

Oxford MIGMAKER range

(Traditional transformer Mig)

British made MIG welding machines.



USER INSTRUCTION MANUAL



Safety – multiple risks – please read carefully

Before using make sure all operators are familiar with the welding/cutting process and have had appropriate training relating to the risks involved.

Please visit the UK HSE sites below to understand & control the risks from welding & cutting.

<https://www.hse.gov.uk/welding/other-welding-risks.htm>

<https://www.hse.gov.uk/welding/welding-controls.htm>

<https://www.hse.gov.uk/welding/health-risks-welding.htm>

Basic safety information is summarised below.

- When welding or cutting in an environment with increased risk of electric shock extra precautions must be observed. Typical conditions with increased risk of electric shock are working in wet or damp conditions, working inside vessels, working in cramped conditions and exposed to conductive parts. You should only use welding machines marked with S for these higher risk applications. OXFORD MIGMAKER models are all marked with the S symbol.
- Before use check the local area for flammable materials & ensure suitable fire extinguishers are available to hand. Do not weld near or on flammable materials or any product that may contain flammable compounds or gasses or fumes inside such as tanks & cylinders. After welding check the local area carefully for any burning or smoking materials & recheck after 30 mins or so.
- Always use correct PPE (eye and body protection) when using this machine. Recommended eye protection is with a shade 10-12 lenses, for most general work, for high power use up to shade 15. Full face protection is essential. Wear leather gloves & ensure all exposed skin has protection from burns.
- Use correct LEV (fume extraction) equipment & always avoid inhaling welding fume.
- Ensure other persons in the area have sufficient PPE from the welding arc, sparks & fumes.
- Electromagnetic fields are created by the welding process, these can be hazardous & may affect pacemakers, keep welding cables as far as possible away from your body. Do not coil cables around the body, keep cables at ground level where possible. If you have a pacemaker do not weld until you have consulted your medical adviser.
- Keep bodily parts & clothing well away from wire feed systems, fans, wire spools & other moving parts.
- Only connect dedicated MIG gas to this machine, normally a mix of argon/CO₂, or pure CO₂ or pure argon.
- Gas cylinders must be treated with care, a damaged cylinder may explode. Transport cylinders safely, only use in upright position & ensure they are secured from falling.
- Never lift this machine with a gas bottle attached.
- Before mounting a gas cylinder to this machine check the wheels/axles & undercarriage are in perfect condition & no parts are missing.
- Only use & move this machine on a flat stable surface, take extra care if a gas cylinder is attached, the extra height & weight of a cylinder can cause instability.
- Only use this machine for MIG/MAG welding, it is not designed for any other use.
- This machine is rated to IP23S so may be used indoors or outside, if used outside it must be protected from water & excess damp.
- Do not use in a wet environment, this machine & torch should be kept dry.
- Do not use this machine with side panels missing or other parts missing or damaged.

Further information on the safe use of welding & cutting machines can be found in IEC60974-9

A documented risk assessment should be carried out prior to installation & use of this machine.

Declaration of conformity

**MIGMAKER models 182, 202, 252 & 302A 230V are manufactured in the UK
In compliance with.**

Low voltage directive 2014/35/EU
EMC directive 2014/30/EU
RoHS directive 2011/65/EU

In accordance with the following standards & regulations.

IEC60974-6
IEC60974-10
EU2019/1784



Date 01/05/2025

R P Rycroft *R Rycroft* **Managing Director** **Technical Arc Ltd** **York UK. www.tecarc.com**

Pre installation & EMC information

This is 'Class A' equipment & is designed for use in industrial premises, If used on domestic supplies or other environments there could be potential difficulties with electromagnetic interference. It is the user's responsibility to ensure that if any electromagnetic disturbances are detected to resolve this before continuing.

The installer of this equipment should make an assessment of the area before installing.

For all welding machines it is preferable to use as far away as possible from sensitive electrical or electronic equipment such as computers, telecom equipment, safety critical equipment, transmitters and receiving equipment etc.

There is a risk to sensitive equipment from radiated or conducted emissions from this machine.

Consideration must be also given to other premises as the emissions may not be limited to the installed premises.

The following are methods to reduce emissions.

- 1) Keep all welding cables short close together and at ground level.
- 2) Equipotential bonding of metal components in the work area and bonding of the work piece can be considered however there are electrical safety implications for the operator with increased risk of shock if the electrode is touched; therefore it is important the operator is aware and adequately protected from making contact with the work and the electrode. **Before bonding the area and work piece consult an experienced electrician & refer to IEC60974-9.**
- 3) This equipment must be properly maintained and all screws holding the sides etc kept in place.
- 4) Sometimes it may be necessary to fit additional mains input filters or even screen the cables and / or work area. This will involve consulting an experienced engineer or contact OXFORD WELDERS directly.
- 5) Oxford MIGMAKER models comply with IEC61000-3-12 if the input main supply has a short circuit power (Ssc) equal or greater than that specified in the technical specifications. (Measured at the point of entry from the public supply network to the users incoming supply point).

Overview of your OXFORD MIGMAKER

OXFORD MIGMAKER models are all manufactured in the UK using copper wound transformers, simple traditional technology. Robust built quality to give you a lifetime of reliable welding.

Easy to use machines with smooth welding performance. All models start at just 20 amps, you can weld anything from the thinnest car panels, exhausts, etc, up to occasional 10-12mm thick metal with our largest model the 302.

All MIGMAKER's have our F22M powerful 2 roll MIG wire drive system, made using 100% metal gears and bearings. This combined with a strong drive PCB provides more torque than any of our earlier MIGMAKER models. Effortless wire feeding through any length of MIG torch.

The welding power is controlled in steps via voltage switches.

Voltage steps are carefully selected to provide you with the most useful range possible. The first two steps at the low end are selected to be close together to cover a range of thin materials to be welded without overheating or blowing through the job. As you go up the range the voltage step increases, the welding power becomes much less critical on thicker material.

These units are all fan cooled.

Low maintenance machines that can be easily serviced by any competent Engineer.

Technical specifications

Model	Migmaker 182	Migmaker 202	Migmaker 252	Migmaker 302
Input voltage	230V 1 ph	230V 1 ph	230V 1 ph	230V 1 ph
Recommended fuse - slow D type *	16A (13A*)	16A (13A*)	32A (16/13A*)	32A (16/13A*)
Standard supply plug fitted	16A	16A	32A	32A
Minimum ** generator KVA	3KVA	3.5KVA	5KVA	6.5KVA
I eff current	11.5A	13.5A	19A	31A
Voltage steps	4	8	12	12
Recommended MIG wire sizes	0.6-0.8mm	0.6-0.8mm	0.6-1.0mm	0.6-1.0mm
Amps range	20A-180A	20A-200A	20A-250A	20A-300A
Rated output & duty cycle	150/21V@20%	170A/22V@20%	220A/25V@25%	270A/27V@35%
OCV – no load	17-34V DC	17-36V DC	17-38V DC	17-42V DC
t ON max #	2' (150A/21V)	2' (170A/22V)	2'40" (220A/25V)	3'10" (270A/27V)
∑ t ON intermittent ##	12' (150A/21V)	12' (170A/22V)	15' (220A/25V)	21' (270A/27V)
Ssc P ***	900kva	1150kva	1200kva	1400kva
Weight approx	44kg	45kg	50kg	58kg

Enclosure case size approx – all models 340Wx510Hx500L.

Overall size approx. – all models with wheels & gas bottle carrier fitted (measured from floor/ground) – 600mm high x 750mm long x 340mm W (460mm width at rear axle).

* Input fuse size is a result of our calculations & tests, it is possible to use any of these models on a lower fuse size at lower welding power. All models will run from a 13A supply at up to around 160-180A output.

We recommend using a 'D' type circuit breaker (slow acting) to avoid intermittent tripping, in some instances you may experience intermittent tripping if using close to maximum output or welding for extended periods at very high power.

** Min KVA rating quoted is for up to 3/4 power output, to achieve max output we suggest increase KVA by 60-70%.

*** This equipment meets the requirements of IEC61000-3-12 if the short circuit input power (Ssc) is equal or greater than the value specified above. It is the installers or users responsibility to ensure that the input power is suitable for this equipment.

Duty cycle notes; The values specified above are based on MIG welding to the V/A relationship specified in BS IEC60974-1. All duty cycles are tested at 20°C in accordance with IEC60974-6.

t ON max = maximum continuous welding time @ max rated output (expressed in minutes & seconds) before thermal cut out.

∑ t ON intermittent = total welding time per hour @ max rated output (expressed in minutes & seconds).

Electrical Installation

This machine must be connected to the electricity supply by a competent person

All models are 230V single phase.

Make sure your supply voltage matches the voltage model of the Machine. These models will operate from **200V-255V** input voltage.

These models are generator friendly & will not fail due to an unstable supply. However, the welding performance will be reduced if the supply is unstable.

Ensure the green/yellow wire is connected to the earth terminal in the mains plug the other two wires are normally blue and brown wires which must be connected to the appropriate voltage, the blue is neutral and the brown is live, in some instances the colours of the live & Neutral may be both black, in which case it is not important which way around they are connected but the green/yellow wire must always be connected to the earth terminal in the plug.

Do not connect this machine to any voltage other than what is stated on the spec plate and marked on the rear of the machine.

Ensure that any extension cables used are of sufficient current carrying capacity. Extension cables must be at least the same size as the machines original input cable. If extension cables are over 10M increase the cable size.

Ensure that the mains plug fitted (and socket if fitted) are in good condition and they are the correct current carrying capacity.

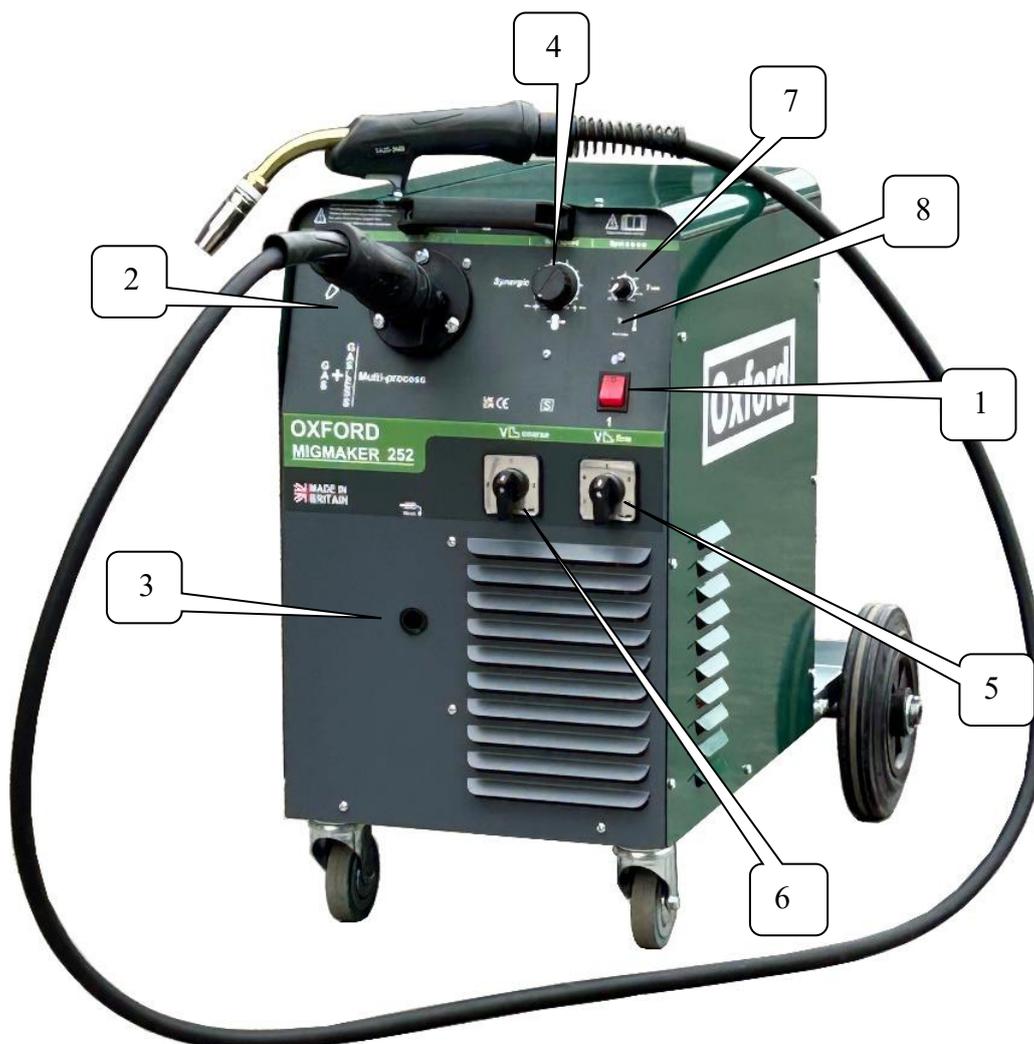
Incorrectly rated extension cables or a poor quality mains supply may cause the voltage to drop excessively during welding, this can reduce the machines operating performance.

NOTE! Mains input cables should be rated based on the I_{eff} value of current shown in the technical specifications on page 4.

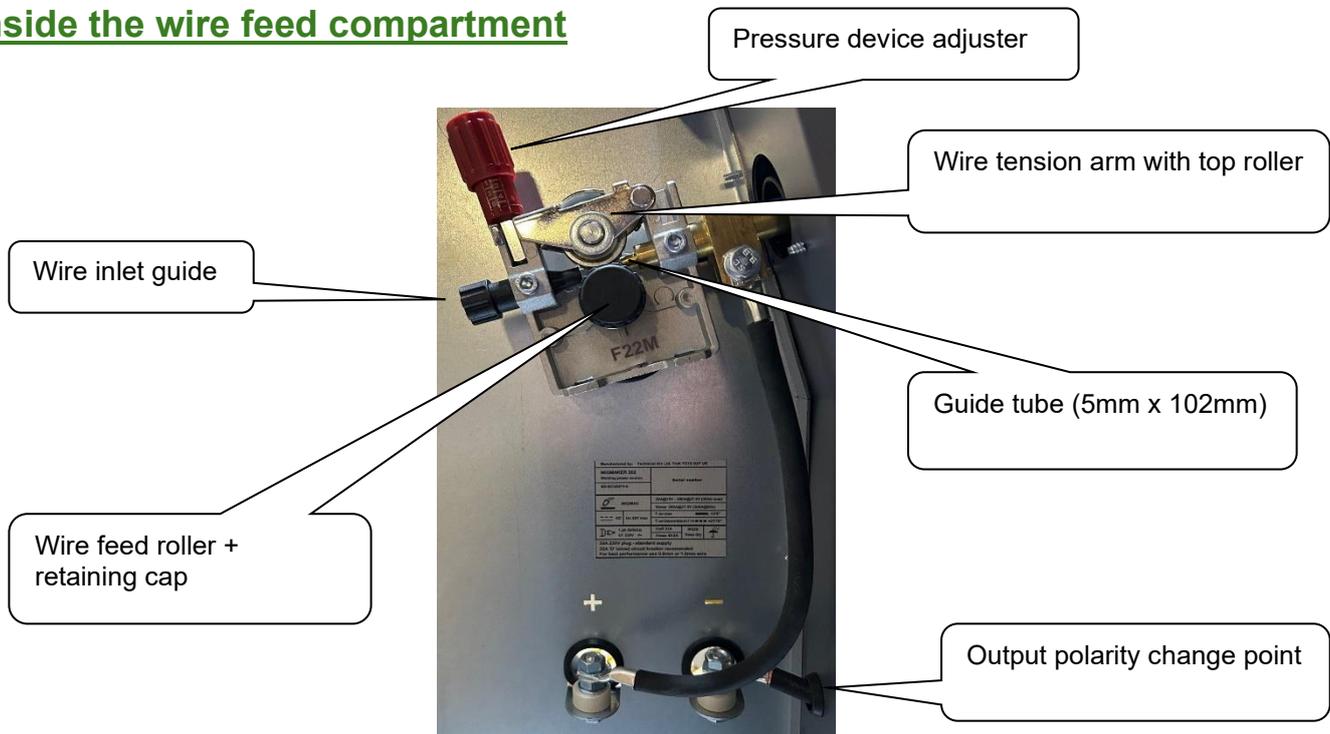
If in doubt consult a qualified electrician.

Functions & Controls

1. **On-OFF switch** – located front panel. Isolates internal circuits from the incoming mains voltage supply.
2. **Euro torch connector** – Mig torch connection suitable for all standard Euro connection MIG torches.
3. **Welding earth return cable entry** – Earth return lead inlet point with termination inside the wire feed compartment.
4. **Wire feed speed control** - This dial is used to set the wire feed speed. The wire feed speed increases automatically as the weld power settings are increased (synergic control). This may need small adjustments as you change the weld power controls to optimise the welding arc.
5. **Fine Weld Power control (voltage)** – This dial is used to set the welding power. Increments in small voltage steps
6. **Coarse Weld Power control (voltage)** – This dial is used to set the welding power. Increments are in larger voltage steps.
7. **Spot timer function** – This function enables you to set a weld time of between 0-5 secs to allow repeatable consistent spot welding to be carried out.
8. **Over temp warning lamp** – Illuminates only if machines duty cycle has been exceeded causing over heated main transformer. (Only illuminates when torch switch pressed).



Inside the wire feed compartment



MIGMAKER wire drive & fitting the MIG wire & torch

Risk of crush damage to fingers etc, from wire feed rollers, switch machine to off before touching wire drive mechanism.

This machine takes both 5kg & 15KG (200mm/300mm dia) reels of mig wire. The wire spool holder adjusts to suit both spool sizes.

All models use the same F22 high torque wire drive which provides day after day of powerful feeding of all types of wire up to 1.2mm diameter.

Always use good quality, clean, rust free wire.

All MIGMAKER models are fitted with the industry standard EURO connector so any common MIG torch can be fitted. We stock 3M, 4M & 5M lengths in various amperage ratings.

- To start, firstly check that the size of groove in the wire feed roller matches the size of the wire being used. The roller has two different size grooves, these are marked on the side. Remove the roller retaining cap & check or rotate the roller if needed.
- Fit the wire reel onto the spool holder & secure with the plastic nut, make sure that the end of the wire is perfectly straight, then manually feed the wire through the inlet guide, over the groove of the roller and through the brass guide tube & right through the Euro connector so it just protrudes, place the wire tensioning arm back into position so the wire is gripped by the two rollers.
- Fit the MIG torch, making sure the large nut is tightened to the Euro connector.
- Check the MIG torch has not pushed the brass guide tube into the wire drive rollers, this can happen if the guide tube is too long or the torch liner is not fitted correctly. The guide tube should be within 1-2mm from the rollers but never rubbing on the rollers. (The guide tube can be moved using long nose pliers, its an interference fit inside the main brass stem within the Euro connector).
- Press the torch switch & allow the wire to feed through the torch keeping torch as straight as possible. The wire may stick behind the contact tip so its good practice to remove the torch consumables first.
- Adjust the pressure device so that the wire feeds through the torch without slipping, don't apply too much tension, it can deform the wire & wear drive parts faster. The wire should have sufficient drive so that if hits an obstacle at the end of the torch it should push away & then slip on the drive roller if the force is too great.
- **The wire spool holder has a build in brake to limit over running of the spool. This is adjustable using the Allen head bolt in the centre. Using an 8mm Allen key adjust so the brake is neither too tight nor too loose. The wire spool should rotate smoothly & not over run at the end of a weld. The brake tension is best set at higher wire feed speed & with a full wire spool. If the wire overruns it may fall off the spool rim, resulting in tangles & incorrect feeding.**

MIGMAKER welding polarity – Gas / Gasless operation

All MIGMAKER models have a built in polarity change point inside the wire feed door as shown on the previous page.

For MIG operation using gas, the earth return cable connects to the – output & the torch connects to the + output.

To use without gas (self shielding MIG wire), swap the polarity to + earth return & - connected to the torch. Two 13mm spanners are needed to change or check the output connections. Always hold the bottom bolt head in one position & adjust the top nut.

Take care when changing or checking polarity, ensure all connections are clear of touching the case or other metal objects, they must be tightened well using two spanners to prevent overheating.

MIG wire

The MIG welding wire used is generally selected to be similar to the material being welded, for instance to weld stainless steel you would not use a mild steel wire etc.

The diameter of MIG welding wire should be selected according to the power and thickness of material being welded. 0.8mm wire is the smallest recommended size & is suitable for between 30 and 180amps for automotive & light fabrication or maintenance. 0.6mm wire can be used for the very thinnest jobs, but generally 0.8mm is Ok for almost all light to medium welding.

1.0mm wire covers the range from about 80amps to 280amps (repairs + medium fabrication).

The above sizes and current ranges are approximate only, as many other factors need to be considered such as the gas used, the material being welded etc.

Always keep the MIG wire dry & rust free, do not use if the wire is rusty

Gas

The choice of gas depends upon the material being welded. For mild steel & general purpose welding Argon with co2 content between 5% and 20% gives the best results. Pure co2 can be used however it gives a cold and splattery weld and is not so nice to use, pure argon results in an arc which is flary & too hot for mild steel. However for stainless steels and aluminium welding pure argon is normally used. Some specialist gases such as helium / argon mixtures are available for special applications, consult your local gas specialist for further information.

The correct gas flow is essential, too little flow can result in a porous weak weld, too much and the arc can become harsh.

The gas flow should be set on the regulator to suit the welding conditions; higher welding current needs a higher gas flow, the correct flow rates are between 2-25 litres per min. Start with a very low flow rate, as a guide you should be able to only just hear the gas flowing from the nozzle when pulling the torch switch.

Never try to use a gas not intended for MIG welding

MIG welding with this machine

With the machine all set up ready to MIG weld, the operator should first set the welding power required to suit the thickness and type of weld to be carried out. The weld power switches adjust the welding voltage. A little trial and error is required when first setting the welding voltage. It's generally better to start with a lowish voltage setting and increase if needed.

Next set the wire feed speed to suit the welding power set and the wire size being used.

You should start initially with some scrap metal, the welding torch should be held over the material so that the copper contact tip is around 5mm away from the job and at around 45° to the job. It's acceptable to rest the outer edge of the welding nozzle onto the job just angle the torch back to give 3-6mm between the tip & the work. Make sure your eyes are protected by the welding mask, then press the torch switch and attempt to weld watching through the lens of the mask. As soon as a stable arc is created pull the torch away from the job slightly & move the torch steadily to create the required weld position & profile.

For welding at currents below 250A (dip transfer) a good arc condition is achieved when a consistent buzz or crackle is heard from the arc. If the arc is very bright and trying to burn back to the contact tip, then increase the wire speed a little, if the arc is stubbing out or pulsing badly or if the wire is trying to push the torch away from the job, then turn the wire speed down a bit.

To finish a weld simply release the torch switch but keep the torch in place for a fraction of a second, this allows the wire to burn back from the arc a little. If you pull away the torch too quickly then the welding wire may have too long a stick out from the torch each time. This machine has a burn back control fitted internally to stop the wire fractionally before the welding arc finishes to achieve the correct wire stick out.

The direction of travel affects the weld a little, pulling the torch tends to create a narrower more prominent weld. Whilst pushing the torch gives a wider more penetrating weld.

MIG welding basics

The normal process of MIG welding involves an electric arc, a consumable wire and a shielding gas.

The electrical arc creates the heat which melts both the welding wire and the material being welded, the result is a weld pool which is protected from the atmosphere by the shielding gas, or by flux if using a special gas-less wire. Without the shielding gas oxygen, other gases would contaminate the weld pool to create a weak porous unusable weld.

The welding current used for MIG welding is DC (direct current).

The output characteristics of most MIG welding machines is of the constant voltage type (CV). Therefore, when the voltage has been selected on the machine its value remains fairly constant, only dropping a little with increasing current draw.

For the vast majority of MIG welding the electrode (wire) is positive potential with the work being negative. MIG welding below 250A is normally carried out in dip transfer mode this means that the wire is constantly dipping into the welding pool & burning back which creates a stable crackle or buzzing sound if set up correctly. MIG welding above 250A is done in spray transfer mode, where the wire constantly burns off into the weld pool without constantly dipping into the pool. This results in a more stable quiet arc.

The welding voltage selection on all models of machines is the main control of the actual heat input into the welding pool, the higher the volts the more power.

MIG welding voltage range is from 14v to 44v.

The wire speed control and the wire size selected both affect the actual value of welding current achieved at a given welding voltage.

Trouble shooting guide

Problem	Possible cause	Solution & checks
Machine trips circuit breaker during welding.	Incorrect circuit breaker used.	Check size against specifications. Check type – it should be a 'D' rated (slow) type.
Fan not running when machine powered up.	Incoming mains power supply.	Check mains supply into machine
Machine stops welding after a period of use on higher settings. Over temp light on front illuminates when torch switch is pressed.	Overheated main transformer caused by duty cycle being exceeded	Reduce output power or welding time to prevent re-occurrence. Constantly overloading any machine will cause excessive wear & stress. Leave machine switched on for 5-10 minutes & retry.
Machine MIG welds but arc is a bit erratic or pulses.	Wire feeding fault or wire feed speed set too high.	Check the tension on the wire drive arm, it should not be too high or too low, around half way is a good setting. Replace the torch liner. Check the torch liner is the correct size to match the wire, this is very important, normally a blue liner is suitable for 0.6 & 0.8mm wire, a red liner for 1.0 & 1.2mm only. Try to keep the torch straight it assists the feeding of wire. Reduce speed setting on the wire speed control.
MIG wire intermittently sticks to contact tip when welding	Wire feeding problem or torch front end consumables overheating.	Check wire feed & torch carefully as above. Check contact tip & adaptor are tightened into torch. Check power rating of torch.
MIG weld has some small bubbles noticeable.	Gas coverage problem.	Check gas flow rate is adequate, clean out the nozzle or replace nozzle if damaged, make sure the torch & consumables are in good condition & check for gas leaks from the torch, machine or regulator. Air can be drawn into a leaking regulator or hose. Check for windy conditions or draft from fan or other sources.
Welding performance appears to have reduced over time, or deteriorates during welding, most noticeable on long runs.	Overheated or damaged welding cables or earth clamp.	Check all weld cables, cable lugs & the work piece (earth) clamp for any signs over overheating or damage. A hot connection or cable is a sure sign of power loss which compromises welding performance.

For any technical assistance or problems contact your local OXFORD supplier in the first instance. Or contact OXFORD WELDERS directly. We can diagnose almost any problem within minutes over the phone or by email.

Common wire feed spare parts

Description	Part number	pcs/machine
Roller 0.6-0.8mm V groove for hard wire	FECV0608	1
Roller 0.8-1.0mm V groove for hard wire	FECV0810	1
Roller 1.0-1.2mm V groove for hard wire	FECV1012	1
Roller 1.0-1.2mm U groove for soft wire	FECU1012	1
Roller 1.0-1.6mm Knurled for flux cored	FECK1016	1
Roller retaining cap	FEC2011	1

Maintenance

General - operator checks

These models are easy to maintain with little to go wrong, however with a little basic maintenance your MIGMAKER will keep welding reliably year after year.

Firstly, cables can easily become damaged, the operator should carry out daily checks of all cables, welding cables and connections etc; any faults must be reported to a competent person and the machine taken out of service until repaired. Particular attention should be paid to the mains input cable to ensure it is kept safely away from anything which may damage it. In the event of any crush damage, insulation damage or other damage, isolate the machines supply at the wall immediately.

Any wheels & running gear should be regularly checked for condition, with particular attention paid to the rear wheels & axles to ensure stability when a gas cylinder is fitted.

Check the two polarity change connections inside wire drive compartment. They must be tight & with no signs of over heating or shorting to chassis. Check the welding earth cable & clamp for signs of overheating or damage. A poor clamp or connections results in a poor weld.

The welding torch & wire feed roller mechanism needs to be checked & cleaned regularly to ensure best performance; the torch liner will need replacing after a few rolls of wire or every few months.

The wire feed rollers & gears should be checked each year or sooner in tough environments.

After a period of non use or in damp conditions the MIG wire may rust, don't run rusty wire through the drive rollers & torch. Try uncoiling the top layers of wire if rusted a little.

Internal & engineer maintenance

Do not attempt any electrical repairs without first isolating any incoming mains power supply.

Do not attempt any electrical repairs unless fully competent.

Do not attempt any maintenance or inspection of any feed mechanisms or fans or other moving parts without switching machine to off.

These models require very little maintenance. However, we do recommend a regular service inspection and electrical test be carried out by a competent person and documented; the outer covers from the power source should be removed & any dust cleaned out with particular attention made to excess dust build up on or around the main components. All internal connections & wiring should be inspected for any signs of overheating or failure. Particular attention should be paid to the main welding circuit power connections & output socket connectors. An electrical safety test to BS EN IEC60974-4 should be completed. (Note - PAT testing of welding machines is incorrect & unsafe, only tests to IEC60974-4 are appropriate to confirm electrical safety).

The frequency of this service depends mainly on machine usage & conditions. If the machine is used regularly or used in dirty or damp conditions this should be every 12 – 24 months, however if the machine is used for occasional work & kept in clean dry conditions its perfectly acceptable to consider a 3-5 year service interval.

We aim to offer the very best long term support for your OXFORD machine. We stock all parts in York & will provide service & support to keep it working for you for a minimum of 25 years from purchase.

Your OXFORD supplier should be able to organize all service, testing & supply of spares for this machine & should be contacted in the first instance.

Alternatively, please contact us directly at sales@oxfordwelders.co.uk.

Or telephone 01904 410041 (overseas +44 1904 410041)

Spare parts not shown in this manual

All spare parts are readily available from your OXFORD supplier or direct from OXFORD.

sales@oxfordwelders.co.uk

Manufactured in Great Britain by;

Oxford Welders / Technical Arc Ltd

York

YO19 5UP

UK

Tel: 01904 410041 (International +44 1904 410041)