WELD STAR

# USER MANUAL

## WS-MU4-1


INFINIUM

# Introduction to your new product

## Thank you for selecting this Weld Star Infinium product.

This product manual has been designed to ensure that you get the most from your new Weld Star 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 Weld Star distributor in the unlikely event of a problem occurring.
Please record below the details of your new Weld Star product as these may be required for warranty purposes should you require assistance or spare parts.

Date purchased _____

Purchased from _____

Model name _____

Serial number _____

(The serial number is normally located on the product packaging, top or underside of the machine)

**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. www.weldstar.uk

# CONTENTS

# SAFETY INSTRUCTIONS

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

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

### General electrical safety


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

### General operating safety

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

# SAFETY INSTRUCTION

### Use of Personal Protective Equipment (PPE)


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

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

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

### Welding and Cutting Lens Shade Selector Guide

<table>
<tr><th>Current</th><th>MMA Electrodes</th><th>MIG Light Alloys</th><th>MIG Heavy Metals</th><th>MAG</th><th>TIG</th><th>Plasma Cutting</th><th>Plasma Welding</th><th>Air Arc Gouging</th><th>Current</th></tr>
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</table>

# SAFETY INSTRUCTION

**Safety against fumes and welding gases**


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

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

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

When welding outdoors appropriate RPE should be used.

An example of personal fume protection

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

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

Do not breathe in the welding fume.

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

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

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

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

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

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

**Precautions against fire and explosion**


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

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

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

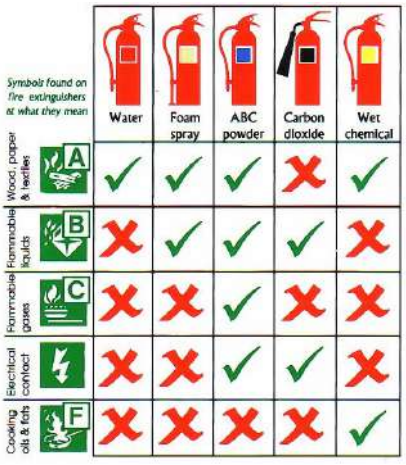
Do not weld or cut fuel and lubricant containers, even if empty. These must be carefully cleaned before they can be welded or cut.

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

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

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

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




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

# SAFETY INSTRUCTION

**The working environment**

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

**Protection from moving parts**

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

**Risks due to magnetic fields**


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

**Handling of compressed gas cylinders and regulators**


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

**Never deface or alter any cylinder**

# SAFETY INSTRUCTIONS

### Fire awareness


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

### Hot parts


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

### Noise awareness

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

### RF Declaration

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

### LF Declaration

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

# SAFETY INSTRUCTION

**Materials and their disposal**

Welding equipment is manufactured with BSI published standards meeting CE requirements for materials which do not contain any toxic or poisonous materials dangerous to the operator.
Do not dispose of the equipment with normal waste.
The European Directive 2012/19/EU on Waste Electrical and Electronic Equipment states that electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility for disposal.

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

# PACKAGE CONTENTS AND UNPACKING

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

## Weld Star WS-MU4-1 ACDC LCD

Weld Star MU4-1 Power Source
Titanium T240 3M MIG Torch (T240-3)
Titanium 26 Tig Torch 12ft (TIG-103)
MMA work lead
Work Return Lead
Gas Regulator
Gas Hose
0.8mm/1.0mm V feed roll
Operating Manual

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

# PRODUCT OVERVIEW

The Weld Star MU4-1 is a true multi-process inverter welder offering professional welding performance in all processes and is the first of its kind to include pulse technology in MIG, TIG and MMA, making it the most versatile machine on the market today.
It has been designed to incorporate the most advanced features and technology offering the operator a user-friendly interface via the 5" true colour LCD display.
Welding process's include:


- MIG/MAG Synergic
- MIG/MAG Pulse
- MIG/MAG Standard
- TIG AC (HF/LIFT)
- TIG DC (HF/LIFT)
- MMA AC
- MMA DC

**Weld Star Plasma WS-MU4-1 Product Features:**

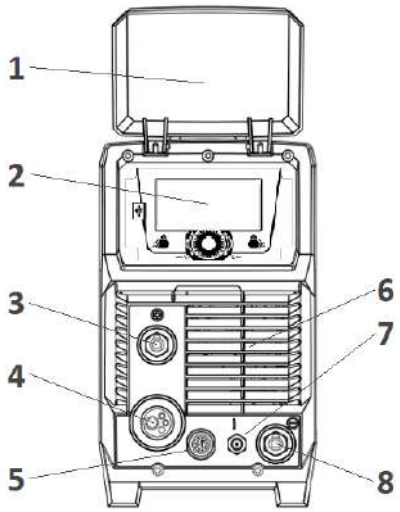
- Advanced IGBT multi-process inverter technology which is compact and lightweight at only 20kg
- PFC technology offering multiple advantages such as energy efficiency and wide range input voltage from 95Vac – 265Vac
- Wired and wireless remote control options
- Generator friendly
- Smart fan – reduces power consumption and intake of dust and fumes
- IP23 protection
- Built to EN-60974-1 and is fully compliant with the European Commission Regulation 2019/1784, CE and UKCA
- With synergic MIG/MAG, welding parameters can be automatically selected based on material thickness and voltage with synergic curves for common materials and wires
- Integrated TIG welding features such as HF or lift TIG, pre/post flow gas times, 2T/4T, slope up/down and pulse, all to ensure excellent TIG welding characteristics in both AC and DC
- SMART TIG function with advanced TIG welding features, such as multi-wave, Q start and hybrid TIG, whilst still maintaining ease of set up for the user
- DC and AC MMA suitable for a wide range of electrodes
- Advanced MMA features such as pulse and automatic current regulation based on electrode diameter
- Hot start arc ignition function which ensures excellent arc ignition in MMA for easier and more reliable arc starting
- Self adaptive arc force technology which maintains MMA arc conditions during operation even with long welding cables
- In-built VRD (MMA and TIG mode only)
- Designed for gas and gasless MIG welding wires.
- Ability to save up to 10 stored programs for quick set up
- Advanced error code menu for ease of fault and troubleshooting diagnosis
- Panel mounted USB connection for quick and easy firmware updates
- Available with a wide range of accessories including on torch remote, foot pedal, spool on gun and 2 wheel trolley

# TECHNICAL SPECIFICATIONS

| Parameter | Unit | Weld Star WS-MU4-1 | |
|---|---|---|---|
| Rated input voltage | V | Wide Voltage 95Vac – 265Vac | |
| | | AC110V (±15%) 50/60Hz | AC230V (±15%) 50/60Hz |
| Rated input power | kVA | 4.5 | 7.5 |
| Rated input current Imax | A | MIG 35<br>TIG AC 31.5 / DC 33<br>MMA AC 36.5 / DC 39.5 | MIG 28<br>TIG AC 21 / DC 22.5<br>MMA AC 30.5 / DC 33.5 |
| Rated input current Ieff | A | MIG 17.5<br>TIG AC 16 / DC 16<br>MMA AC 18.2 / DC 19.7 | MIG 14<br>TIG AC 10 / DC 11<br>MMA AC 15 / DC 17 |
| Welding current range | A | MIG 10 ~ 140<br>MMA 5 ~ 130<br>TIG 5 ~ 160 | MIG 40 ~ 200<br>MMA 5 ~ 200<br>TIG 5 ~ 200 |
| No-load voltage | V | MIG 28<br>MMA 75 (VRD 13)<br>TIG 75 | |
| Rated duty cycle (40°C) | % | MIG 140A @ 25%<br>MMA AC/DC 130A @ 25%<br>TIG AC/DC 160A @ 25% | MIG 200A @ 25%<br>MMA AC/DC 200A @ 25%<br>TIG AC/DC 200A @ 25% |
| Efficiency | % | 85 | |
| Idle state power | W | 30 | |
| Power factor | cosϕ | 0.99 | |
| Standard | - | EN60974-1 | |
| Protection class | IP | IP23 | |
| Insulation class | - | H | |
| Noise | db | <70 | |
| Humidity | % | <90% (20°C) | |
| Operating temperature range | °C | -10 ~ +40 | |
| Storage temperature | °C | -25 ~ +55 | |
| MIG Torch | - | Titanium T240 3m | |
| MIG recommended wire size | mm | FE: 0.6/0.8/1.0 - SS: 0.8/1.0 - Flux Cored: 0.6/0.8/1.0 | |
| Wire reel weight/spool size | kg/mm | 5kg / 200mm | |
| MMA recommended electrode size | mm | 1.6 ~ 3.2 | 1.6 ~ 4.0 |
| Overall size | mm | 620 X 220 X 370 (without handle)<br>620 X 220 X 430 (with handle) | |
| Weight | kg | 20 | |

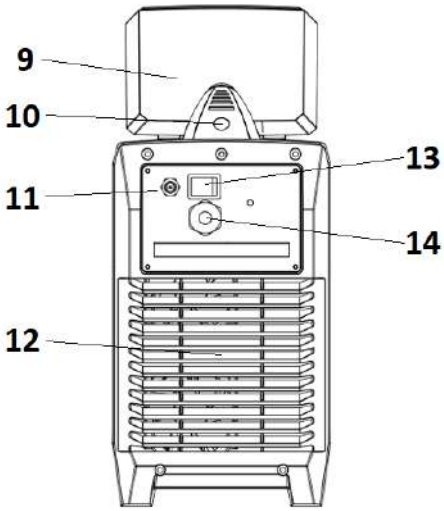
# CONTROLS

**Front view Weld Star WS-MU4-1**




1. Protective control panel cover
2. Control panel (see below and page 16 for further information)
3. Positive '+' Dinse socket outlet (35/50mm)
4. MIG torch outlet connector, the connection that allows for a euro style MIG torch to be fitted
5. Control socket (see page 29 for further information)
6. Cooling air vent
7. TIG gas outlet (10mm)
8. Negative '-' Dinse socket outlet (35/50mm)

**Rear view Weld Star WS-MU4-1**




9. Protective control panel cover
10. Carry handle
11. Gas inlet
12. Air vent
13. Mains power ON/OFF switch
14. Mains input power cable

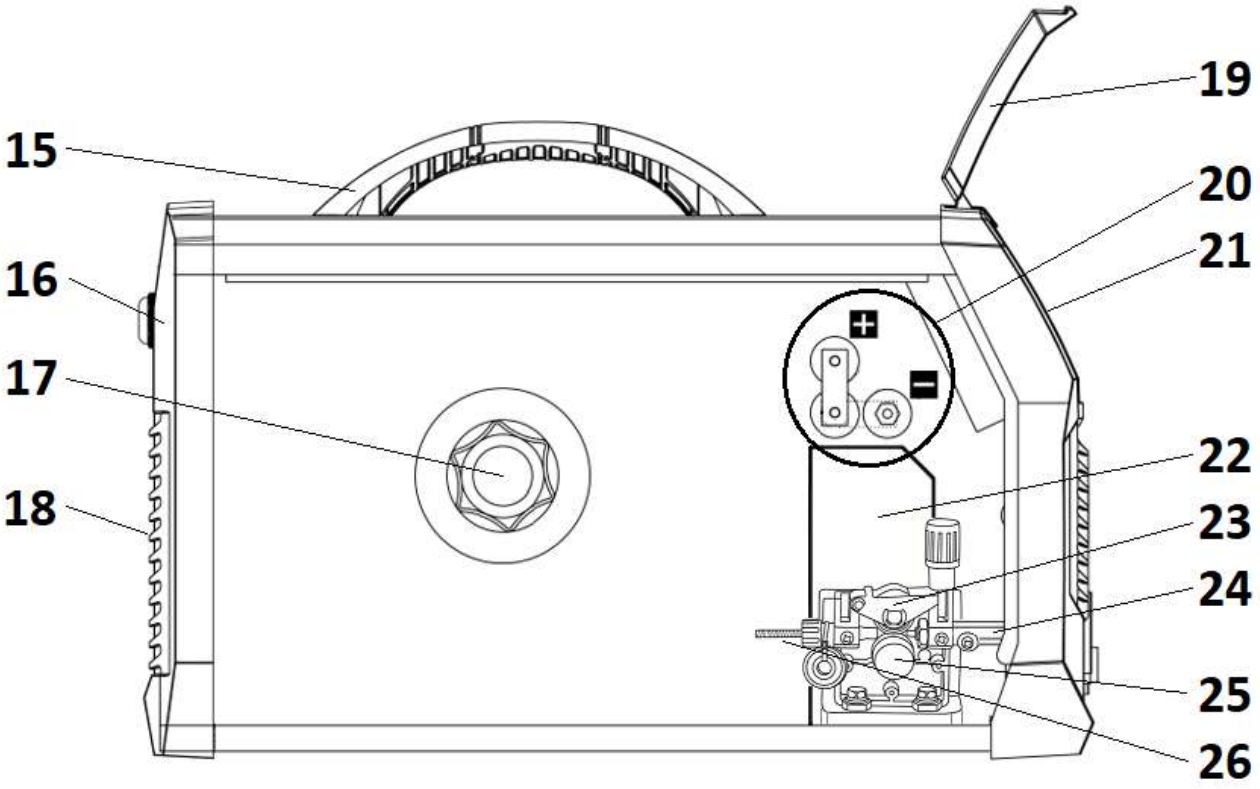
**Control panel view Weld Star WS-MU4-1**


27 USB Connector *
28 5" Digital screen
29 Left control button
30 Main control dial and activation button
31 Right control button

* The front panel USB socket allows for easy software updates to be loaded into the machine. By inserting a 'loaded' Weld Star USB while the machine is turned off and then switching the machine ON will the machine automatically load the updated firmware and programs (during this mode the screen displays the firmware update status). Once the update is complete the machine will boot up as normal.

# CONTROLS

**Side view Weld Star WS-MU4-1**




15. Carry handle.
16. Rear panel (see page 12 for further information).
17. Wire spool holder and tensioner: Allows a 5kg (200mm diameter) reel of wire to be located in place via an alignment pin and then locked in place with the 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 an allen key clockwise (to tighten) or anti clockwise (to loosen).
18. Rear air vent.
19. Protective control panel cover.
20. Adjustment point to euro MIG torch outlet polarity to be either positive '+' or negative '–'.
    When using gas set the connection to '+' when using 'gasless' welding wire set the connection to '–'.
21. Control panel (see page 12 and from page 16 for further information).
22. Drive Assembly feed motor and gearbox (the feed motor is located behind the plastic cover).
23. Upper pressure roll assembly: Holds the upper drive roll in place which applies pressure to the welding wire via the fitted grooved drive roll, the pressure is applied via the drive roll tensioner which allows the correct amount of tension to be applied to the top roller to ensure good feed of the wire through the MIG torch.
24. Outlet feed adaptor: Part of the Euro outlet connector assembly which contains the inner outlet guide which ensures smooth wire feed from the drive assembly through to the MIG torch.
25. Wire feed roller and retaining nut. Secures and holds the grooved drive roll in place.
    The feed roll supplied with the machine from new is a 0.8mm/1.0mm V.
26. Inlet wire guide: The welding wire is fed through the inlet guide prior to feeding through the drive rollers.

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

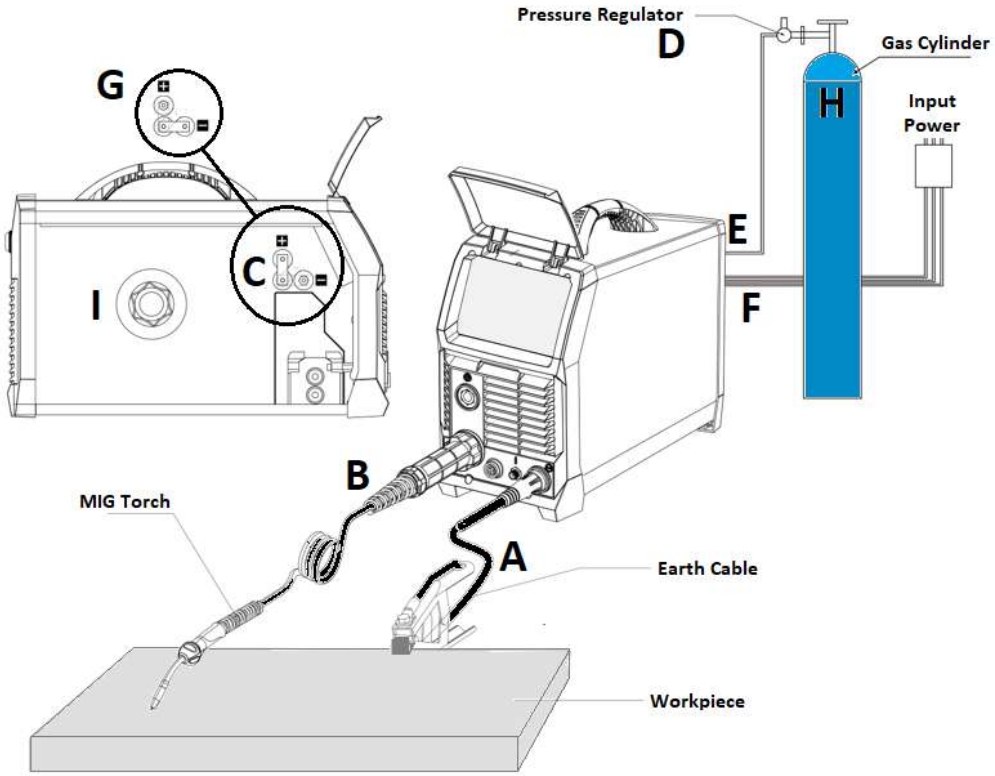
### MMA welding

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

**MIG welding**




- Insert the welding torch (B) into the “Euro connector for torch in MIG” output socket on the front panel of the machine and tighten it into position.
- Insert the work return lead cable plug (A) into the “-” output terminal of the welding machine and tighten by rotating it clockwise.
- Ensure that the link (C) the torch polarity connection link is in the vertical position and connected to the “+” terminal, this ensure that’s the MIG torch polarity is positive (+).
- Install the welding wire on the spindle adapter (I).
- Connect the cylinder (H) equipped with the gas regulator (D) to the gas inlet on the back panel of the machine (E) with a gas hose.
- Ensure that the wire groove size of the fitted drive roll matches the contact tip (fitted to the MIG 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 sliding of the wire. (too much pressure will lead to wire distortion which will affect wire feeding).
- Turn the machine ON
- Via the user display, place the welding mode function into the MIG position (see page 16).
- ‘Inch’ the welding wire through the MIG torch and out via the contact tip (see page 16).
- You are now ready to start MIG welding.

**Gasless self shielded MIG welding**

When carrying out MIG welding with gasless welding wire the welding torch polarity is reversed, so the MIG torch is ‘-’ and the work return lead is ‘+’

Follow the above procedure except for the following:

- Insert the work return lead cable plug (A) into the “+” output terminal of the welding machine and tighten by rotating it clockwise.
- Ensure that the link (G) the torch polarity connection link is in the horizontal position and connected to the “-” terminal, this ensure that’s the MIG torch polarity is now negative (-).
- Ensure that you have turned OFF the gas supply at the cylinder.

# MULTIFUNCTIONAL DISPLAY WINDOW

**Display Screen Explained WS-MU4-1**

Upon powering ON your MU4-1 and boot up sequence is complete, the main menu will appear on the LCD digital screen 'F' as shown right, this allows the operator to navigate the various welding processes by rotating the control dial 'B' clockwise or anti clockwise and when the desired option is front and centre then you can press the dial 'B' to access the required welding mode.
Along with the settings option you can also navigate yourself though the welding modes that include: MMA, MIG Pulse, MIG Synergic, MIG Standard, Lift TIG, HF TIG and Smart TIG.


Button 'A' is usually associated with the icon that's circled 'D' (to access option short press A).
Button 'C' is usually associated with the icon that's circled 'E' (to access option short press C).


Navigate to one of the MIG welding process options, the example shown left is MIG manual, you will then note that just above the control dial circled 'H' it shows the polarity of the MIG torch and work return lead:

- MIG torch symbol is '+' (positive polarity)
- Work return lead clamp is '-' (negative polarity)

To check that the outputs are configured correctly, please check out pages 15-16 to adjust and set if required.

In this screen you also have the ability to check and activate gas purge along with 'inching' the wire feed.

- If you long press and release button 'A' (approx. 3 seconds) the gas solenoid will activate allowing the gas to purge and flow, allowing you to test and set the gas flow accordingly.
- If you long press and release button 'C' (approx. 3 seconds) this activates the wire feed motor which In turn pushes the welding wire through the MIG torch and contact tip.

If you press the control dial 'B' button, this will take you to the MIG manual welding process control screen, as shown left, where you can adjust (in this case being MIG Manual) the following settings:


- 1 Wire Feed Speed
- 2 Welding Voltage
- 3 MIG Torch switch control, 2T, 4T, S4t, Spot and S2t
- 4 Variable MIG Inductance control

To access these advanced setting, press the control dial 'B' and each of the green circled parameters numbered 1 - 4 will highlight red in turn as you rotate the control dial B.
To adjust a highlighted parameter, press the control dial which will allow you to adjust selected parameter by rotating the dial and then pressing the control dial again will store the parameter setting and automatically move to the next parameter option.

**Please Note: Parameter options vary depending on welding process and torch trigger mode selected.**

# MULTIFUNCTIONAL DISPLAY WINDOW


**Display Screen Explained WS-MU4-1 (continued)**

As previously noted buttons A and C have 2 functions determined by either a short or long press of buttons A and C.

- Briefly pressing buttons A or C will activate the 2 option icons circled purple.
- Pressing, holding the releasing buttons A and C for approx. 3 seconds will activate the 2 option circled in green (save and load in this case).


Following on from the instructions on the previous page, if you press and release (short press) button 'C' you will now enter a new screen (shown left) that allows the operator to select and adjust more advanced (in this case) MIG settings such as:

- Pre gas flow
- Slope up
- Current
- Slope down
- Post gas flow
- Burn back
- Also Start Amps, Start Amps time and final amps are available in either S2t or S4t torch trigger mode.

**Please Note: These parameter options do change depending on which welding process and torch trigger mode you have selected.**

**Save and Loading welding programs**

The following information details the save and load options of welding parameters as detailed below:


**Saving a welding program**

If you long press (approx. 3 seconds) and release button 'A' the screen will change to the memory save option.

As you will see this screen allows the operator to save his setup to 1 of 10 memory programs.

To save, rotate the control dial to the desired program number and then press and release button 'C'.


**Loading a welding program**

If you long press and release button 'C' (for approx. 3 seconds) the screen will change to the memory load option.

This screen allows the operator to load previously saved welding programs.

To load a program, rotate the control dial to the desired program number and then press and release button 'C'

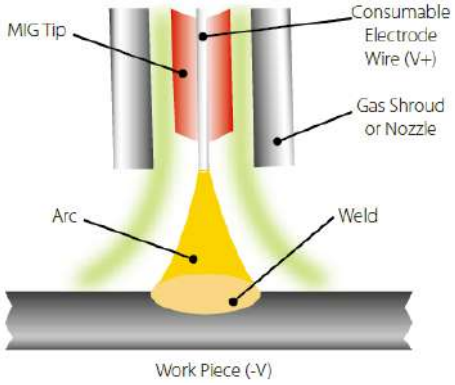
You will then return to the loaded welding program screen.

# OPERATION - MIG/MAG

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

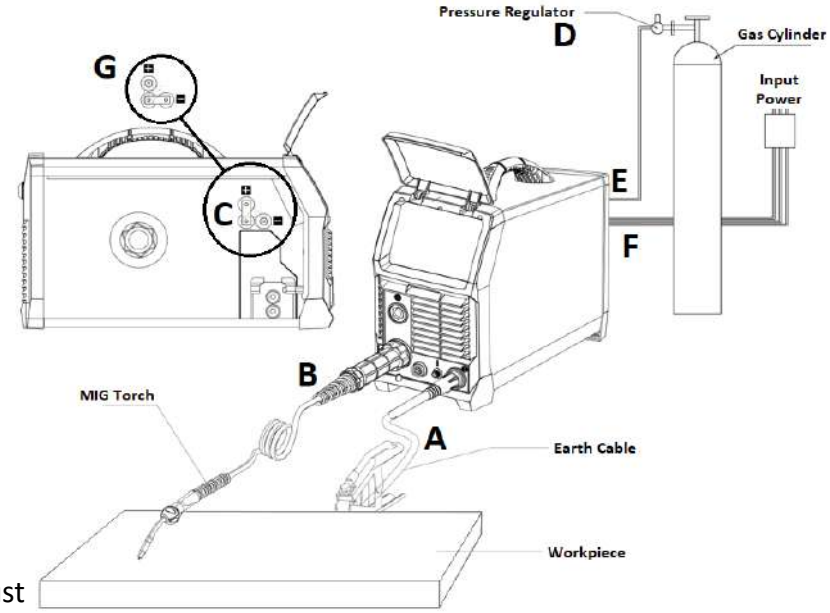
### MIG/MAG welding mode

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 as shown (B)
Work return lead to '-' (A)

Ensure that a suitable inert gas supply is connected (E).

Switch the power switch on the back panel to "ON" (F) the machine is started with the panel display coming ON.

Via the display navigate to welding mode and set welding mode to MIG or MIG synergic depending on your application.

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

Adjust the displays MIG settings on the machine control panel to get the correct desired welding condition of welding voltage, current etc (see page 17 for further info on the control panel display function)

Operate the torch trigger and welding can be carried out, (Note: Once the MIG torch switch is pressed, if no welding current is sensed within 5 seconds, wire feed, gas and output voltage will stop).

The below MIG wire guide can vary depending on material used, work piece thickness, welding position and joint form.

| Wire Diameter | DIP Transfer | | Spray Transfer | |
|---|---|---|---|---|
| (mm) | 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 |

### MIG - Gasless Welding

The operation method is the same as the above MIG operation except there are no gas options and the output polarity is reversed (G in above image).

**Please Note:**

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

# MULTIFUNCTIONAL DISPLAY WINDOW - MIG MODE

**Welding screen/display explained MU4-1**


Upon powering ON your WS-MU4-1 and boot up is complete, the control panels main menu will appear on the digital panel as shown above.

You can now navigate yourself though the various options and welding modes which include:
Settings, MIG Pulse, MIG Synergic, MIG Manual, Lift TIG, HF TIG, Smart TIG and MMA.

In the home screen, for MIG welding the following options are available:


MIG Pulse


MIG Synergic


MIG Manual

By rotating the main centre control dial you will 'scroll' through the options and by pressing the dial you will enter either MIG Pulse, MIG Synergic or MIG manual mode.

Conventional MIG welding equipment (MIG manual) run at a steady single amperage where the operator has access and controls of the wire feed speed rate and the welding voltage whereas with MIG pulsed welding the machine runs a peak and a background amperage and the unit will constantly switch between the two amperages enabling the operator to put out a lower overall heat input into the material.
One of the benefits of MIG pulse includes smoother spatter free welding to help prevent blowing through thin material.
When MIG synergic welding is referred to it means that when a single setting is adjusted (voltage or material thickness) the other settings like current or wire speed change automatically.

**Please Note:**
**When in the selection screens (as above) for MIG welding modes, pressing and holding either the bottom left or the bottom right buttons will give you the facility of 'Gas Test' or 'Wire Feed Inch' which are noted in the top line of the display.**

# MULTIFUNCTIONAL DISPLAY WINDOW - MIG MODE

**Welding screen/display explained MU4-1**

When selecting either MIG pulse or MIG Synergic mode, the operator has the option to select material, gas and wire size as shown below, this selection is carried out by rotating and pressing the main dial to select the desired option.

**Material selection choice is as follows:**

- FE - Mild Steel
- Flu.Fe - Flux Cored
- Ss - Stainless Steel
- AlMg - Aluminium Magnesium


**Gas selection choice is as follows:**

- 80% Ar  20%C02
- 100% C02


**Wire diameter size selection choice is as follows:**

- 0.6mm (0.024)
- 0.8mm (0.032)
- 0.9mm (0.035)
- 1.0mm (0.039)


At this point the bar along to bottom of the screen does show the operator welding mode, material, gas and wire size that have selected.

Once you have selected the key welding setup parameters as shown above, you will now enter the main welding screen that displays centrally your chosen MIG process, material, gas and wire size.



As the above screens show, the left circular section offers either current or wire feed setting and the right section shows voltage/arc length and these options can vary depending on which MIG process has been selected.
The bottom row shows, material thickness, torch trigger mode and inductance control and to adjust each setting, simply press the control dial until the parameter you wish to adjust is highlighted in red and then rotate the dial to adjust said parameter, pressing the control dial again stores that parameter setting.

When in Pulse MIG you have an additional feature called ‘Wire retract’ which is only effective when welding aluminum material. When ‘Wire Retract’ is set it ON (see page 32), at arc starting the welding wire will briefly retract when first touching the workpiece and the initial start current is lowered to enhance weld starting properties. When set to OFF the ’Wire Retract’ feature will not be active.

# MULTIFUNCTIONAL DISPLAY WINDOW - MIG MODE

**Welding screen/display explained MU4-1**


When selecting MIG manual, you will be taken directly to the welding screen shown left.
Now the left circular section offers just wire feed speed control and the right section shows voltage control, while the bottom row shows torch trigger mode and inductance control.
Again, to adjust each setting, simply press the control dial until the parameter you wish to adjust is highlighted in red and then rotate the dial to adjust said parameter, pressing the control dial again stores that parameter setting.

However depending on which MIG mode you have selected, further welding parameters are available and adjustable by following the next steps.
The selection and setting of advanced welding parameters can be carried out in the welding interface screen by pressing the bottom right button to enter the welding parameter setting interface;
In this welding parameter setting interface, press the control dial to select the parameter as required and rotate the dial to set a value for the selected parameter.



You will note from the above images that the selected parameter being adjusted is Pre-Flow Gas and the bottom bar shows the min setting (0.0) and the max setting of (20) seconds with the lines between going up/down depending where you set the adjustment rotating dial.

| Depending on welding process and torch trigger selection, welding parameters options available | Unit | Welding parameters range available by rotating the dial |
|---|---|---|
| Pre-flow | Seconds | 0 ~ 20 |
| Slow feed | Mm/min | 0 ~ 10 |
| Start current | % | 1 ~ 200 |
| Start current (arc length) | A | -10 ~ +10 (Pulse mode only) |
| Up Slope | Seconds | 0.0 ~ 20.0 |
| Welding Current Range | A | 25 ~ 110 (110V) / 25 ~ 200（230V） |
| Down Slope | Seconds | 0 ~ 20 |
| End Amp (current) | % | 1 ~ 200 |
| Final current (arc length) | - | -10 ~ +10 (Pulse mode only) |
| Burn Back | Seconds | 0 ~ 10 |
| Post-flow | Seconds | 0 ~ 20 |
| Wire Retract | - | ON or OFF |

**Please Note:**

- The above listed parameter options do change depending on which welding process and torch trigger mode you have selected.
- When in S2t and S4t trigger modes, the MIG Pulse and Synergic adjustable settings (as shown above) will offer additional changeable parameter that can be adjusted to suit the operator preferences.

# MULTIFUNCTIONAL DISPLAY WINDOW - MIG MODE

**Welding screen/display explained MU4-1**

When selecting MIG mode you can select various trigger modes noted within the red circles below.
Navigate to and highlight the lower bar central option (as circled below) as shown as 4T trigger mode.



Depending on which welding mode you are in, will determine which options you can select.

As with previous pages, to select a different trigger option, press the control dial until the 4T trigger (as in the case the above images show) is highlighted red and then rotate the dial to select with trigger option you require, pressing the control dial again stores that parameter selection.

**2T: normal trigger control**
In this mode the torch trigger must remain depressed for the welding output to stay active.
Press and hold the torch trigger to activate the power source (weld) then release the torch trigger switch to stop the welding process.

**4T: latch trigger control**
This light will illuminate when the power source is in 4T welding mode.
This mode of welding is mainly used for long welding runs to reduce operator finger fatigue.
In this mode the operator can press and release the torch trigger and the output will remain active.
To stop welding, the trigger switch must again be depressed and released. This function eliminates the need for the operator to hold the torch trigger.

**Spot weld mode**
When spot is selected, this offers the operator a pre-determined time for the weld time to be active.
Once selected, to adjust the spot weld time you must first access the advanced parameter feature screen (by pressing bottom right control button when in the above screen) then rotate the control knob until the spot icon (top right) is highlighted, then pressing the control knob allows you to adjustment the spot welding time. Spot time is adjustable between 0.5 ~ 20 seconds.

**S2t: Special 2T control**
Different from normal 2T, you can set 'Start Current Percent' and 'Start Current Time' in S2t mode.
If you press the gun torch, output current will start from the 'Start Current' and become 'Peak Current' after the 'Start Current Time'. This function is useful when welding aluminium.
To access S2t the feature, please see page 21.

**S4t: Special 4T control**
In S4t mode, you can set 'Start Current Percent' and 'End Current Percent'.
If you press the gun torch first time, output current will start from the 'Start Current'.
Next if you release the gun torch, current will become 'Peak Current', next if you press the gun torch again, current will become 'End Current'.
To access S4t feature, please see page 21.

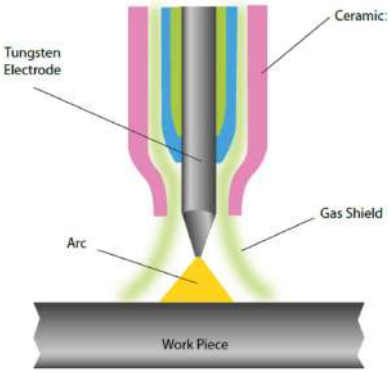
Please Note: The Wire Retract function works in S2t and S4t mode (see page 20 for further details)

# 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 personnel within the welding area.**

**TIG welding mode**

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



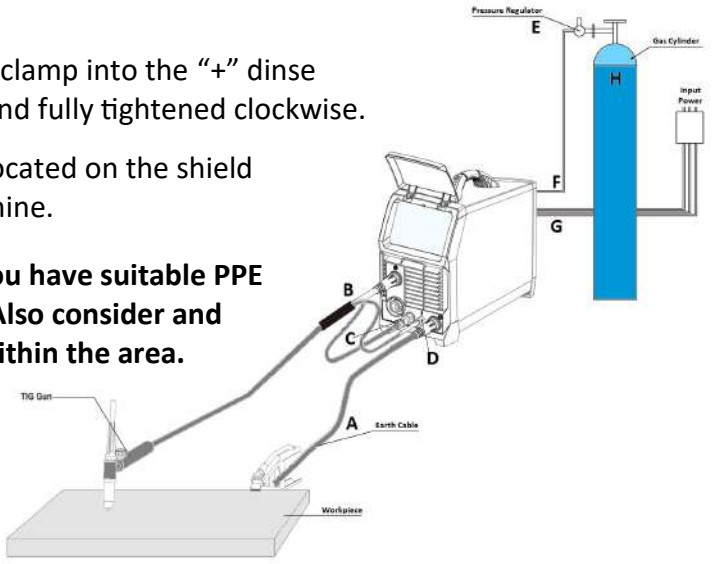

TIG welding is an arc welding process that uses a non-consumable tungsten electrode to produce the heat for welding.

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.

Connect the TIG torch power connection to the "-" dinse connector and fully tighten clockwise. Also connect the torch trigger plug and gas connection to the relevant connections on the front panel.

Insert the work return lead cable plug for the work clamp into the "+" dinse socket on the front panel of the welding machine and fully tightened clockwise.

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 PPE including eye protection and protective clothing. Also consider and take the necessary steps to protect any persons within the area.**

Now you will need to switch the power switch on the back panel to "ON"

Access the welding mode choice option via the digital display on the user control panel and then select the TIG mode option, you will also have the choice to choose either HF or lift TIG function.

Set the required amperage (along with other TIG parameter functions) via the digital control panel suitable for the application and TIG tungsten being used (see below guide).

Ensure you have adequate welding current according to the thickness of the work and weld prep being carried out and filler wire being used.

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

Open the gas valve of the cylinder, press the torch trigger and adjust the gas regulator to obtain the desired flow rate.

Once welding is complete release the torch trigger switch which will stop the welding arc but ensure you leave the torch in place to shield the weld with gas for a few seconds until the preset post flow gas turns off.

Please see page 22 for further parameter control options for TIG welding.

# MULTIFUNCTIONAL DISPLAY WINDOW - TIG MODE

**Welding screen/display explained MU4-1**


Upon powering ON your MU4-1 and boot up is complete, the control panels main menu will appear on the digital panel as shown above.
You can now navigate yourself through the various options and welding modes which include: Settings, MIG Pulse, MIG Synergic, MIG Manual, Lift TIG, HF TIG, Smart TIG and MMA.

In the home screen, for TIG welding the following options are available:


LIFT TIG


HF TIG


SMART TIG

By rotating the main centre control dial you will 'scroll' through the options and by pressing the dial you will enter either Lift TIG, HF TIG or Smart TIG.
Once you have selected either of the above TIG options you will then be able to navigate further options of DC, AC along with various AC waveforms, Pulse, slope, 2T/4T and many more.
The following pages will explain this in a little more details.

# MULTIFUNCTIONAL DISPLAY WINDOW - TIG MODE

**Welding screen/display explained MU4-1**

When selecting LIFT TIG or HF TIG, you will be taken directly to the welding screen shown below.



Note that the left circular section offers TIG welding current control and the right section shows TIG voltage, while the bottom row shows Pulse, torch trigger mode and DC/AC output selection.
Again, to adjust each setting, simply press the control dial until the parameter you wish to adjust is highlighted in red and then rotate the dial to adjust said parameter, pressing the control dial again stores that parameter setting.

However, when selecting Smart TIG Mode which gives the operator the options to select Material, Joint Type and Material Thickness as shown below, this selection is carried out by rotating and pressing the main dial to select the desired option.




Material type selection choice is as follows:
- FE - Mild Steel
- SS - Stainless Steel
- Al - Aluminium

Joint Type choice is as follows:
- Butt Joint
- Fillet Joint
- Lap Joint

Material thickness selection choice is as follows:
- 1.0mm (0.039in)
- 1.5mm (0.059in)
- 2.0mm (0.079in)
- 2.5mm (0.098in)
- 3.0mm (0.119)

At this point the bar along to bottom of the screen will update showing the operator material, welding joint and material thickness selected and once the 3rd option is selected you will switch to the screen shown right.

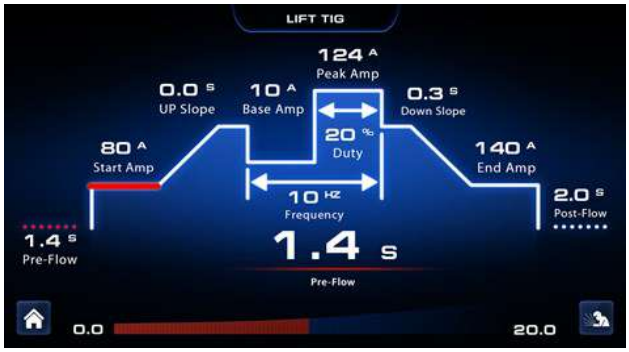

Within this screen, the left circular section offers TIG welding current control and the right section shows TIG voltage, while the bottom row (left to right) shows Tungsten size, gas mix with recommended gas flow rate, 2T torch trigger mode, recommended filler wire size, DC output and pulse being OFF.
To adjust each setting, press the control dial until the parameter you wish to adjust is highlighted in red, then rotate the dial to adjust said parameter, pressing the control dial again stores that parameter setting.

# MULTIFUNCTIONAL DISPLAY WINDOW - TIG MODE

**Welding screen/display explained MU4-1**

Whether you have previously selected LIFT TIG, HF TIG or Smart TIG, the selection and setting of advanced welding parameters can be carried out in the welding interface screen by pressing the right button to enter the welding parameter setting interface.

In this welding parameter setting interface, pressing the control dial will select the various parameter in turn and once the required parameter is highlighted in red, rotate the dial to set a value for the selected parameter.




You will note from the image right that the selected parameter being adjusted is Start Amps and you will also note that the bottom bar shows the minimum setting (0.0) and a maximum setting of (200) amps with the variable red bar between going up/down depending where you set the adjustment rotating dial.

**Additional TIG features**

As with the above, whether you have selected LIFT TIG, HF TIG or Smart TIG, AC or DC, the option of further advanced welding parameters are possible, the following parameters which can be accessed via the welding interface screen by pressing the bottom right button to enter the welding parameter setting interface screen.

In this welding parameter setting interface, pressing the control dial will select the various parameter in turn and once the required parameter is highlighted in red, rotate the dial to set a value for the selected parameter.

| Depending on welding process and torch trigger selection, welding parameters options available | Unit | Welding parameters range available by rotating the dial |
|---|---|---|
| Pre-flow | Seconds | 0 ~ 20 |
| Start current | A | 1 ~ 200 |
| Up Slope | Seconds | 0 ~ 20 |
| Down Slope | Seconds | 0 ~ 20 |
| End current | A | 1 ~ 200 |
| Post-flow | Seconds | 0 ~ 20 |
| Duty | % | 5 ~ 95 |
| Frequency | Hz | 0.5 ~ 999 |
| Balance | - | -5 ~ +5 |
| AC Frequency | Hz | 50 ~ 250 |
| Base Amps | A | 10 ~ 200 |
| Spot Time | S | 0.1 ~ 10 |
| Tungsten size choice | mm | 1 ~ 4 |
| Q Start (DC TIG only) | S | 0 ~ 60 |
| Dynamic Arc (DC TIG only) | A | 0 ~ 50 |
| Multitack (DC TIG only) | Hz | 0 ~ 6 |
| Extra Fusion (AC TIG only) | % | 0 ~ 80 |
| Mix AC/DC (AC TIG only) | % | 0 ~ 80 |

**Please Note:** The listed advanced parameter options do change depending on which welding process and torch trigger mode you have selected and the below shows the parameters adjustable range.

# MULTIFUNCTIONAL DISPLAY WINDOW - TIG MODE

**Welding screen/display explained MU4-1**

Depending on which welding mode you are in, will determine which options you can select.

As with previous pages, to select a different trigger option, press the control dial until the 2T tigger mode (shown in the image right) is highlighted red and then rotate the dial to select with trigger option you require, pressing the control dial again stores that parameter selection.


**2T: normal trigger control**
In this mode the TIG torch trigger must remain depressed for the welding output to stay active.
Press and hold the torch trigger to activate the power source (weld) then release the torch trigger to stop the welding process.

**4T: latch trigger control**
4T (latch) mode is mainly used for long welding runs to reduce operator finger fatigue. In this mode the operator can press the TIG torch trigger, start the weld process and then release the torch trigger and welding will remain active.
To stop welding, the trigger switch must again be depressed and released.
This function eliminates the need for the operator to hold the torch trigger.

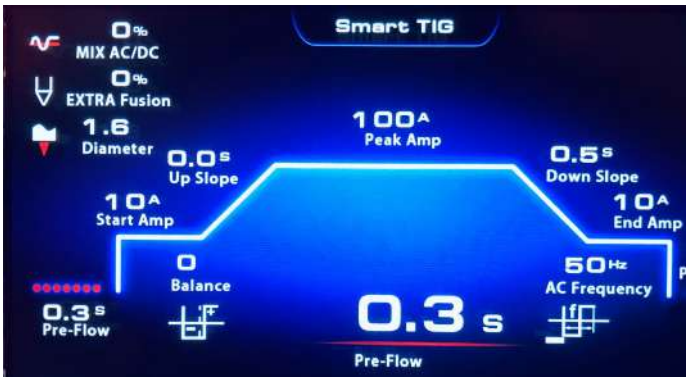
**Repeat Trigger Mode**
The repeat function is operated during the down slope cycle of the Slope Sequence and is active through the down slope period only. During the down slope period by opening the TIG torch Switch the current will increase back to weld current. Within the Down Slope period the repeat function can be operated as many times as required.
To continue slope cycle and end slope sequence keep the torch switch pressed and allow weld current to reach final current setting.
Once final current setting is reached depressing the TIG torch switch again will turn OFF the welding arc and post flow begins.

**Spot weld mode**
When spot is selected, this offers the operator a pre-determined time for the weld time to be active. Once selected, to adjust the spot weld time you must first access the advanced parameter feature screen (by pressing the bottom right control button when in the above screen) then rotate the control knob until the spot icon (top right) is highlighted, then pressing the control knob allows you to adjustment the spot welding time.
Spot time is adjustable between 0.1 ~ 10 seconds.

# MULTIFUNCTIONAL DISPLAY WINDOW - TIG MODE

**Welding screen/display explained MU4-1**

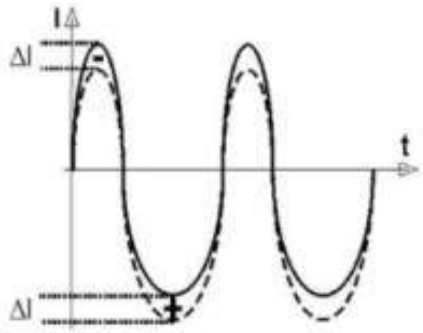
**Additional TIG features continued**




**MIX AC/DC**
AC wave in AC/DC, this parameter serves to set the AC wave percentage with respect to the DC current output.

The consequences of a higher value:
- Greater weld penetration.
- Less deformation.
- Faster creation of the weld pool.
- Reduced cleanliness of the workpiece.

**EXTRA Fusion**
This parameter establishes the percentage of the positive current wave (pickling) that is subtracted and added to the negative current (fusion).
The image right shows the positive wave interval AI that, if subtracted and added to the negative wave, forms the new form of broken line wave.




The consequences of a higher value:
- Tighter arc.
- Greater weld penetration.
- Reduced pickling.
- Loss of arc.
- Less deformation of the electrode.

**Q-Start**
This parameter allows the unit to start in synergic pulsed TIG mode for the preset time interval, before switching automatically to the welding Mode parameters already selected on the interface panel.
The Q-start parameter creates a weld pool faster with respect to the standard starting procedure.
This parameter is useful when spot welding thin gauge material.


**Dynamic ARC**
Welding power remains constant even when the distance between electrode and workpiece changes, the consequences of a higher value are:

- The welding arc concentration remains unchanged.
- Prevents electrode sticking.
- Thin workpieces may become deformed more easily.

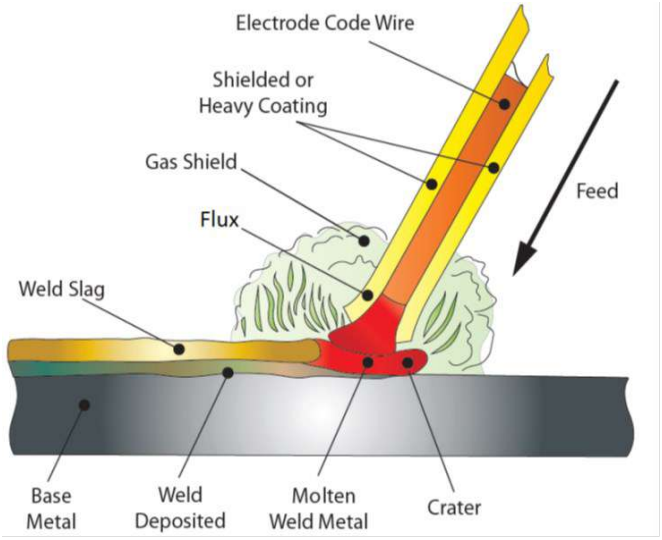
**Multitrack**
This parameter allows thin gauge sheet to be welded without deformation, the consequences of a higher value:

- Welding of thinner gauge sheet without deformation.
- Less melting of material, slower welding process.

# 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 personnel within the welding area.**

**MMA welding mode**



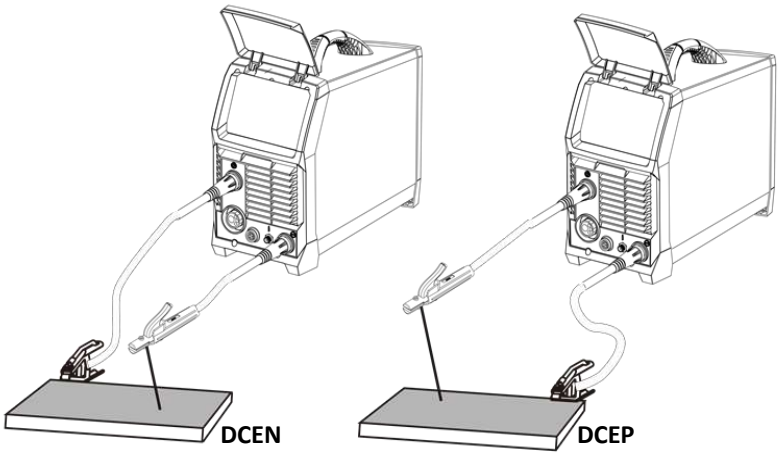

MMA (Manual Metal Arc), SMAW (Shielded Metal Arc Welding) or just Stick Welding.
Stick welding is an arc welding process which melts and joins metals by heating them with an arc between a covered metal electrode and the work.

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 uniformed 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”.




Using the control display navigate to the MMA mode, select MMA by switching to the MMA position. There is now open circuit voltage output at both output terminals, (see page 20 for further info on the control panel display function).

Ensure you check that you have the electrode polarity correct (See image left).

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

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

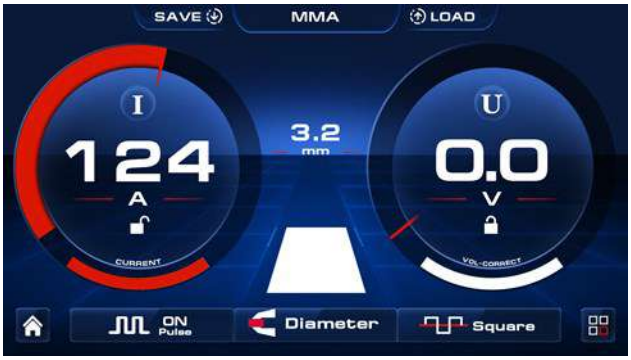
| Electrode Diameter (mm) | Recommended Welding Current (A) |
|---|---|
| 1.6 | 25 ~ 45 |
| 2.0 | 35 ~ 65 |
| 2.5 | 50 ~ 90 |
| 3.2 | 60 ~ 130 |
| 4.0 | 100 ~ 180 |
| 5.0 | 150 ~ 250 |
| 6.0 | 200 ~ 310 |

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

# MULTIFUNCTIONAL DISPLAY WINDOW - MMA MODE

**Welding screen/display explained MU4-1**


Upon powering ON your MU4-1 and boot up is complete, the control panels main menu will appear on the digital panel as shown above, rotate the control dial until the MMA welding option is center and then press the dial to access this welding mode.



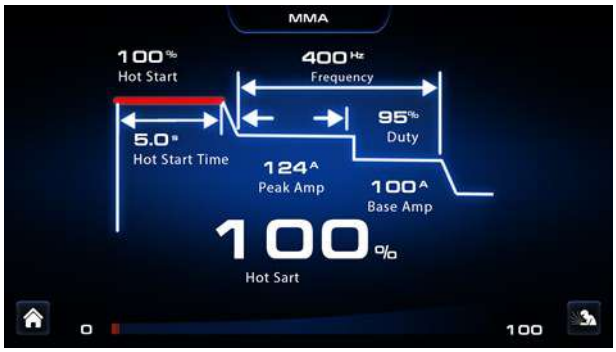

In the image right you can see how the MMA screen setup, the left dial is the preset welding amperage and in the right dial shows the associated welding voltage and in the centre it shows the selected MMA electrode size (3.2mm in this case).
The bottom row shows MMA pulse ON/OFF, welding electrode diameter and choosing between DC or AC welding output.

From this screen you can also select and control advanced MMA welding parameters via the icon  by pressing the right button to enter the welding parameter setting interface.

The following page will explain this in a little more detail.

# MULTIFUNCTIONAL DISPLAY WINDOW - MMA MODE

**Welding screen/display explained MU4-1**




**MMA Welding parameter adjustments**

The image to the right shows the process flow of MMA welding, Hot Start current with hot start time, if AC is selected then AC frequency and AC duty is adjustable as shown as well as other parameters.

You will note from the image right that the selected parameter being adjusted is Hot Start and you will also note that the bottom bar shows the minimum setting (0) and the maximum setting of (100) % with the variable red bar between going up/down depending where you set the adjustment rotating dial.

In this welding MMA parameter setting interface, pressing the control dial will select the various parameter in turn and once the required parameter is highlighted in red, rotate the dial to set a value for the selected parameter.

**Please Note:**

**The above shown advanced parameter screen options and the listed below do change depending on whether AC or DC have been selected along with pulse being ON or OFF.**

The chart below shows some of the parameters available and there adjustable range.

| Accessible welding parameters | Unit | Parameters range |
|---|---|---|
| Hot start | % | 0 ~ 100 |
| Hot start time | Seconds | 0.5 ~ 5.0 |
| Arc force | A | 0 ~ 100 |
| Duty | % | 5 ~ 95 |
| Frequency | Hz | 0.5 ~ 400 |
| Peak Amp | A | 10 ~ 110 (110V input)<br>10 ~ 200 (230V input) |
| Base Amp | A | 10 ~ 110 (110V input)<br>10 ~ 200 (230V input) |

**VRD**

Voltage Reduction Device is an in-built electrical circuit which is used in the MMA mode to reduce the OCV to a safe voltage of less than 13V when the machine is in idle.


**Activating VRD**

Press and hold together for approx. 3 seconds buttons A and C, then release. You will then be taken to the 'hidden' VRD screen that allows you to turn VRD ON or OFF by rotating the control dial clockwise or anti clockwise to turn VRD ON or OFF.

Upon selecting your required status, press button A which will save the VRD setting and return you to the MMA welding mode screen.


Upon returning to the MMA screen you will now note that the U (OCV) voltage is now under 13V and located centrally it states that VRD is ON (as shown left).

# MULTIFUNCTIONAL DISPLAY WINDOW - SETTINGS

**Welding screen/display explained MU4-1**


The ‘Settings’ parameter adjustment section can be accessed by rotating the control dial (B) until the settings icon is front and centre (as image right shows) then press to enter the setting interface which is shown below.


The settings page is divided into two sections ‘general’ and ‘machine’ and to switch between these two tabs simply press button ’C’ and the tab selected will be highlighted in red.

Within the general tab you can rotate the control dial ‘B’ which will scroll the operator through the options of Languages, Brightness, Beeper, Unit, Information, Factory Reset and Program Update and when you press the control dial you will access the chosen option, in the above image case you can see that the ‘General’ tab and then the ‘Language’ tab is selected.
You can now select further language options (if available) by rotating the control dial again and pressing the control dial ‘C’ to confirm your selection.

Pressing the button ’A’ will take you back to the main menu.

The below information shows the available options within the settings section.

| Options | Welding parameters available by press the control dial | Welding parameters available by rotating the control dial |
|---|---|---|
| General | Languages | English<br>(other languages are available by request) |
| | Screen Brightness | Adjustable between 1 - 10 |
| | Beeper | ON or OFF |
| | Unit | Metric or Imperial |
| | Information | Version details |
| | Factory Reset | Restoring to factory setting |
| | Program Update | Updating program (USB port) |
| Machine | Fan | Normal (Permanently on)<br>Smart (Fan on demand) |
| | Wireless Control | Connecting a<br>Wireless Remote or Wireless Control |
| | Wire Retract | ON or OFF (see page 9) |
| | Remote control | Off or Remote |

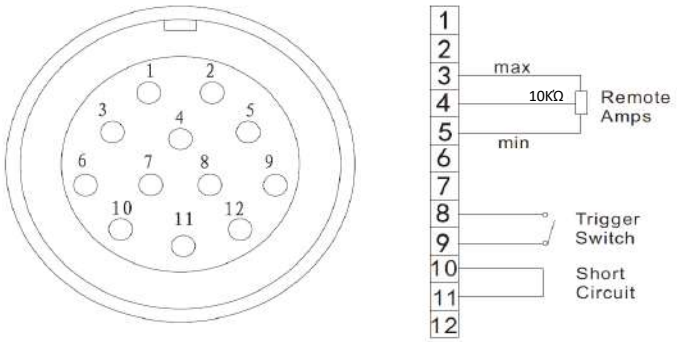
# REMOTE CONTROL WIRED

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

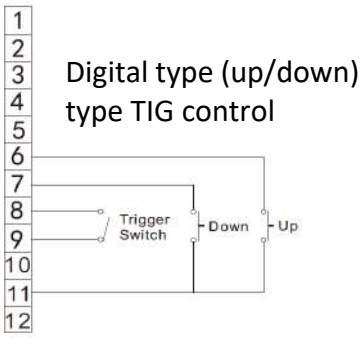
**Remote control socket**

The 12 pin remote control socket located on the front panel is used to connect a TIG torch trigger with switch and/or torch mounted 'analogue' current adjustment dial, a digital type mounted torch control, a foot pedal for TIG welding.

**Remote socket pin and wiring configuration**




**Analogue potentiometer type TIG Control**




**Digital type TIG Control**


Generic library pictures

The Weld Star TIG welding machine can accept a remote current control signal from a analogue type potentiometer (A) or from a digital up/down button (B) arrangement source as shown below to the right.

(A) Using a 10K Potentiometer remote control will change the current from 5amp to maximum set using the machine current control.
(B) Using an up/ down button remote signal, the current may be increased or decreased in 1A increments, or 'scrolls' up to 30A at a time if the button is held down.

Before starting to use a wired remote control, see page 61 for instructions on activating remote control.

**TIG torch with remote amperage control via a potentiometer**

Connect the TIG torch control plug to the machines 12 pin remote socket and place the machine torch trigger mode into 4T (see from page 22).
Press the TIG torch switch to start the machine output functions. The finger controlled torch handle mounted current potentiometer controls the welding amperage (by rotating clockwise/anti clockwise) up to the already pre-set level set on the welding power source control panel.
With a TIG torch current control connected, the machines digital ammeter will display the pre-set preview amps until the torch switch is pressed, when welding commences it will then display actual welding current depending on where your torch mounted potentiometer is positioned.

**Foot pedal amperage control**

Connect the foot pedal control plug to the machines 12 pin remote socket and place the torch trigger mode into 2T (see page 22). Press the foot pedal down to start the machine output functions.
The foot control potentiometer controls the welding current up to the preset level set on the welding power source control panel.
With the foot control connected, the panel digital ammeter will display the pre-set preview amps until the foot control is depressed then it displays actual welding current when welding.

**Please note:**

**The maximum output current must be set on the power source control panel by the user prior to the foot control being connected.**

# REMOTE CONTROL - WIRELESS

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

**Wireless control**

The Weld Star WS-MU4-1 is equipped with in-built wireless technology and can accept a wireless remote foot current control signal from a wireless foot pedal which offers greater flexibility to the operator.


Please follow the below instruction on pairing a wireless remote control.

The 'Settings' parameter adjustment section can be accessed by rotating the control dial (B) until the settings icon is front and centre (as image right shows) then press to enter the setting interface which is shown below right.

The settings page is divided into two sections 'general' and 'machine' and to switch between these two tabs, when machine is highlighted press button 'C' and the Machine tab will now be highlighted in red.


Within the machine tab you can rotate the control dial 'B' which will scroll through machine options of Fan, Wireless, Wire Retract and Remote control, press the control dial when Wireless is highlighted to access.

Once in the wireless connect menu screen you will see the options to choose from:

- Wireless Foot Pedal 'unconnected'
- Wireless Remote Control 'Unconnected'

At this point, turn ON your optional wireless foot pedal.

On the wireless menu screen, highlight and select 'wireless remote control' and the screen will change to say 'Connecting' and shows an image of a foot pressing down on a foot pedal.

As shown, now press down on the foot pedal which will start the pairing process

Once the machine and the foot pedal have connected the screen will show 'paired successfully' and show 'Connected' under the wireless foot pedal image.

**Turning remote control ON and OFF**

Once you have either connected a Wired or Wireless remote control, you now need to the remote control command from panel to remote and you do this by selecting, setting, machine and then the Remote Control option icon on the left side of the screen, once in this option menu you will be able to ON (or OFF) remote control. ON for remote control and OFF for panel current control.

Pressing button 'A' will save your settings and take you back to the main menu screen.

# MAINTENANCE

**The following operation requires sufficient professional knowledge on electrical/electronic 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 safely, it must be maintained regularly. Operators should understand the maintenance methods and be conversant with operating arc welding machines. This guide should enable customers to carry out simple examination and safeguarding by themselves, so as to reduce the fault rate and repair times of the arc welding machine, and so lengthen service life of the MIG welding machine.

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

⇒ **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 electrical/electronic 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 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<br>The machine fan may not be functional<br>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<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 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<br>Insufficient cooling air<br>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<br>Faulty MIG torch switch |
| Machine error codes | See the following troubleshooting page for further detail on error codes (page 37) |

# ERROR CODES

**The following operation requires sufficient professional knowledge on electrical/electronic 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!

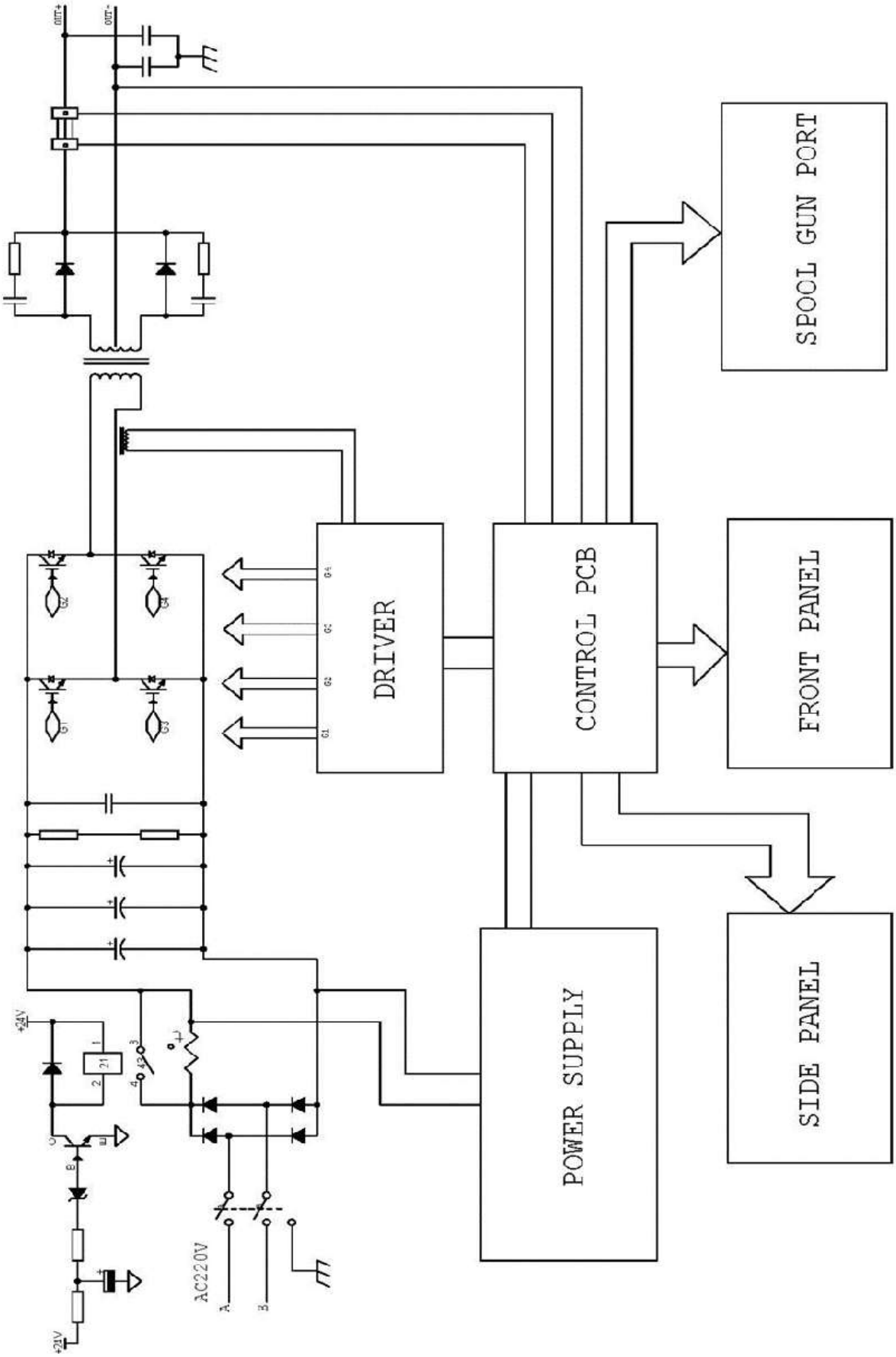
Only professional maintenance personnel should repair the machine!

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

| Error Type | Error code | Description | Lamp status |
|---|---|---|---|
| Thermal relay | E01 | Over-heating(1st thermal relay) | Yellow lamp (thermal protection) always on |
| | E02 | Over-heating(2nd thermal relay) | Yellow lamp (thermal protection) always on |
| | E03 | Over-heating(3rd thermal relay) | Yellow lamp (thermal protection) always on |
| | E04 | Over-heating(4th thermal relay) | Yellow lamp (thermal protection) always on |
| | E09 | Over-heating (Program in default) | Yellow lamp (thermal protection) always on |
| Welding machine | E10 | Phase loss | Yellow lamp (thermal protection) always on |
| | E11 | No water | Yellow lamp (lack of coolant) always on |
| | E12 | No gas | Red lamp always on |
| | E13 | Under voltage | Yellow lamp (thermal protection) always on |
| | E14 | Over voltage | Yellow lamp (thermal protection) always on |
| | E15 | Over current | Yellow lamp (thermal protection) always on |
| | E16 | Wire feeder over load | - |
| Switch | E20 | Button fault on operating panel when switch on the machine | Yellow lamp (thermal protection) always on |
| | E21 | Other faults on operating panel when switch on the machine | Yellow lamp (thermal protection) always on |
| | E22 | Torch fault when switch on the machine | Yellow lamp (thermal protection) always on |
| | E23 | Torch fault during normal working process | Yellow lamp (thermal protection) always on |
| Accessory | E30 | Cutting torch disconnection | Red lamp blink |
| | E31 | Water cooler disconnection | Yellow lamp (lack water) always on |
| Communication | E40 | Connection problem between wire feeder and power source | - |
| | E41 | Communication error | - |

# ELECTRICAL SCHEMATIC

**The following operation requires sufficient professional knowledge on electrical/electronic 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.**



# 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.
Weld Star 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.

**Model:**

**Weld Star WS-MU4-1 ACDC**

**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.

# CE 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**
Weld Star WS-200P ACDC

**Authorised Representative**
Wilkinson Star Limited
Shield Drive,
Wardley Industrial Estate
Worsley
Manchester
M28 2WD

Signature

Dr John A Wilkinson OBE

Position Chairman

**Date**

WILKINSON STAR LIMITED Company Registration No. 01758127

Company stamp

# STATEMENT OF WARRANTY

All Weld Star welding, plasma multi-process machines sold through our partner Wilkinson Star Ltd within the United Kingdom, Ireland and Europe shall be warrantied to the original owner, non transferable, against failure due to defective materials or production.
The warranty period is 5 years following the date of purchase.
We recommend you register your product within 28 days of purchase via the registration page via the Weld Star product website www.weldstar.uk
The original invoice is documentation for the standard warranty period.
The warranty period is based on a single shift pattern.

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

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

In the unlikely event of a problem, this should be reported to the Wilkinson Star Ltd 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.

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

Wilkinson Star Ltd 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 Wilkinson Star Ltd.
The replaced part(s) remain(s) Wilkinson Star Ltd 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.

# OPTIONS AND ACCESSORIES

| Part Number | Description |
|---|---|
| T240-3 * | MIG Torch 3mtr Euro |
| T240-4 | MIG Torch 4mtr Euro |
| T240-5 | MIG Torch 5mtr Euro |
| WCS25-3LDT * | Welding Cable Set (MMA) 3m |
| WC-2-03LD | Electrode Holder and Lead 3m |
| EC-2-03LD | Work Return Lead and Clamp 3m |
| TIG-103 * | Titanium 26 Tig Torch 12ft c/w Dinse Adaptor |
| TIG-103-8 | Titanium 26 Tig Torch 25ft c/w Dinse Adaptor |
| CP3550 | Cable Plug 35-50mm |
| SSARG2G * | Single Stage 2 Gauge Argon Regulator |
| CRH14 * | 2mtr Gas Hose |
| WS-T2 | 2 Wheel Trolley |
| 10055168 | “V” Groove 0.6mm/0.8mm |
| 10036428 * | “V” Groove 0.8mm/1.0mm |
| 10039481 | "V" Groove 1.0mm/1.2mm |
| 10029899 | "U" Groove 0.8mm/1.0mm |
| 10016532 | "U" Groove 1.0mm/1.2mm |
| WS-WFCP | Wired Foot Pedal |
| WS-WLFCP | Wireless Foot Pedal |
| * supplied as standard with new machine | |

# MEMORY STORAGE

Use the below section to list your stored program channel numbers that you have created and stored for specific welding tasks.

| Channel Memory | Welding process MMA, MIG or TIG | Job number or Description of welding job |
|---|---|---|
| C00 | | |
| C01 | | |
| C02 | | |
| C03 | | |
| C04 | | |
| C05 | | |
| C06 | | |
| C07 | | |
| C08 | | |
| C09 | | |
| C10 | | |

# NOTES

# WELD STAR | INFINIUM

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59 A family business engineered through generations **since 1971**

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