

# SifWELD®



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## SifWeld Evolution MTS400 SYN



# Operation Manual



## TSXE3D400MTS

## DECLARATION OF CONFORMITY

The Low voltage Directive 2006/95/EC of 12 December 2006, entering into force 16 January 2007  
The EMC Directive 2004/108/EC, entering into force 20 July 2007  
The RoSH Directive 2011/65/EC, entering into force 2 January 2013

**Type of Equipment**

Welding power source for MIG/MAG, TIG/TAG, MMA welding

**Brand name or trade mark**

SifWeld® Evolution

**Type designation etc.**

MTS400 SYN

**Manufacturer or his authorised representative established within the EEA****Name, address, telephone no, fax no**

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**The following harmonised standard in force with the EEA has been used in the design:**

EN60974-1- Arc welding equipment- Part 1: Welding power sources  
EN60974-10 Arc welding equipment - Part 10: Electromagnetic Compatibility (EMC) requirements

Additional information: restrictive use, Class A equipment, intended for use in locations other than residential

**By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative established within the EEA, that the equipment in question complies with the safety requirements stated above.**

Place and Date  
Letchworth, UK  
01-04-2015

Signature



Keith Mullan

Position  
Quality Manager  
Weldability Sif

**WEEE Directive & Product Disposal**

*At the end of its serviceable life, this product should not be treated as household or general waste. It should be handed over to the applicable collection point for the recycling of electrical and electronic equipment, or returned to the supplier for disposal.*



# Safety Guidelines

These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted. 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. Operators should respect the safety of other persons.

## Prevention against electric shock

The equipment should be installed by a qualified person and in accordance with current standards in operation. It is the user's responsibility to ensure that the equipment is connected to a suitable power supply. Consult with your utility supplier if required. If earth grounding of the work piece is required, ground it directly with a separate cable. 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. Cables (both primary supply and welding) should be regularly checked for damage and overheating. Do not use worn, damaged, under sized or poorly jointed cables. Ensure that you wear the correct protective clothing, gloves, head and eye protection. Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work ground. Never touch the electrode if you are in contact with the work ground, or another electrode from a different machine. 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 manufacturer's instructions.

## Safety against fumes and welding gases

Locate the equipment in a well-ventilated position. Keep your head out of the fumes. Do not breathe the fumes. Ensure the welding zone is in a well-ventilated area. If this is not possible provision should be made for suitable fume extraction. If ventilation is poor, wear an approved 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. Do not weld on coated metals, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings on many metals can give off toxic fumes if welded.

## Prevention against burns and radiation

Arc rays from the welding process produce intense, visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Wear an approved welding helmet fitted with a proper 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. The sparks and spatter from welding, hot work pieces, and hot equipment can cause fires and burns. Welding on closed containers, such as tanks, drums, or pipes, can cause them to explode. Accidental contact of electrode to metal objects can cause arcs, explosion, overheating, or fire. Check and be sure the area is safe and clear of inflammable material before carrying out any welding.

**Protection against noise**

Some welding and cutting operations may produce noise. Wear safety ear protection to protect your hearing.

**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 toward your body. Always ensure machine covers and protective devices are in operation.

**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 cutting / welding area. Remove all flammable and combustible materials from the cutting / welding zone and surrounding areas. Do not cut/weld fuel and lubricant containers, even if empty. These must be carefully cleaned before they can be cut/welded. Always allow the cut/welded 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.

**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.

**RF Declaration**

Equipment that complies with directive 2004/108/EC 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 absorbcency 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

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.

### Handling of Compressed gas cylinders and regulators

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. Never deface or alter any cylinder.



**The following signs and explanations are to remind the user of the potential risks involved and the dangers of misuse or mistreatment of the welding machine.**



**RUNNING PARTS MAY BE DANGEROUS!**

Keep away from running components, including the fan.



**ELECTRIC SHOCKS CAN KILL!**

Never touch electrical parts. Keep the equipment in good condition, replace damaged parts, undertake regular maintenance according to the instructions.



**BE AWARE OF SPARKS AND SPATTER**

Wear protective clothing, such as leather gloves, Flame retardant overalls, boots and eyewear.



**DO NOT TOUCH THERMAL COMPONENTS!**

Thermal components may cause severe burns when in contact with unprotected skin.

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# 1. Preface

## 1.1 General

### **Congratulations on choosing your SifWeld Evolution MTS400SYN welding machine.**

Used correctly, SifWeld products can significantly increase the productivity of your welding, and provide years of economical service. This operating manual contains important information on the use, maintenance and safety of your SifWeld product. Please read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on SifWeld products, consult an authorised SifWeld dealer, or visit the SifWeld web site at [www.sifweld.com](http://www.sifweld.com). The specifications presented in this manual are subject to change without prior notice.

### **Important notes**

Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with the **'NOTE!'** notation. Read these sections carefully and follow their instructions.

### **Disclaimer**

While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. We reserve the right to change the specification of the product described at any time without prior notice. Do not copy, record, reproduce or transmit the contents of this guide without prior permission.

## 1.2 Introduction

The SifWELD MTS400SYN is a professional, microprocessor-controlled inverter welding package for MIG, MMA & Lift-TIG applications .

With 100% Duty Cycle at 400A and 60% at 500A this machine is the ideal work horse for high production manufacturing in air cooled or water cooled versions. Using the built in synergic facility the machine will automatically give the optimum welding parameters for the specific material, wire size and shielding gas.

Featuring IGBT technology and providing a lightweight, multi-process machine. A separate wire feed system with full feature control.

### Features

- 500A, Three phase MIG welding machine with separate wire feed unit
- Synergic or manual settings
- Very high duty cycle, 100% at 400A, 60% at 500A
- Perfect machine for high production environment.
- Supervisor lock out included
- Full digital control with large colour LCD Screen for showing and changing all welding parameters on both the power source and the WFU.
- 15Kg Reel or Bulk Drum
- Water cooled or air cooled ready to weld packages.
- 5M or 10M interconnect cable
- 25m interconnect cable for special applications



## 1.3 Technical Specifications

### SifWeldEvolution MTS400 SYN

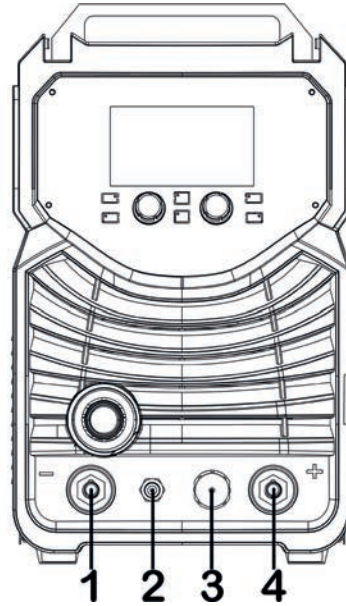
Input Voltage (V)	3~400±10%		
Frequency (HZ)	50/60		
	MIG	TIG	MMA
Input Current (A)	41	33.1	41.8
Input Power (KW)	28.4	22.9	28.9
Welding Current (A)	40~500	10~500	10~500
Welding Voltage (V)	16~39	10.4~30	20.4~40
No-load Voltage (V)	58.1	70.1	67.1
Duty cycle (40°C)		60% 500A 100% 400A	
Diameter (mm)	Fe: 0.6/0.9/1.0/1.2/1.6 SS: 0.8/0.9/1.0/1.2/1.6 Flux-Cored: 0.6/0.8/0.9/1.0/1.2/1.6 Al: 1.0/1.2/1.6		
Protection class	IP21S		
Circuit breaker	D32A		
Dimensions (mm)	620 x 260 x 430		
Weight (Kg)	33.8		
Power Factor	0.75		

## 1.4 Overview of Machine

### Front View

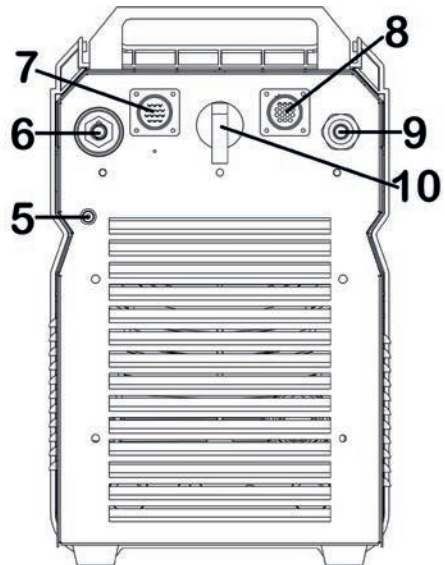
Power Source Front Panel Layout

1. Negative Output
2. Gas outlet
3. TIG gun control connector.
4. Positive Output



### Rear View

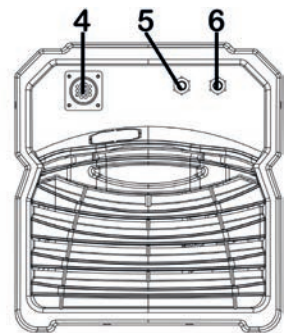
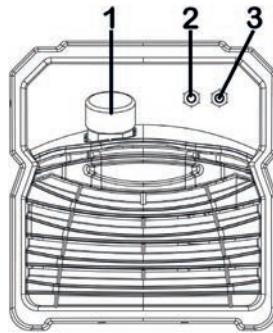
5. Gas Inlet
6. Positive Output
7. Wire feeder connector
8. Water Cooler connector
9. Power source input
10. Power switch



**Front View**

Water Cooler Front Panel Layout

1. Intake: From here, water or coolant, antifreeze, etc. can be injected into tank.
2. Water outlet for TIG (blue).
3. Water inlet for TIG (red).

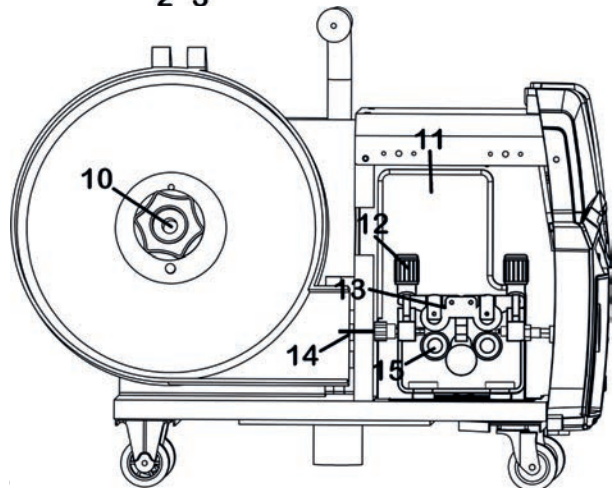
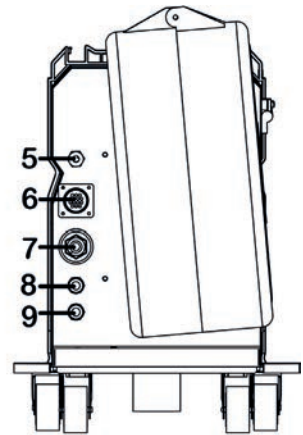
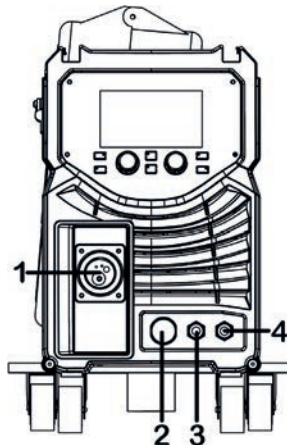


**Rear View**

4. The water cooler control connector.
5. Water outlet for MIG (blue).
6. Water inlet for MIG (red).

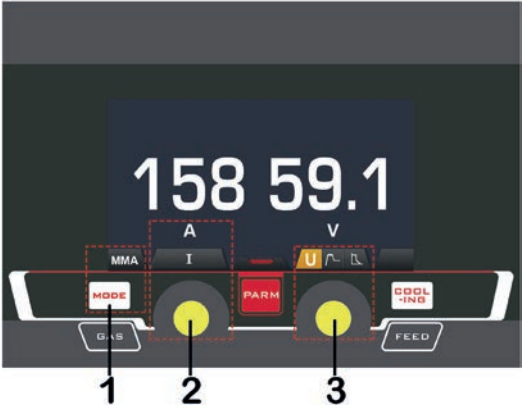
**Wire Feeder**

1. MIG gun connector.
2. 9 core Gas Socket for Spool gun.
3. Water outlet.
4. Water inlet.
5. Gas connector.
6. Control anode.
7. Positive output anode.
8. Water inlet.
9. Water outlet.
10. Wire reel Shaft.
11. Wire Feed Motor.
12. Wire feed tension adjustment (2x).
13. Wire feed inlet guide.
14. Wire drive roller (2x).



# 2. Control Panels

## 2.1 MMA Display



**1. Welding mode button**  
Press it to select MMA welding mode.

**2. L parameter knob**  
Rotate it to adjust welding current.

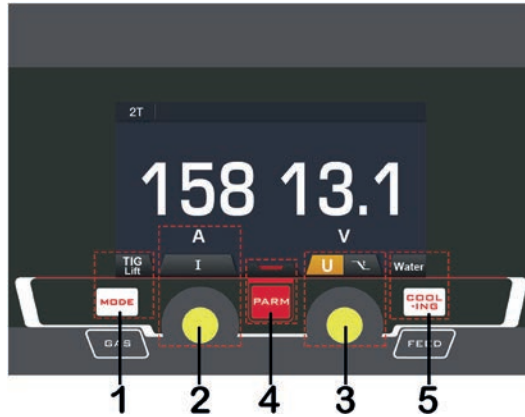
**3. R parameter knob**  
Press it to select Hot start or Arc force and rotate it to adjust value. Setting range: 0~10.

**Hot start**  
Hot start provides extra power when the weld starts to counteract the high resistance of the electrode and workpiece as the arc is started. Setting range: 0~10.

**Arc force**  
An MMA welding power source is designed to produce constant output current. This means with different types of electrode and arc length; the welding voltage varies to keep the current constant. This can cause instability in some welding conditions as MMA welding electrodes will have a minimum voltage they can operate with and still have a stable arc.

Arc Force control boosts the welding power if its senses the welding voltage is getting too low. The higher the arc force adjustment, the higher the minimum voltage that the power source will allow. This effect will also cause the welding current to increase. 0 is Arc Force off, 10 is maximum Arc Force. This is practically useful for electrode types that have a higher operating voltage requirement or joint types that require a short arc length such as out of position welds.

## 2.2 LIFT TIG Display



### 1. Welding mode button

Press it to select TIG Lift welding mode.

### 2. L parameter knob

Rotate it to adjust welding current. In functional parameter interface, rotate it to select parameters.

### 3. R parameter knob

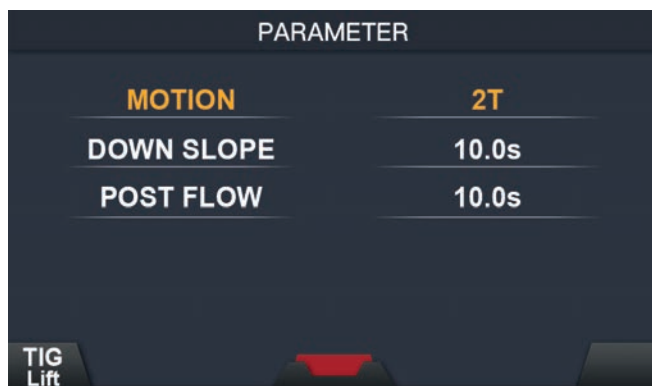
Rotate it to adjust Down Slope time and other parameters.

### 4. Functional parameter button.

### 5. Cooling mode button

Press it to select water cooling mode.

## Function Interface

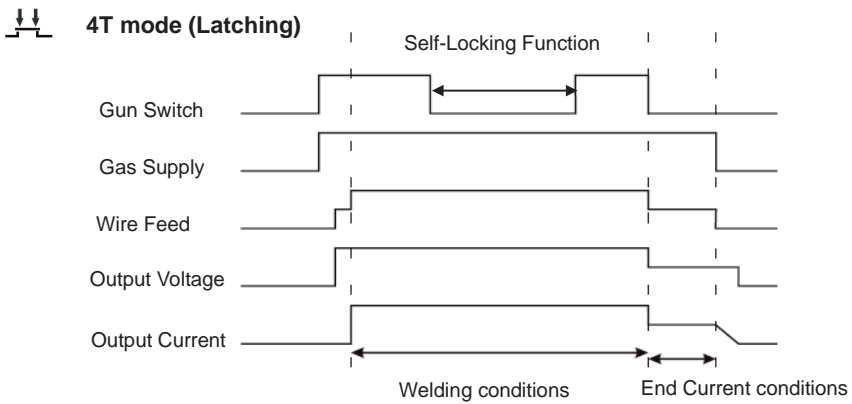
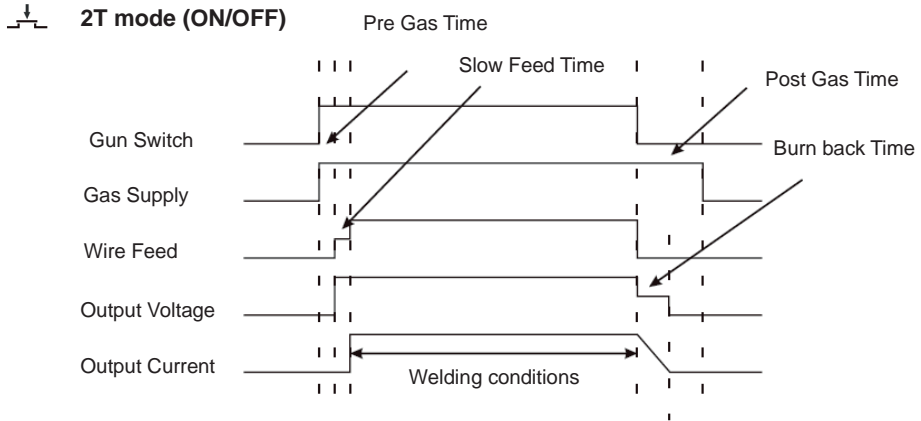


The image shows a dark-themed digital display interface for a welding machine. At the top, the word "PARAMETER" is centered in white. Below it, the word "MOTION" is displayed in orange. To the right of "MOTION", the trigger mode "2T" is shown in orange. Below "MOTION", two parameters are listed in white: "DOWN SLOPE" and "POST FLOW". To the right of each parameter, its value is shown in white: "10.0s" for both. In the bottom left corner, the text "TIG Lift" is visible in white. At the bottom center, there is a red button icon.

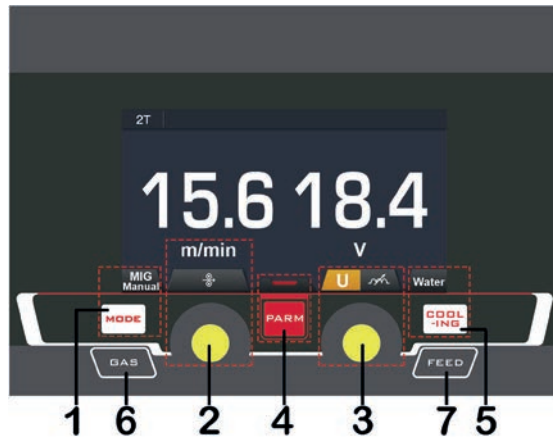
PARAMETER	
<b>MOTION</b>	<b>2T</b>
DOWN SLOPE	10.0s
POST FLOW	10.0s

1. **Trigger mode:** 2T or 4T.
2. **Down slope time:** 0~10s.
3. **Post flow time:** 0~10s.

# Trigger Mode Select



## 2.3 MIG Manual Display



**1. Welding mode button** Press it to select MIG Manual welding mode.

**2. L parameter knob**

Rotate it to adjust wire feeding speed. In functional parameter interface, rotate it to select parameters.

**3. R parameter knob** Rotate it to adjust parameters.

**4. Functional parameter button.**

**5. Cooling mode button** Press it to select water cooling mode.

**6. Manual shield gas check button.**

**7. Manual wire feed button.**

### FUNCTION INTERFACE

**1. Trigger mode:** 2T/ 4T/ Spot weld.

**2. Pre Flow:** 0-10s.

**3. Post Flow:** 0-10s.

**4. Burnback:** 0-10.

**5. Slow Feed:** 0-10s.

PARAMETER	
MOTION	2T
PRE FLOW	10.0s
POST FLOW	10.0s
BURNBACK	10
SLOW FEED	10s

MIG Manual



**Burnback**

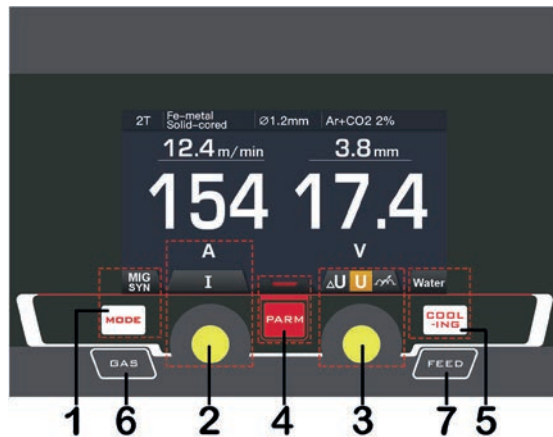
Short-circuit between welding wire and molten pool leads to the increase of current, which leads to the melting speed of welding wire too fast, and the wire feeding speed cannot keep up with, which makes the welding wire and workpiece disconnected. This phenomenon is called “burn back”. This function is to ensure the welding seam is not constant after welding. Range: 0-10.

**Slow feed**

This function is used to regulate the start speed of wire feeding increasing. Range: 0-10s.

**Spot Weld trigger mode**

**2.4 MIG SYN Display**



**1. Welding mode button**

Press it to select MIG SYN welding mode.

**2. Left parameter knob**

Rotate it to adjust wire feeding speed. In functional parameter interface, rotate it to select parameters.

**3. Right parameter knob**

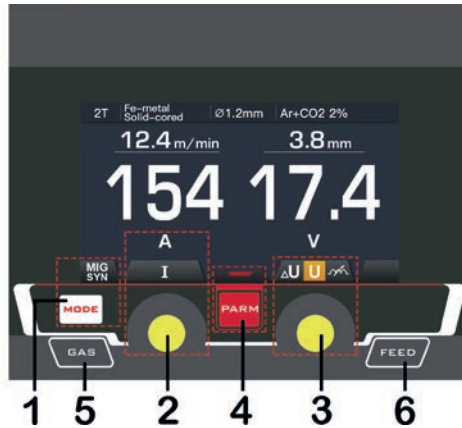
Rotate it to adjust parameters.

**4. Functional button.**

**5. Manual shield gas check button.**

**6. Manual wire feed button.**

## MIG SYN Functional Parameter interface



1. **Trigger mode:** 2T/ 4T/ S4T/ Spot weld. (No Spot weld in MIG Dual Pulse.)
2. **Wire material:** SS solid-cored/ Fe solid-cored/ Fe flux-cored/ Al-Mg solid-cored/ CuSi.
3. **Wire diameter:** 0.6~1.6mm.
4. **Shield gas:** CO2 and Ar+CO2 20%.
5. **Pre flow time:** 0~10s.

The operator simply sets the welding current like MMA or TIG welding and the machine calculates the optimal voltage and wire speed for the material type, wire type and size and shielding gas being used. Obviously other variables such as welding joint type and thickness, air temperature affect the optimal voltage and wire feed setting, so the program provides a voltage fine tuning function for the synergic program selected. Once the voltage is adjusted in a synergic program, it will stay fixed at this variation when the current setting is changed. To reset the voltage for a synergic program back to factory default, change to another program and back again.

## Supervisor Lock

Press Button 2 for three to five seconds then press Button 3 for three to five seconds, to unlock press Button 3 for three to five seconds then press Button 2 for three to five seconds.

## 2.5 Spool Gun Display



1. **Welding mode button** Press it to select Spool Gun welding mode.
2. **L parameter knob**  
Rotate it to adjust wire feeding speed. In functional parameter interface, rotate it to select parameters.
3. **R parameter knob** Rotate it to adjust parameters.
4. **Functional parameter button.**
5. **Manual shield gas check button.**
6. **Manual wire feed button.**

## Spool Gun Functional Parameter interface

1. **Trigger mode:** 2T/ 4T/ Spot weld.
2. **Pre flow time:** 0~10s.
3. **Post flow time:** 0~10s.
4. **Burnback:** 0~10.
5. **Slow feed time:** 0~10s.

PARAMETER	
<b>MOTION</b>	<b>2T</b>
PRE FLOW	10.0s
POST FLOW	10.0s
BURNBACK	10
SLOW FEED	10s

MIG Manual

## 3. 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 rating 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**

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

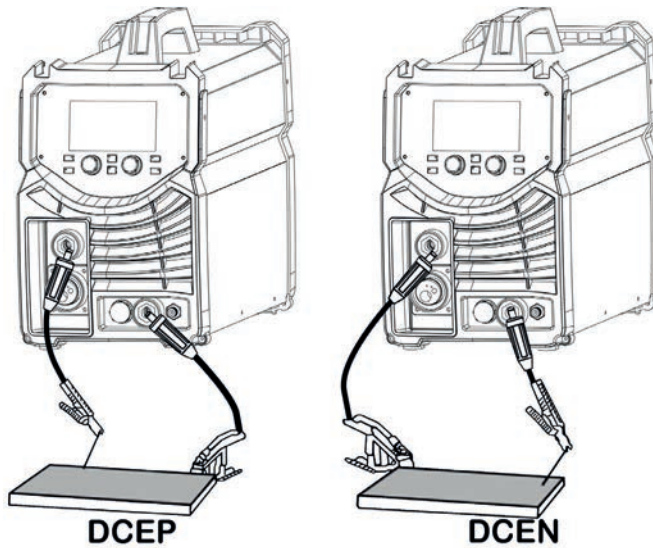
### MMA Welding

Two sockets are available on this welding machine, One Positive (+) and one Negative (-) polarity, to connect MMA/Electrode holder cable and earth clamp cable. Various electrodes require different polarity for optimum results and careful attention should be paid to the polarity, refer to the electrode manufacturers information for the correct polarity.

DCEP: Electrode connected to Positive (+) output socket.

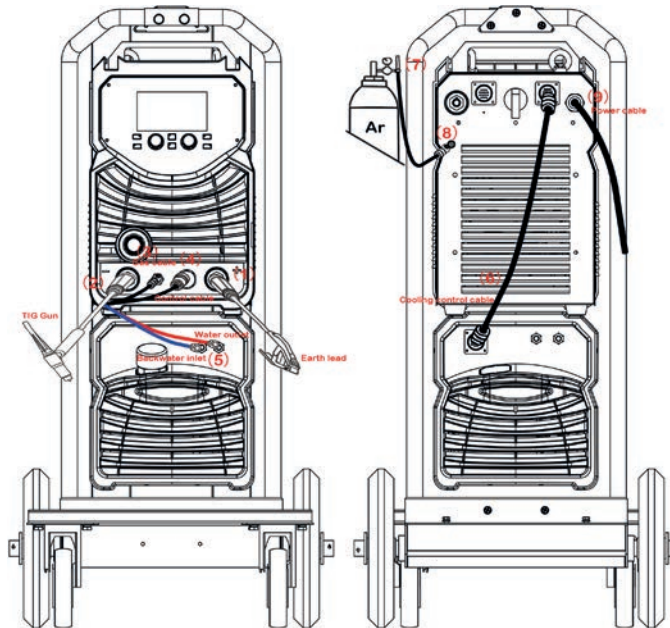
DCEN: Electrode connected to Negative (-) output socket.

1. Turn the power source on and press the welding mode key to MMA welding mode.
2. Set the welding current relevant to the electrode type and size being used as recommended by the electrode manufacturer.
3. Set the Hot Start and Arc Force as required using the right parameter knob.
4. Place the electrode into the electrode holder and clamp tight.
5. Strike the electrode against the work piece to create an arc and hold the electrode steady to maintain the arc.

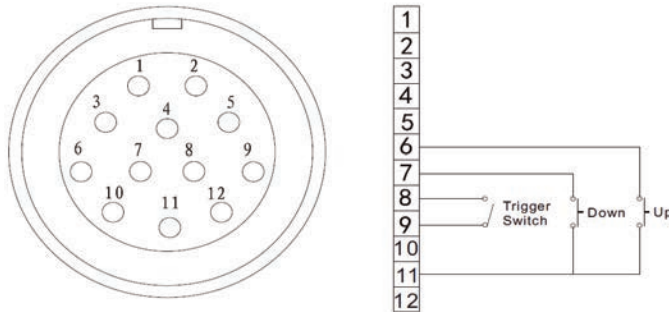
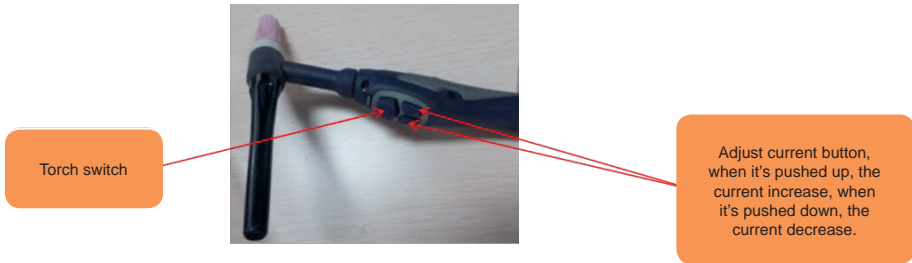


**TIG Welding**

1. Insert the earth cable plug into the positive socket on the front of the machine and tighten it.
2. Plug the welding torch into the negative socket on the front panel, and tighten it.
3. Connect the gas line of TIG Gun to outlet gas connector on the front of the machine. Check for Leaks!
4. Connect the control cable of torch switch to 9 pin socket on the front of the machine.
5. Connect the water inlet and outlet pipe of TIG Gun to inlet and outlet water connector on the front of the cooling water.
6. Connect the control cable of cooling water with the aero socket on the rear panel of welding machine.
7. Connect the gas regulator to the Gas Cylinder and connect the gas line to the Gas Regulator. **Check for Leaks!**
8. Connect the gas line to the machine inlet gas connector via the quick push lock connector located on the rear panel. **Check for Leaks!**
9. Connect the power cable of welding machine with the output switch in electric box on site.
10. Carefully open the valve of the gas cylinder, set the required gas flow rate.
11. Select TIG welding mode on the front panel.
12. Set torch operation 2T/4T.
  - When 2T operation is selected press trigger Gas starts, touch and lift arc start, release trigger Gas and Arc stops.
  - When 4T operation is selected press and release trigger Gas starts, touch and lift arc start, press and release trigger Gas and Arc stops.
13. Select water cooling mode on the front panel.



### 3.1 Torch Switch Control



Remote Control Socket

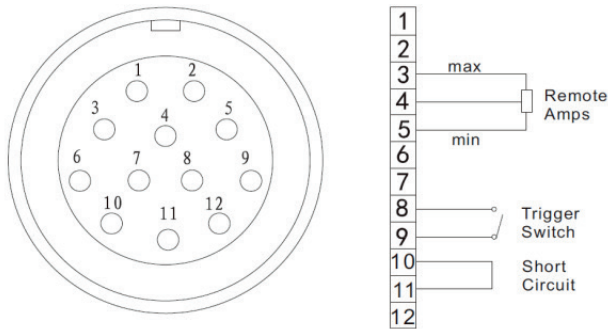
Socket Pin	Function
1	Not connected
2	Not connected
3	Not connected
4	Not connected
5	Not connected
6	The button of "UP" input
7	The button of "DOWN" input
8	Trigger Switch Input
9	Trigger Switch Input
10	Not connected
11	The button of "UP"& "DOWN" input
12	Not connected

## 3.2 Remote Torch Control



Torch switch

Adjust current roller wheel, when it's roll upwards, the current increase, when it's roll downwards, the current decrease.



Remote Control Socket

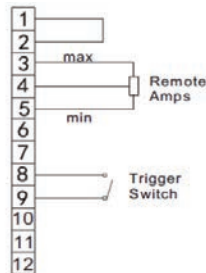
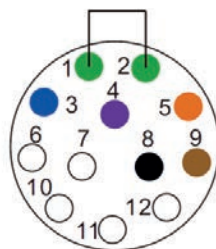
Socket Pin	Function
1	Not connected
2	Not connected
3	10k ohm (maximum) connection to 10k ohm remote control potentiometer
4	Wiper arm connection to 10k ohm remote control potentiometer
5	Zero ohm (minimum) connection to 10k ohm remote control potentiometer
6	Not connected
7	Not connected
8	Trigger Switch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



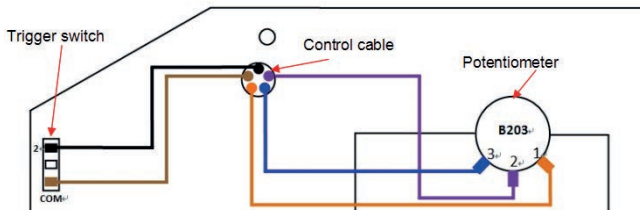
### 3.3 Pedal Switch Control

- When plug the twelve-lead aero-socket of pedal switch in it. Welder will identify the pedal switch, the welding current knob on the front panel will can't use and only 2T can be selected.
- When use the adjustment knob of max-welding current beside the pedal, can set the max-current you want.

Socket Pin	Function
1	Be shorted with 2
2	Be shorted with 1
3	20k ohm (maximum) connection to 20k ohm remote control potentiometer
4	Wiper arm connection to 20k ohm remote control potentiometer
5	Zero ohm (minimum) connection to 20k ohm remote control potentiometer
6	Not connected
7	Not connected
8	Trigger Switch Input
9	Trigger Switch Input
10	Not connected
11	Not connected
12	Not connected



Remote Control Socket



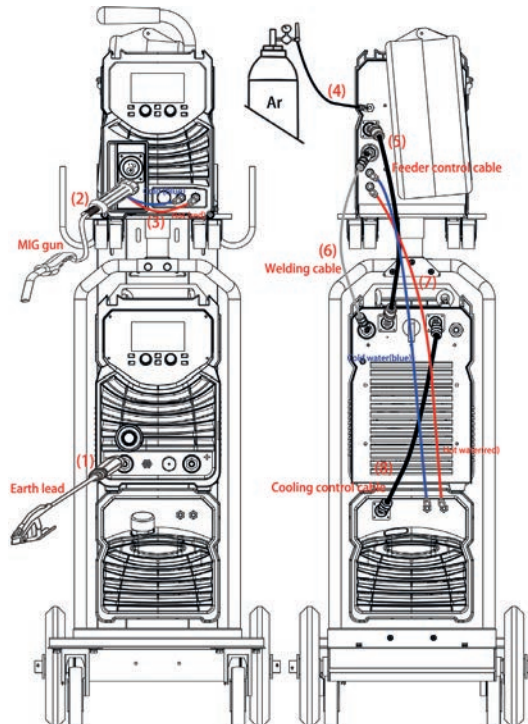
**MIG Welding**

1. Insert the earth cable plug into the negative socket on the front of the machine and tighten it.
2. Plug the welding torch into the MIG torch connection socket on the front panel of the wire feeder, and tighten it.

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

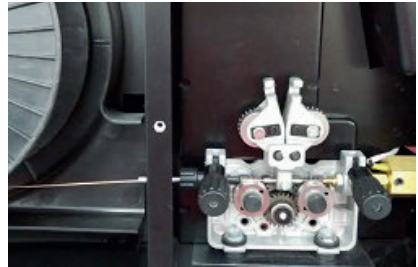
3. Connect the water inlet and outlet pipe of MIG Gun to the water inlet and outlet connectors on the front of the wire feeder.
4. Connect the gas line to gas connector on the rear panel of wire feeder. Check for Leaks!
5. Connect the control cable of wire feeder with the aero socket on the rear panel of welding machine.
6. Connect the cable of wire feeder with the positive output of welding machine.
7. Connect the water inlet and outlet pipe of wire feeder with the water inlet and outlet connectors on the rear front of cooling water.
8. Connect the control cable of cooling water with the aero socket on the rear panel of welding machine.
9. Connect the power cable of welding machine with the output switch in electric box on site.

**NOTE!** Air cooling mode without cooling device and the water pipe is not needed for the air cooling mode.





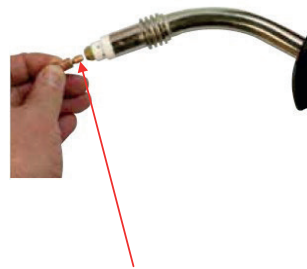
**10.** Place wire onto spool holder - (spool retaining nut is left hand thread) Feed the wire through the inlet guide tube on to the drive roller.



**11.** Feed wire over the drive roller into the outlet guide tube, push the wire through approx 150mm.

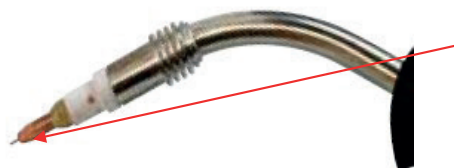


**12.** Close down the top roller bracket and clip the pressure arm into place with a medium amount of pressure applied.



**13.** Remove the gas nozzle and contact tip from the front end of the MIG torch.

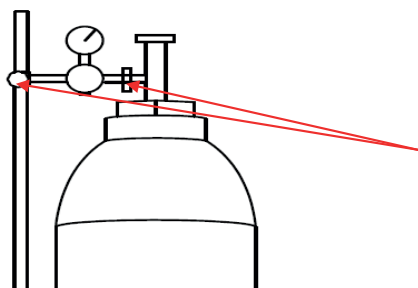
**14.** Press and hold the manual wire key to feed the wire down the torch cable through to the torch head.



**15.** Fit the correct size contact tip over the wire and fasten tightly into the tip holder.



**16.** Fit the gas nozzle to the torch head.



**17.** Carefully open the gas cylinder valve and set the required gas flow rate.

**18.** Select torch trigger mode: 2t or 4T.

**19.** Select water cooling mode..

**20.** Select the required welding parameters using the knobs and buttons.

## 3.4 Wire Feed Roller

The importance of smooth consistent wire feeding during MIG welding cannot be emphasized enough. Simply put the smoother the wire feed then the better the weld.

Feed rollers or drive rollers are used to feed the wire mechanically through the length of the welding gun cable. Feed rollers are designed to be used for certain types of welding wire and they have different types of grooves machined in them to accommodate the different types of wire. The wire is held in the groove by the top roller of the wire drive unit and is referred to as the pressure roller, pressure is applied by a tension arm that can be adjusted to increase or decrease the pressure as required. The type of wire will determine how much pressure can be applied and what type of drive roller is best suited to obtain optimum wire feed.

**Solid Hard Wire** - Such as steel, stainless steel requires a drive roller with a "V" shape groove for optimum grip and drive capability. Solid wires can have more tension applied to the wire from the top pressure roller that holds the wire in the groove and the "V" shape groove is more suited for this. Solid wires are more forgiving to feed due to their higher cross-sectional column strength, they are stiffer and don't deflect so easily.

**Soft Wire** – Such as aluminum, require a "U" shape groove. Aluminum wire has a lot less column strength, can bend easily and is therefore more difficult to feed. Soft wires can easily buckle at the wire feeder where the wire is fed into inlet guide tube of the torch. The U-shaped roller offers more surface area grip and traction to help feed the softer wire. Softer wires also require less tension from the top pressure roller to avoid deforming the shape of the wire, too much tension will push the wire out of shape and cause it to catch in the contact tip.

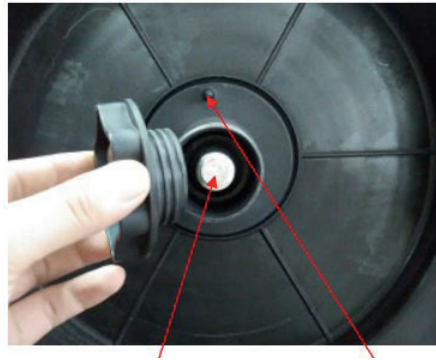
**Flux Core / Gasless Wire** - These wires are made up of a thin metal sheath that has flux and metal compounds layered onto the surface and then rolled into a cylinder to form the finished wire. The wire cannot take too much pressure from the top roller as it can be crushed and deformed if too much pressure is applied. A knurled-V drive roller has been developed and it has small serrations in the groove, the serrations grip the wire and assist to drive it without too much pressure from the top roller. The down side to the knurled wire feed roller on flux cored wire is it will slowly over time bit by bit eat away at the surface of the welding wire, and these small pieces will eventually go down into the liner. This will cause clogging in the liner and added friction that will lead to welding wire feed problems. A U groove wire can also be used for flux core wire without the wire particles coming off the wire surface. However, it is considered that the knurled roller will give a more positive feed of flux core wire without any deformation of the wire shape.

## 3.5 Wire Installation & Setup

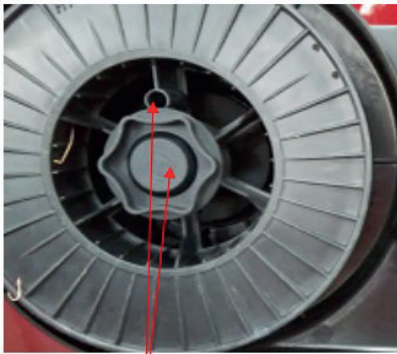
The importance of smooth consistent wire feeding during MIG welding cannot be emphasized enough. The correct installation of the wire spool and the wire into the wire feed unit is critical to achieving an even and consistent wire feed. A high percentage of faults with MIG welders emanate from poor set up of the wire into the wire feeder. The guide below will assist in the correct setup of your wire feeder.



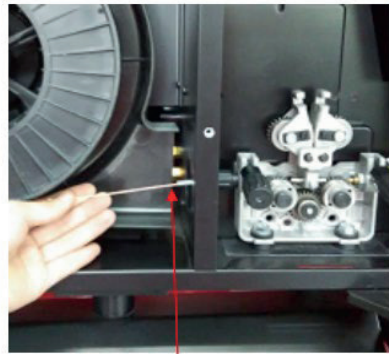
1. Remove the spool retaining nut.



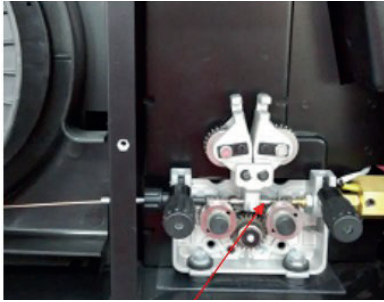
2. Note the tension spring adjuster and spool locating pin.



3. Fit the wire spool onto the spool holder fitting the locating pin into the location hole on the spool. Replace the spool retaining nut tightly.



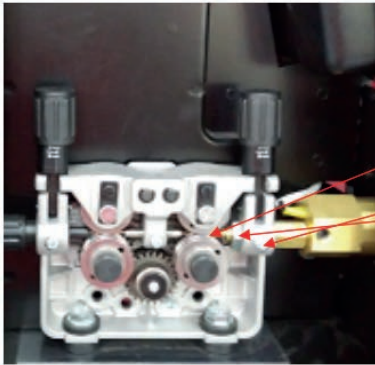
4. Snip the wire carefully, be sure to hold the wire to prevent the spool uncoiling. Carefully feed the wire into the inlet guide tube of the wire feed unit.



**5.** Feed the wire through the drive roller and into the outlet guide tube of the wire feeder.



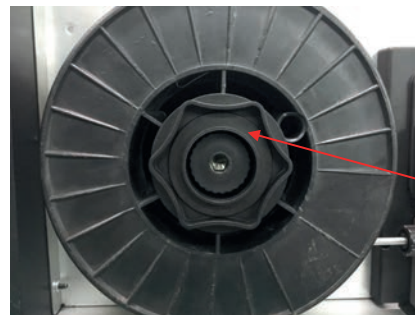
**6.** Lock down the top pressure roller and apply a medium amount of pressure using the tension adjustment knob.



**7.** Check that the wire passes through the center of the outlet guide tube without touching the sides. Loosen the locking screw and then loosen the outlet guide tube retaining nut too make adjustment if required. Carefully retighten the locking nut and screw to hold the new position.



**8.** A simple check for the correct drive tension is to bend the end of the wire over hold it about 100mm from your hand and let it run into your hand, it should coil round in your hand without stopping and slipping at the drive rollers, increase the tension if it slips.



**9.** The weight and speed of the wire spool turning creates an inertia that can cause the spool to run on and the wire loop over the side of the spool and tangle. If this happens increase the pressure on the tension spring inside the spool holder assembly using the tension adjustment screw.

## 3.6 MIG Torch liner Types

### MIG Torch Liners

The liner is both one of the simplest and most important components of a MIG gun. Its sole purpose is to guide the welding wire from the wire feeder, through the gun cable and up to the contact tip.

### Steel Liners

Most MIG gun liners are made from coiled steel wire also known as piano wire, which provides the liner with good rigidity and flexibility and allows it to guide the welding wire smoothly through the welding cable as it bends and flex during operational use. Steel liners are primarily used for feeding of solid steel wire, other wires such as Aluminum, Silicon Bronze, Etc. will perform better using a Teflon or Polyamide line. The internal diameter of the liner is important and relative to the wire diameter being used. The correct inside diameter will assist in smooth feeding and prevention of the wire kinking and bird-nesting at the drive rollers. Also bending the cable too tightly during welding increases the friction between the liner and the welding wire making it more difficult to push the wire through the liner resulting in poor wire feeding, premature liner wear and bird-nesting. Dust, grime and metal particles can accumulate inside the liner over time and cause friction and blockages, it is recommended to periodically blow out the liner with compressed air. Small diameter welding wires, 0.6mm through 1.0mm have relatively low columnar strength, and if matched with an oversized liner, can cause the wire to wander or drift within the liner. This in turn leads to poor wire feeding and premature liner failure due to excessive wear. By contrast, larger diameter welding wires, 1.2mm through 2.4mm have much higher columnar strength but it is important to make sure the liner has enough internal diameter clearance. Most manufacturers will produce liners sized to match wire diameters and length of welding torch cable and most are color coded to suit.

### Teflon and Polyamide (PA) Liners

Teflon liners are well suited for feeding soft wires with poor column strength like aluminum wires. The interiors of these liners are smooth and provide stable feeding, especially on small diameter welding wire Teflon can be good for higher heat applications that utilize water-cooled torches and brass neck liners. Teflon has good abrasion resistance characteristics and can be used with a variety of wire types such as silicon bronze, stainless steel as well as aluminum. A note of caution to carefully inspect the end of the welding wire prior to feeding it down the liner. Sharp edges and burrs can score the inside of the liner and lead to blockages and accelerated wear. Polyamide Liners (PA) are made of carbon infused nylon and are ideal for softer aluminum, copper alloy welding wires and push pull torch applications. These liners are generally fitted with a floating collet to allow the liner to be inserted all the way to the feed rollers.

### Copper - Brass Neck Liners

For high heat applications fitting brass or copper wound jumper or neck liner on the end of the liner at the neck end will increase the working temperature of the liner as well as improve the electrical conductivity of the welding power transfer to the wire. It is recommended for all Aluminum and Silicone Bronze welding applications.



## 4. 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 area.

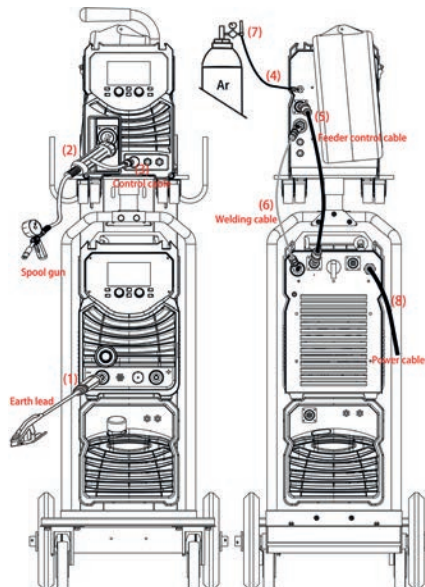
### 4.1 Spool Gun Display

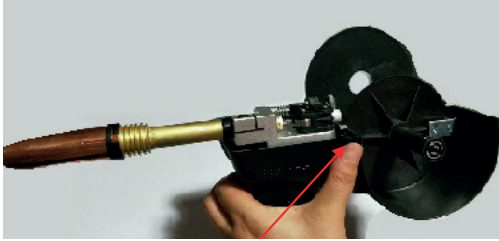
#### Set up installation for Spool Gun

1. Insert the earth cable plug into the negative (-) socket on the front of the machine and twist to tighten.
2. Connect the Spool Gun to the MIG torch connection socket on the front panel of the wire feeder, and tighten it.

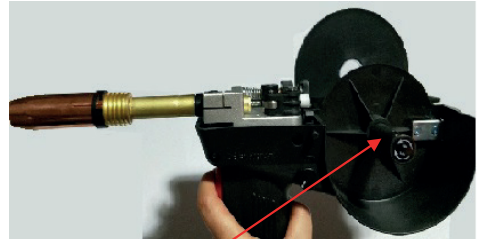
**IMPORTANT!** When connecting the torch be sure to tighten the connection. A loose connection can result in the connector arcing and damaging the machine and gun connector.

3. Connect the Spool Gun control cable to the multipin receptacle on the front panel of the wire feeder.
4. Connect the gas line to gas connector on the rear panel of wire feeder.
5. Connect the control cable of wire feeder with the aero socket on the rear panel of welding machine.
6. Connect the cable of wire feeder with the positive output of welding machine.
7. Connect the gas regulator to the Gas Cylinder and connect the gas line to the Gas Regulator.
8. Connect the power cable of welding machine with the output switch in electric box on site.

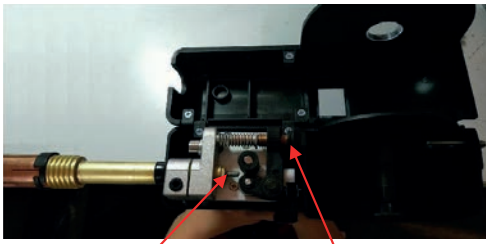




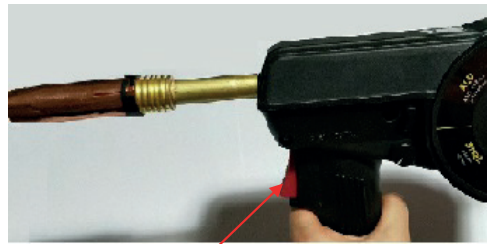
**9.** Remove the spool cover by pressing button and lifting off the cover.



**10.** Place a spool of wire inside the spool holder.



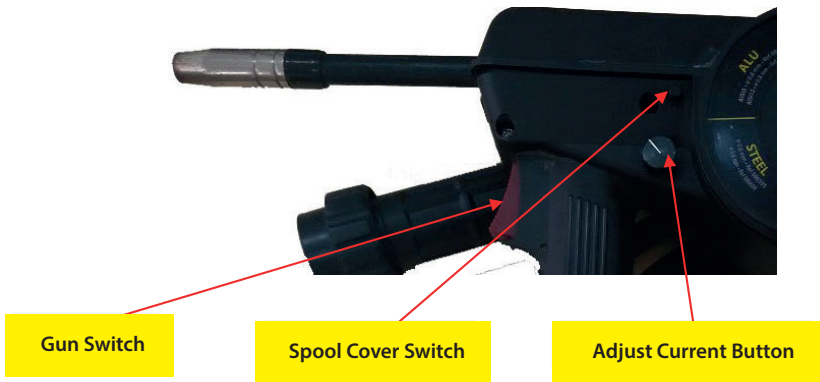
**11.** Feed the wire through the drive rolls and into the inlet guide tube. Swing back and clip down the wire tension swing arm.



**12.** Pull the trigger to drive the wire through the neck until it exits the contact tip holder.

**13.** Carefully open the gas cylinder valve and set the required gas flow rate.

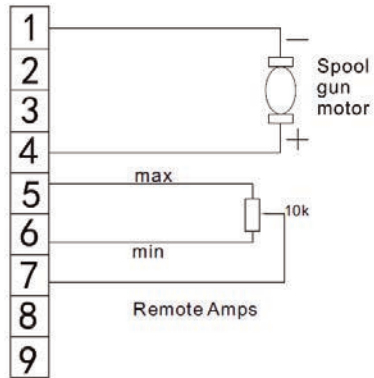
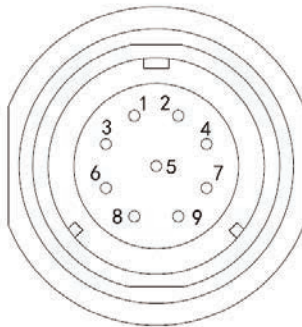
**14.** Select spool gun mode using the knob. Set welding parameters using the knobs.



**Gun Switch**

**Spool Cover Switch**

**Adjust Current Button**



**Remote Control Socket**

Socket Pin	Function
1	Spool gun motor
2	Not connected
3	Not connected
4	Spool gun motor
5	10k ohm (maximum) connection to 10k ohm remote control potentiometer.
6	Zero ohm (minimum) connection to 10k ohm remote control potentiometer.
7	Wiper arm connection to 10k ohm remote control potentiometer.
8	Not connected
9	Not connected

# 5. Troubleshooting

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

## 6. Maintenance

The utilisation level of the power source and its working environment should be taken into consideration in planning the frequency of maintenance of the machine. Appropriate use and preventive maintenance guarantee the best trouble-free use of the equipment. This allows you to avoid interruptions in use and increases the productivity of the machine.

### 5.1 Cables

Check the condition of welding and mains cables daily. Do not use damaged cables. Also make sure that all extension cables used in the mains connection are in proper condition and compliant with regulations.

**NOTE! The mains cables may be repaired and installed only by electrical contractors and installers authorised to perform such operations.**

### 5.2 Power source

Make sure the machine is placed away from any grinding area.

1. Clean the exterior of the machine and the fan grills net of any dust and stains – for example, with a soft brush and vacuum cleaner.
  - Do not use pressurised air. The stain may become compressed into the grooves of the coolers.
  - Do not use a pressure-washing device.
2. Check the electrical connections of the machine. Clean any oxidised connections, and tighten the loosened ones.
  - Check for the right tension before you start repairing the connections.

**NOTE! Remember that the machine may be repaired only by an electrical contractor or installer authorised to perform such operations.**

### 5.3 Regular maintenance

Authorised service agents perform regular maintenance by agreement. Tasks included in regular maintenance:

- Cleaning of equipment.
- Inspection and maintenance of the welding gun.
- Checking of connectors, switches, and control knobs.
- Checking of electrical connections.
- Checking of the mains cable and plug.
- Replacement of damaged or worn parts.
- Calibration testing, with adjustment of the functions and operational values of the machine, if necessary.

## 7. Warranty

Weldability Sif warrants its customers that all new SifWeld manual welding and cutting equipment purchased shall be free of failure from defective materials or production for a period of 2 Years from the date of purchase.

This warranty period can be extended to 5 Years from the date of purchase (including the standard warranty period) for customers in the United Kingdom and Republic Of Ireland; or to 3 Years from date of purchase for customers in all other countries, subject to registration of the product at [www.sifweld.com](http://www.sifweld.com) within the first year of purchase, and undergoing annual preventative maintenance servicing with effect from the second year of ownership.

All warranty periods start from the date of purchase from Weldability Sif or an approved SifWeld distributor to the original end user. The date on the sales invoice is considered the date of purchase for the purpose of the warranty period, or the date of manufacture is used if proof of purchase is not available. Equipment is warranted to the original owner/user customer, and is not transferable.

Subject to the underlying purchase contract, or, failing such, the Weldability Sif general terms and conditions of sale, both the cost of replacement parts and Weldability Sif's labour expense in correcting defects covered by the warranty, will be assumed by Weldability Sif during the warranty period. Weldability Sif shall in no event be responsible for any direct or indirect damages, third party expenses, as well as any loss of income/revenue, all of which are specifically excluded under this warranty.

The warranty does not cover : Any defects resulting from normal wear and tear; Improper use; Failure to observe the operating and maintenance instructions; Connection to an incorrect or faulty mains supply; Overloading during use; Any transport or storage damage; External damage such as fire, impact or damage due to natural causes, e.g flooding; Use of unapproved spare or wear parts or replacement parts not supplied by or approved by Weldability Sif; Any modification or alteration of the equipment; or any other circumstances beyond the control of Weldability Sif. The warranty period is based on a single 8-hour 5-day shift pattern and the extended warranty is not applicable to units that are purchased for rental or hire. Weldability Sif will submit an invoice for any repair work performed outside the scope of the warranty.

Any warranty repair must be performed by Weldability Sif or an Authorised SifWeld Service Centre. The customer is responsible for all shipping costs and risk associated with items that are returned covered under warranty. Weldability Sif may opt to refund the purchase price (less any costs and depreciation due to use and wear). Faults/defects found under warranty should be reported to the Weldability Sif Technical team for review. A warranty claim reference number will be issued and details of the most appropriate Authorised SifWeld Service Centre will be advised, if appropriate. The customer has no claim to any loan or replacement products whilst repairs are being performed or replacements are being provided.

The decision about repair or replacement of any defective part(s) is made by Weldability Sif. The replaced part(s) remain(s) property of Weldability Sif. The warranty extends only to the machine power-source, wire-feed unit and parts contained inside. No other warranty is expressed or implied, including with regard to the fitness of the equipment for any particular application.

Under the terms of the warranty, welding torches, their consumable parts, wire-feed 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 not covered.

The extended warranty is only valid where products have been used strictly in accordance with the operating instructions, all installation guidelines have been implemented, all legal requirements have been observed, regular preventative maintenance has been undertaken and a continuous history of annual servicing has been completed and recorded. Failure to register the equipment online within 1 year of purchase, or to complete the required annual servicing cycle from year 2, will invalidate the extended warranty period.

Annual preventative maintenance servicing must be arranged and paid-for by the equipment owner/user and carried out by Weldability Sif or an Authorised SifWeld Service Centre, in order to maintain validity of the extended warranty. Service visits can be booked online at [www.sifweld.com](http://www.sifweld.com) or by calling 0870 330 7757 and will be charged at an average of £65 net per hour of travel/ servicing time. Please allow an average of 2 hours servicing per machine and one hour each way of travel.

Warranty support is facilitated by our network of Authorised SifWeld Service Centres that provide highly experienced capability and carry-out the professional repair, service and calibration of SifWeld equipment.





**Weldability sif**

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