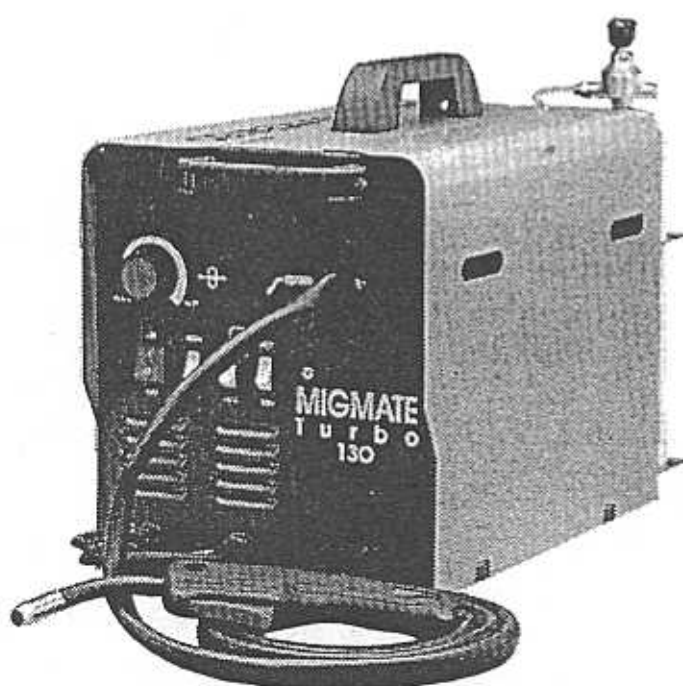


Manual

NEW MIGMATE

PORTABLE MIG WELDERS



Portable MIG Welders



162000068

Introduction

With this welding unit you can now experience the many advantages of the MIG/MAG and/or MOG welding processes. This unit will enable you, with the help of this manual and a little practice, to obtain a professional finish in welding car bodywork, and many other uses for which you'll find it ideal.

THE MIG / MAG / MOG WELDING PROCESS

This welder produces a direct current output (D.C.) with a static flat characteristic, enabling an arc to be struck between a continuously fed consumable electrode (wire) and the workpiece. Power for the arc is provided by a transformer which has its output rectified to direct current. The wire is fed through the torch by feed rollers mounted on a DC drive motor and current is passed to the wire through the copper contact tip in the torch nozzle. The wire melts in the arc and is transferred to the weld pool in the form of droplets.

MIG / MAG PROCESS

The gas is passed through the machine and the torch and exits through the shroud, shielding the arc and the molten metal thus protecting it from air contamination.

MOG PROCESS

The wire used in this process has a flux core which, when melted, produces a gas which shields the weld pool from air contamination. This flux forms a coating which solidifies on the surface of the weld, this can be easily wire brushed off when the weld has cooled.

Both processes result in low heat input to the workpiece, ensuring minimum heat spread and distortion which combined with ease of use make them the ideal process for a multitude of jobs particularly on thin materials.

GUARANTEE

This welder is fully guaranteed against manufacturing defects for a period of 12 months from the date of purchase. The unit will be repaired free of charge with the exception of damage caused due to lack of proper maintenance, misuse or unauthorised tampering with the unit. Items which are subject to wear and tear such as torches, tips, shrouds, liners, etc., are not covered under the guarantee.

If your welder proves faulty during the guarantee period, it should be returned to the place of purchase together with the original receipt.

Safety

SAFETY

BEFORE OPERATING THE WELDING UNIT, YOU MUST PAY SPECIAL ATTENTION TO THE SAFETY NOTES GIVEN BELOW.

GENERAL

- 1) Electrical repairs must only be carried on by qualified or suitably trained personnel and only with the unit disconnected from mains.
- 2) We strongly advise that access to the interior of the unit be restricted to trained personnel only and that operating the unit with the covers removed be avoided.
- 3) The unit must be correctly installed (see "SETTING UP").
- 4) When the torch switch is pressed a voltage of 18 – 41V DC is present between the wire (contact tip) and work return lead. Normally this presents no hazard whatsoever but must be born in mind when servicing the torch or wire feed mechanism. Disconnect from the mains supply before undertaking servicing or repair operations.
- 5) MIG welding units are simple and safe to operate under normal circumstances. If the unit is to be used under unusual circumstances e.g. in wet or damp conditions, on boats or oil rigs, in an elevated position or platform, then we strongly recommend that extra thought be given to any possible hazard introduced by the situation. The degree of protection of the unit is IP 21 and it must not be exposed to rain.

This unit is suitable for welding operations in an environment with increased hazard of electric shock.

IF IN ANY DOUBT WHATSOEVER SEEK OUR PROFESSIONAL ADVICE

- 6) Do not attempt to lift the unit with the gas cylinder mounted on the rear platform. ALWAYS REMOVE THE GAS CYLINDER BEFORE LIFTING.
- 7) THIS UNIT CAN BE USED ON A SLOPING FLAT SURFACE UP TO 15°. If the optional wheel kit is used, chock the wheels before tilting.

FIRE

- All inflammable materials must be removed from the welding area.
 - DO NOT STRIKE AN ARC ON OR NEAR THE GAS CYLINDER.
 - DO NOT ATTEMPT TO WELD FUEL OR GAS CONTAINERS UNTIL ADEQUATE STEPS HAVE BEEN TAKEN TO ENSURE THAT NO VAPOUR REMAINS. It is strongly recommended that fuel tanks are thoroughly steam cleaned before welding.
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Safety contd.

FUMES

Toxic gases are given off during the MIG welding process which may collect in the welding area if the ventilation is poor. Be alert at all times to the possibility of fume build-up. **In small or confined areas use a fume extractor.**

GLARE

The electric arc generated by the MIG process gives off direct heat and ultra-violet radiation. It is essential that the eyes of the operator and bystanders are protected from the glare during welding.
ALWAYS USE A FACESHIELD OR WELDING HELMET FITTED WITH THE CORRECT GLASS FILTER.

HEAT

- It is desirable that **WELDING GLOVES** are worn whilst welding. They will protect the hands from ultra-violet radiation and direct heat of the arc.
- **OVERALLS** should also be worn. They should be of the type designed to be **BUTTONED AT THE WRISTS AND THE NECK.**

DRESS

In addition to faceshield, gloves and overalls, other types of protective clothing should be worn when working on thicker materials:

- when welding at higher settings a leather apron is recommended to protect the operator from spatter.
- when welding in the overhead position, the head and the neck should be protected by a skullcap and scarf.
- do not wear flimsy footwear whilst welding, we strongly recommend the wearing of industrial footwear.

IMPORTANT INFORMATION

- These units should never be exposed to rain or snow.
- Do not use in wet or damp environment.
- Do not use for thawing pipes.
- These units should be connected to the mains supply through a circuit breaker with the following ratings:

TYPE	CIRCUIT BREAKER
HANDYMATE	6 A
HANDYMIG	6 A
MIGMATE 105	6 A
MIGMATE 130	16 A
MIGMATE 150	16 A

Setting up

1) ELECTRICAL

Connection to a suitable socket must be made by a good quality three pin plug or a suitable fused isolator switch, with the wires connected as follows:

BROWN (or red or black) = live

BLUE (or white) = neutral

GREEN/YELLOW (or green) = earth/ground

THIS APPLIANCE MUST BE EARTHED/GROUNDED

(IN CERTAIN MARKETS A SUITABLE MOULDED OR STANDARD EARTHED/GROUNDED PLUG IS PROVIDED ACCORDING TO LOCAL REGULATIONS)

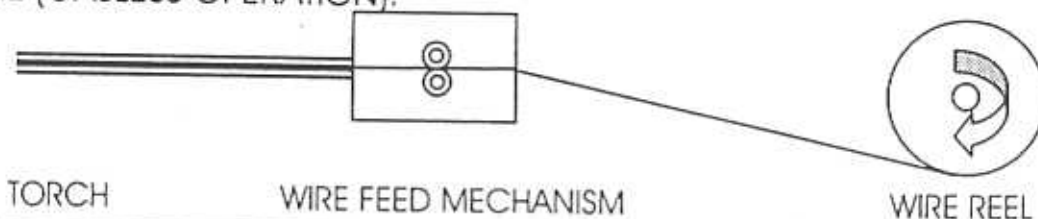
2) FEEDING THE WIRE

If the wire is not already fed through the torch, or when fitting a new reel follow the procedure below:

- Remove the shroud from the torch and unscrew the contact tip.
- Fit wire reel onto spindle.

Two sizes of wire reels where applicable can be fitted to the welder:

- 0.225 – 0.45kg cored wire reels, and 0.35-0.70kg solid wire fit straight onto the wire reel spindle.
 - 5kg reels are fitted using two spacers marked S and Z which must be assembled the correct way round. Additionally, the 5kg reels are available in two widths, in all cases the spring mounting must be correctly fitted.
- Locate the free end of the wire which will be terminated in a hole on the reel rim. Remove the end from the hole and cut off any distorted wire with a sharp pair of wire cutters. Be careful not to allow the wire to become slack on the reel.
 - Hinge back the pressure arm and feed the end of the wire into the hole in the end of the liner ensuring that the wire has been fitted so that it is fed into the wire feed mechanism in a straight line.
 - Fasten down the pressure arm ensuring that the wire is in the groove in the feed roller. N.B. the feed roller has two grooves, one for 0.6mm wire and one for 0.8mm. Ensure that the correct one is being used. To reverse the roller unscrew the two screws securing the roller supporting bracket and remove the bracket. The roller can now be removed from its shaft and reversed. ALWAYS USE THE KNURLED ROLLER FOR CORED WIRE (GASLESS OPERATION).



Setting up *contd.*

- f) Switch on the machine and operate the torch trigger, the wire feed roller will turn, feeding the wire through the torch. It is advisable to keep the torch as straight as possible during this operation.
- g) When the end of the wire has emerged from the far end of the torch, feed the tip onto the wire, ensuring that it is the correct size for the diameter of wire being used, tighten it and replace the shroud.

3) SELECTING POLARITY (DUAL PURPOSE MODELS ONLY)

The torch and work lead polarity must be set correctly for the type of welding to be carried out. When using normal welding wire (solid) and gas (CO₂, Argon, etc.) the torch connection is connected to the positive (+) terminal and the work lead to the negative (-) terminal.

When using cored wire for gasless operation the work lead is connected to the positive (+) terminal and the torch connection to the negative (-) terminal. The leads can be withdrawn from the +/- terminals by turning the terminals anti-clockwise. To ensure a good connection when refitting turn them fully clockwise.

IMPORTANT: THE FOLLOWING SETTING UP PROCEDURES DO NOT APPLY TO THE GASLESS MACHINES.

4) FITTING THE GAS CYLINDER MOUNTING BRACKET (WHERE PROVIDED)

Fit the two brackets to the rear of the machine sliding them into the slots punched for this purpose.

N.B. The bracket with the smaller hole should be mounted at the bottom.

5) CONNECTING THE GAS PIPE

(Also applicable to dual purpose machines when using solid wire)

Connect the gas pipe to cylinder by pushing the free end into the connector on the regulator. (If required, the pipe can be detached again by pushing the pipe and the small ring around it into the fitting, and then pulling the pipe whilst maintaining the pressure on the ring).

6) FITTING THE GAS REGULATOR AND DISPOSABLE CYLINDER (WHERE PROVIDED)

- a) Remove the seal from the cylinder thread and **PROTECTING THE EYES** depress slightly the valve pin to allow a small amount of gas to escape. The valve will close automatically when the pin is released.

Setting up *contd.*

- b) Connect the gas regulator by slowly screwing it onto the cylinder thread. Hand tighten only.
- c) **IMPORTANT:** Always detach the flowmeter from the cylinder when you have finished welding. This to avoid small leakages, that may occur in fittings and torches which will empty the cylinder in the long term.

N.B. Due to local regulations, some machines are supplied with different types of regulators, with no regulator and with or without a gas cylinder.

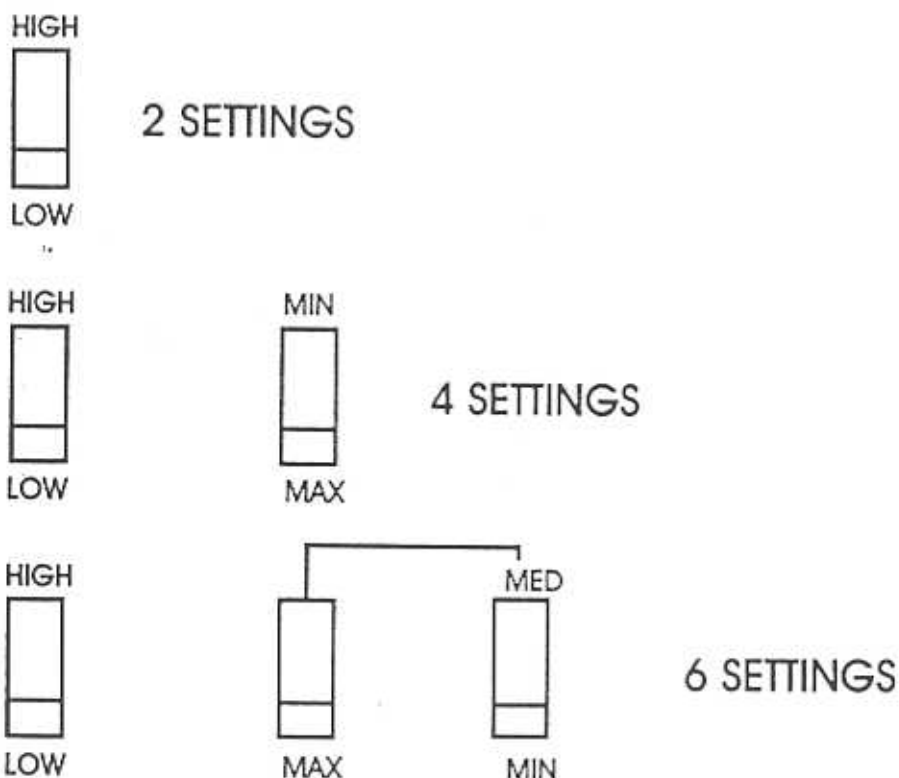
7) SETTING THE GAS FLOW

Turn the control knob fully clockwise and then turn back anti-clockwise approximately 1/2 – 1 turn depending on welding conditions.

8) VOLTAGE SETTING

The machine depending on the model will have 2, 4 or 6 output settings, controlled by the rocker switch(es) on the front panel (see fig. A).

FIG. A



Setting up *contd.*

Switching from one setting to the other automatically increases and decreases the wire speed and therefore the welding output. On material from 0.6mm up to 1.3mm select "LOW" setting(s). For thicker materials select "HIGH" setting(s).

Fine adjustment can be obtained by selecting "MAX", "MED", "MIN" settings where provided. On 6 settings machines the "MIN" and "MED" switch is not enabled unless the "MAX" switch is depressed upwards.

N.B. The wire feed speed is automatically adjusted when the output is selected. The wire speed setting control provides fine tuning (see fig. B).

WIRE SPEED SETTING

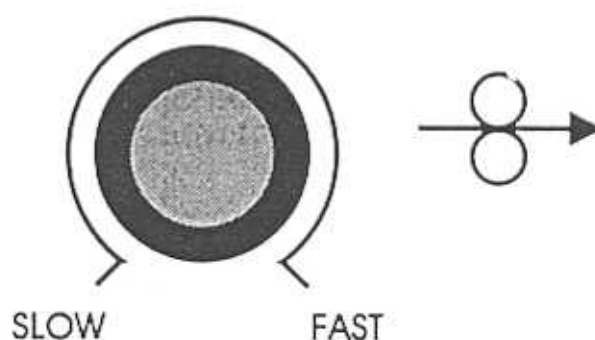


FIG. B

Starting to weld

BEFORE WELDING ENSURE THAT:

- You have read the safety section of this manual.
 - All oil, petrol and flammable containers have been removed from the area.
 - There is good all round ventilation, particularly at the front and rear of the unit.
 - You have an adequate fire-fighting appliance on hand.
- 1) Connect the work earth clamp onto the metal to be welded (scrap material for first attempt).
 - 2) Set output and wire feed speed by turning or pressing the appropriate controls (see figs A and B), taking into account the material type and thickness and the wire size.
 - 3) Plug in and switch on the machine.
 - 4) Clip off any protruding wire to 3mm (1/8") from the tip.
 - 5) Position tip 6mm (1/4") from the point where the welding is to commence.
 - 6) Hold the mask in front of your eyes.
 - 7) Press the trigger and when the arc strikes move the torch slowly in the chosen direction.
 - 8) If the arc gives a humming sound and a blob tends to form on the end of the wire, you have insufficient wire speed and it should be increased; or if it gives an erratic sound with possibly a feel that the wire is stubbing against the work and excessive spatter, you have too much wire speed and it should be reduced. When the speed is correct you will get a steady smooth crackling sound. If a porous weld results you have insufficient gas flow and it should be increased.
 - 9) The unit can be set to deliver different output currents at a duty cycle that is written as a percentage on its rating plate printed on the cover. This percentage represents the welding time in a 10 minutes cycle, e.g. 60% means that the welding time is 6 minutes and rest time is 4 minutes. If the unit is used beyond its duty cycles, the temperatures of some components might become too high due to over use: the internal thermal protector will then prevent the unit from operating. Its intervention is indicated by a yellow lamp in the front panel: if this happens, on non fan cooled machines switch off the machine and allow it to cool down. The thermal protector will re-set automatically after a short period when the components have cooled, and you will be able to restart welding. On fan cooled versions, the machine will cool down more quickly if left switched on with the fan running.
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Notes

Welding problems

WELDING PROBLEMS

Weld deposit "stringy" and Incomplete:

- a) torch moved over the workpiece too quickly
- b) Gas flow incorrect

N.B. MIG welders couldn't work properly if exposed to wind, because the shielding gas is blown off the welding pool.

Weld deposit too thick:

- a) Torch moved over the workpiece too slowly
- b) Welding voltage too low

Arc unstable, excessive spatter and weld porosity:

- a) Torch held too far from the workpiece
- b) Rust, grease or paint on the workpiece
- c) No gas – check bottle content/connections
- d) Incorrect gas for material

Wire repeatedly burns back:

- a) Torch held too close to the workpiece
- b) Intermittent break in the welding circuit caused by:
 - contact tip loose – tighten.
 - contact tip damaged – replace.
 - incorrect size of contact tip for wire – replace.
 - welding wire or liner corroded – replace.
 - worn feed rollers – replace.
 - pressure roller adjustment incorrect – adjust by increasing until light finger pressure on the wire does not stop the wire feeding.
 - pressure roller sticking – check for smooth rotation and lubricate or replace if necessary.
 - wire tangled on reel.

Burning holes in the workpiece:

- a) Torch moved too slowly or erratically.
- b) Welding output too high.

Lack of penetration:

- a) Torch moved too fast.
- b) Welding output too low.
- c) Wire feed speed too low.

Welding problems *contd.*

No arc:

- a) Check earth clamp connections.
- b) Check earth lead or torch cable for an open circuit – replace if necessary.

Machine does not operate when trigger pressed:

- a) Thermal overload cutout in operation – allow to cool down.
- b) Check torch trigger/torch trigger connections.

Machine does not operate – Mains indicator not lit:

- a) Check supply fuse.
 - b) Check mains connections.
-

Maintenance

MAINTENANCE

We strongly advise that:

- electrical repairs must only be carried on by qualified or suitably trained personnel
- access to the interior of the unit be restricted to trained personnel only
- operating the unit with covers removed be avoided
- any maintenance or repair operation be carried out with the unit disconnected from mains.
- If the mains lead is to be replaced, connect and fix the conductors of the new lead inside the machine so that they cannot come into contact with parts that may become hot during normal operation, such as transformer, choke, rectifier or P.C.B. heat sink.

Welding cables

Periodically inspect their connections.

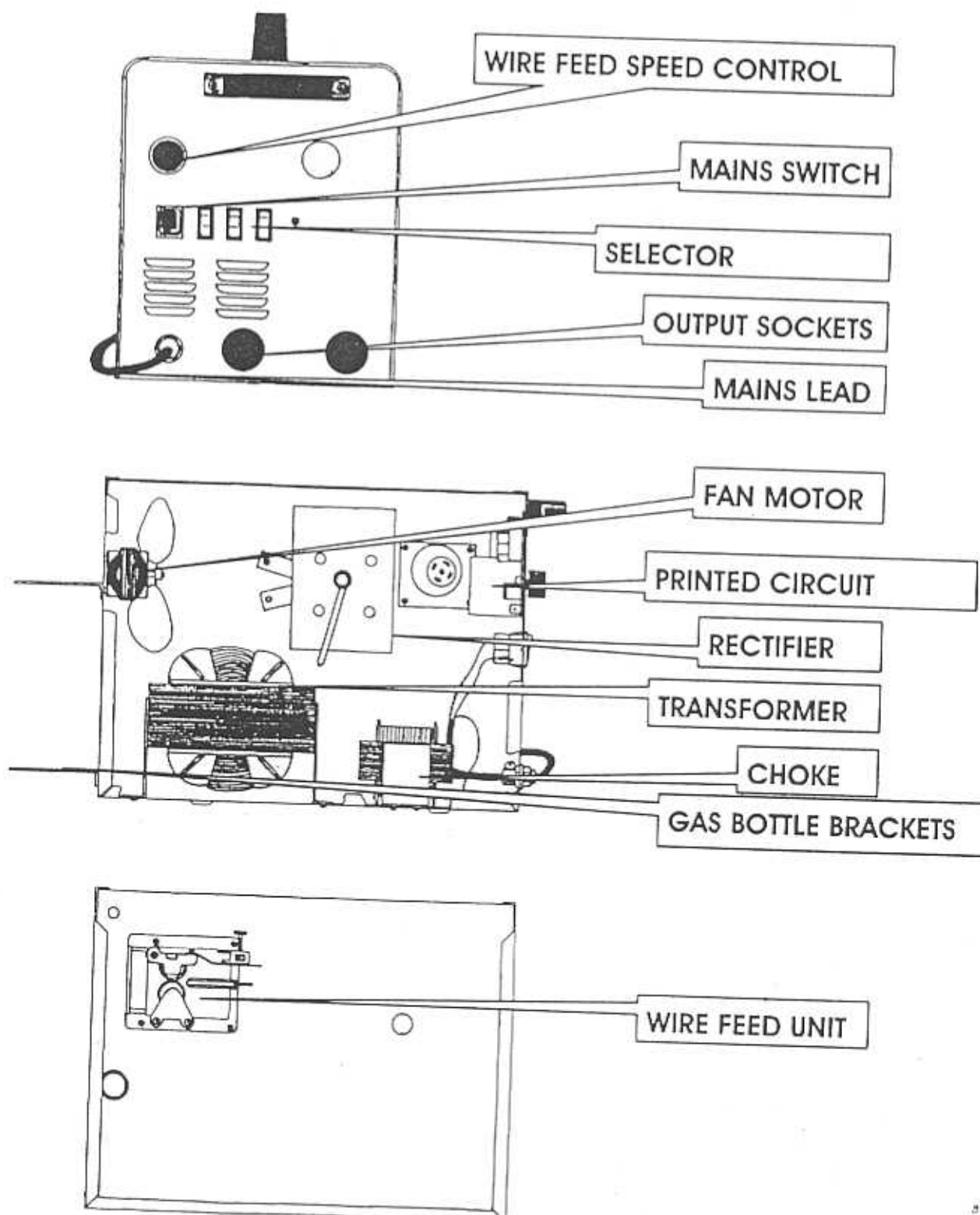
The machine

Periodically requires cleaning internally (more frequently in dirty conditions or on fan cooled versions). The side panel(s) should be removed after having disconnected the unit from the mains supply. The machine should be blown out with dry clean air, avoid directing high pressure air at sensitive components.

Torch

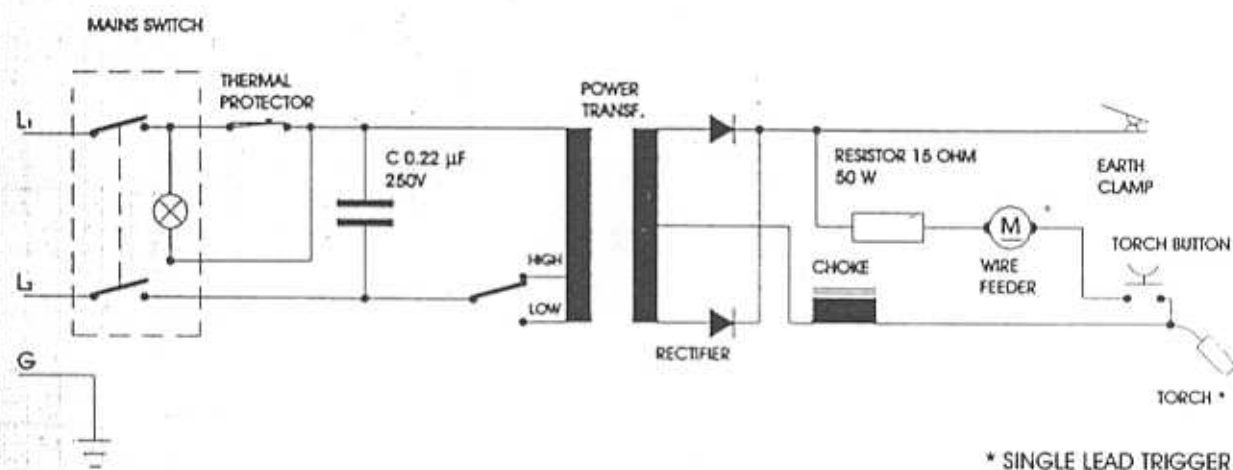
The contact tip and shroud must be cleaned regularly to remove spatter which will eventually disturb the gas flow. Anti-spatter spray sprayed onto the shroud and the tip will reduce the build-up of spatter. Replace the tip regularly as a good electrical contact between the tip and wire is essential. Avoid kinking the torch and never use it to pull the machine around. To ensure the wire passes freely through the torch the liner should be blown through with dry clean air from time to time. If the wire still not pass through the liner freely then the liner should be replaced.

Spare parts list

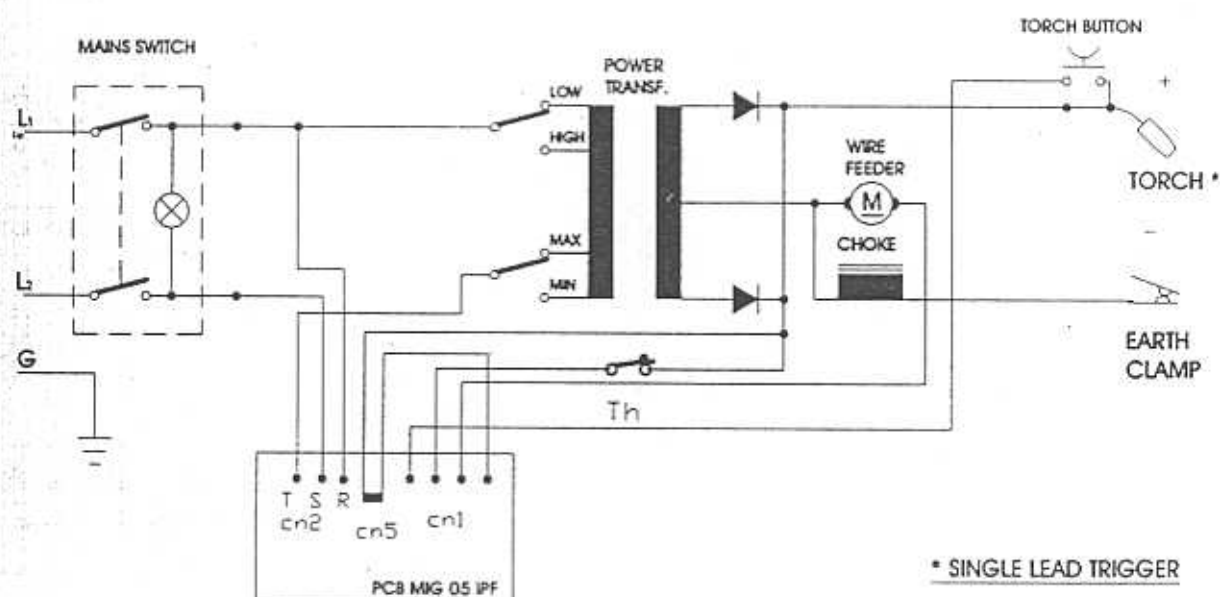


Wiring diagrams

HANDYMATE

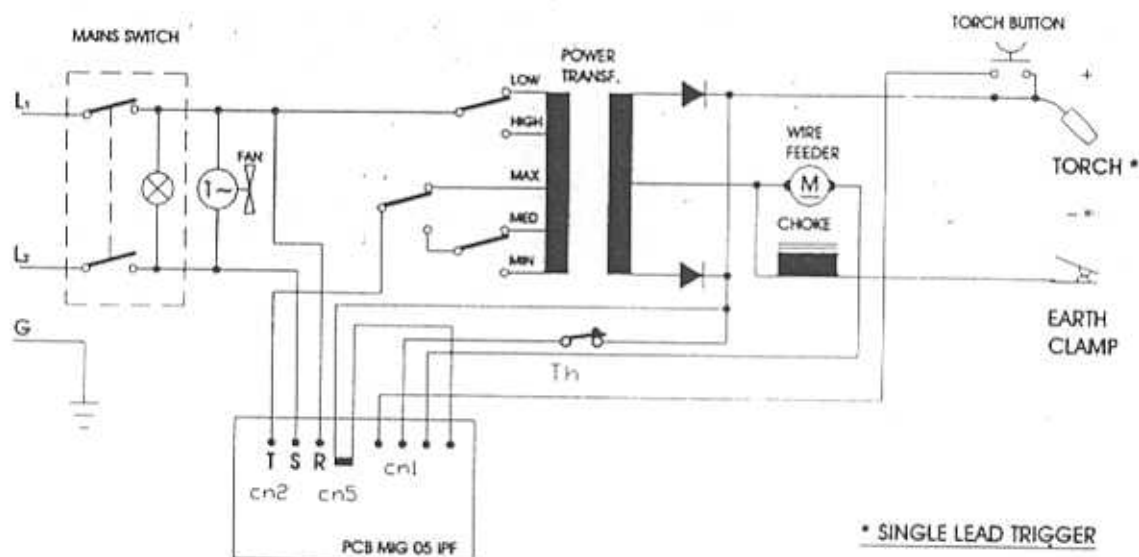


HANDYMIG

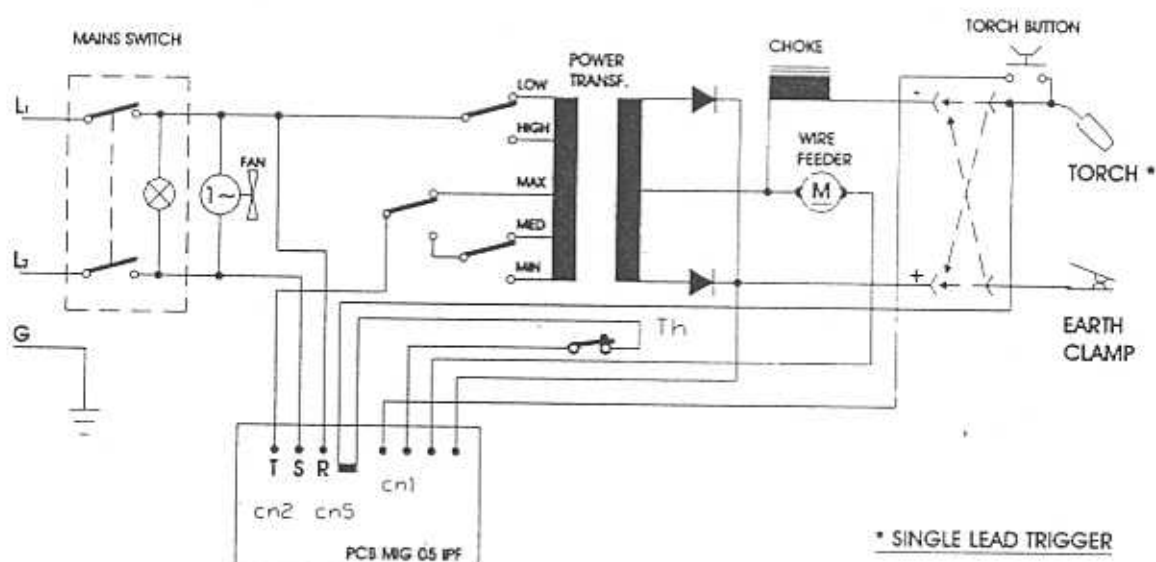


Wiring diagrams *contd.*

MIGMATE 105 - 130 - 150



MIGMATE 105 - 130 - 150 DP



Weights and dimensions

Weights and dimensions in the following table refer to **unpacked** units.

MODEL	WEIGHT (Kg)	DIMENSIONS (L. x W x H; mm.)
HANDYMATE	18.2	430x263x350
HANDYMIG	18.7	430x263x350
MIGMATE 105	19	430x263x350
MIGMATE 130	20.2	430x263x350
MIGMATE 150	21.2	430x263x350