3mtr Euro
T501-4	Titanium 501 MIG Torch Water Cooled 4mtr Euro
T501-5	Titanium 501 MIG Torch Water Cooled 5mtr Euro
WCS50-5	Welding Cable Set 50mm (MMA) 5m
WCS70-5	Welding Cable Set 70mm (MMA) 5m
WC-5-05	Electrode Holder and Lead 50mm 5m
WC-7-05	Electrode Holder and Lead 70mm 5m
EC-5-05	Work Return Lead 50mm and Clamp 5m
EC-7-05	Work Return Lead 70mm and Clamp 5m
WP26V-12-2D	WP26 Style TIG Torch 4m - 2 Piece
WP26V-25-2D	WP26 Style TIG Torch 8m - 2 Piece
CP3550	Cable Plug 35-50mm
CP5070	Cable Plug 50-70mm
JH-HDX	Jasic HD True Colour Auto Darkening Welding Helmet
SSARG2G	Single Stage 2 Gauge Argon Regulator
JM-CABLE-5M	5M Interconnecting Cable - Air/Water Cooled
JM-CABLE-10M	10M Interconnecting Cable - Air/Water Cooled
JM-CABLE-20M	2M Interconnecting Cable - Air/Water Cooled
JWC-05	Water Cooling Unit



Jasic Auto Darkening HD  
Welding Helmet  
with True Colour Technology  
JH-HDX



MMA Lead Set

# OPTIONS AND ACCESSORIES

## DRIVE ROLL OPTIONS

Model	Feed Roll Part Number	Description	Feed Roll Diameter/Width	Quantity Required
JM-270S	10055168	Feed Roll 0.6mm/0.8mm "V" Groove	30mm X 10mm	2
JM-352S	10036428	Feed Roll 0.8mm/1.0mm "V" Groove	30mm X 10mm	2
JM-452S	10039481 *	Feed Roll 1.0mm/1.2mm "V" Groove	30mm X 10mm	2
	10029314	Feed Roll 1.2mm/1.6mm "V" Groove	30mm X 10mm	2
	10029899	Feed Roll 0.8mm/1.0mm "U" Groove	30mm X 10mm	2
	10016532	Feed Roll 1.0mm/1.2mm "U" Groove	30mm X 10mm	2
	10016599	Feed Roll 1.2mm/1.6mm "U" Groove	30mm X 10mm	2
	10029903	Feed Roll 1.2mm/1.6mm FCW	30mm X 10mm	2

## NOTES

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