



INSTRUCTIONS FOR

SUPERMIG WELDERS

Models:

Supermig185/8.V3

Supermig195/9.V3

Supermig220.V4

Supermig235.V3

Thank you for purchasing a Sealey Welder. Manufactured to a high standard this product will, if used according to these instructions and properly maintained, give you years of trouble free performance.

⚠ IMPORTANT: BEFORE USING THIS PRODUCT, PLEASE READ THE INSTRUCTIONS CAREFULLY. MAKE CAREFUL NOTE OF SAFETY INSTRUCTIONS, WARNINGS AND CAUTIONS. THIS PRODUCT SHOULD ONLY BE USED FOR ITS INTENDED PURPOSE. FAILURE TO DO SO MAY CAUSE DAMAGE OR PERSONAL INJURY, AND WILL INVALIDATE THE WARRANTY. RETAIN THESE INSTRUCTIONS FOR FUTURE USE.

1. SAFETY INSTRUCTIONS

1.1. ELECTRICAL SAFETY. ⚠ WARNING! It is the user's responsibility to read, understand and comply with the following:

You must check all electrical equipment and appliances to ensure they are safe before using. You must inspect power supply leads, plugs and all electrical connections for wear and damage. You must ensure the risk of electric shock is minimised by the installation of appropriate safety devices. An RCCB (Residual Current Circuit Breaker) should be incorporated in the main distribution board. We also recommend that an RCD (Residual Current Device) is used with all electrical products. It is particularly important to use an RCD together with portable products that are plugged into an electrical supply not protected by an RCCB. If in doubt consult a professional electrician. You may obtain a Residual Current Device by contacting your Sealey dealer. **You must** also read and understand the following instructions concerning electrical safety.

- 1.1.1. The **Electricity At Work Act 1989** requires all portable electrical appliances, if used on a business premises, to be tested by a qualified Electrician at least once a year by using a Portable Appliance Tester (PAT).
- 1.1.2. The **Health & Safety at Work Act 1974** makes owners of electrical appliances responsible for the safe condition of the appliance, and the safety of the appliance operator. **If in any doubt about electrical safety, contact a qualified electrician.**
- 1.1.3. Ensure the insulation on all cables and the product itself is safe before connecting to the mains power supply. See 1.1.1. & 1.1.2. above and use a Portable appliance Tester (PAT).
- 1.1.4. Ensure that cables are always protected against short circuit and overload.
- 1.1.5. Regularly inspect power supply, leads, plugs and all electrical connections for wear and damage, especially power connections, to ensure that none are loose.
- 1.1.6. **Important:** Ensure the voltage marked on the product is the same as the electrical power supply to be used, and check the plugs are fitted with the correct capacity fuse.
- 1.1.7. DO NOT pull or carry the powered appliance by its power supply lead. Products such as welders must not be pulled or carried by their output cables.
- 1.1.8. DO NOT pull power plugs from sockets by the power cable.

1.2. IMPORTANT : THESE SUPERMIGS CAN BE CONNECTED TO EITHER A 30 AMP SINGLE PHASE SUPPLY OR A PROPERLY INSTALLED 13AMP SUPPLY. TO ACHIEVE MAXIMUM OUTPUT HOWEVER A 30AMP FUSED SUPPLY SHOULD BE USED. WE RECOMMEND YOU DISCUSS THE INSTALLATION OF AN INDUSTRIAL ROUND PIN PLUG & SOCKET WITH A QUALIFIED ELECTRICIAN.

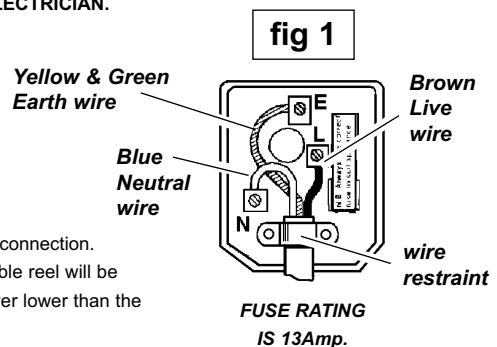
1.2.1. To fit a 13Amp plug proceed as follows: (UK only - see diagram figure 1).

Ensure the unit is correctly earthed via a three-pin plug.

- a) Connect the **GREEN/YELLOW earth wire** to the earth terminal 'E'.
- b) Connect the **BROWN live wire** to live terminal 'L'.
- c) Connect the **BLUE neutral wire** to the neutral terminal 'N'.

After wiring, check there are no bare wires, that all wires have been correctly connected and that the wire restraint is tight.

- 1.2.2. **Cable extension reels.** When a cable extension reel is used it should be fully unwound before connection. A cable reel with an RCD fitted is recommended since any product which is plugged into the cable reel will be protected. The cross-section of the cable on the cable reel must be suitable for the unit and never lower than the cross-section of the main cable supplied with unit.



1.3 GENERAL SAFETY

▲ DANGER! Unplug the welder from the mains power supply before performing maintenance or service.

- ✓ Keep the welder and cables in good working order and condition. (Take immediate action to repair or replace damaged parts).
- ✓ Use genuine parts and accessories only. (Non recommended parts may be dangerous and will invalidate the warranty).
- ✓ Use an air hose to regularly blow out any dirt from the liner, and keep the welder clean for best and safest performance.
- ✓ Check and spray the gas cup and contact tip regularly with anti-spatter spray available from your Sealey dealer.
- ✓ Locate welder in a suitable working area for its function. Ensure area has adequate ventilation as welding fumes can be harmful.
- ✓ Keep working area clean, tidy and free from unrelated materials. Also ensure the working area has adequate lighting, and that a fire extinguisher is at hand.
- ⚠ **WARNING: Use welding head shield to protect eyes and avoid exposing skin to ultraviolet rays given off by electric arc. Wear safety welding gauntlets.**
- ✓ Remove ill fitting clothing, remove ties, watches, rings, and other loose jewellery, and contain long hair.
- ✓ Ensure the workpiece is correctly secured before operating the welder.
- ✓ Avoid unintentional contact with workpiece. Accidental or uncontrolled use of the torch may be dangerous and will wear the nozzle.
- ✓ Keep unauthorised persons away from the working area. Any persons working within the area must wear protective head shield and gloves.
- ✓ **Operators must receive adequate training before using the welder.** The welder must only be operated under supervision.
- ✓ Stand correctly keeping a good footing and balance, and ensure the floor is not slippery, and wear non-slip shoes.
- ✓ Turn voltage switch to "0" (off) when not in use.
- x DO NOT operate the welder if it or its cables are damaged and DO NOT attempt to fit any non genuine torches, components, or parts to the welder unit.
- x DO NOT get welder wet or use in damp or wet locations or areas where there is condensation.

▲ DANGER! DO NOT weld near flammable materials, solids, liquids, or gases, and DO NOT weld containers or pipes which have held flammable materials or gases, liquids or solids. Avoid welding on (or near to) materials cleaned with chlorinated solvents.

- x DO NOT stand welder on a metal workbench, car bodywork or similar object.
- x DO NOT touch any live metal parts of the torch or electrode while the machine is switched on.
- x DO NOT pull the welder by the cable, or the torch. DO NOT bend or strain cables. Protect cables from sharp or abrasive items. DO NOT stand on cables or leads. Protect cables from heat. Long lengths of slack cable must be gathered & neatly coiled. DO NOT place cables where they may endanger others.
- x DO NOT touch the torch or workpiece immediately after welding as they will be very hot. Allow to cool.
- x DO NOT operate welder while under the influence of drugs, alcohol or intoxicating medication, or if fatigued.
- ✓ When not in use store the welder in a safe, dry, childproof area.

1.4. GAS SAFETY

- ✓ Store gas cylinders in a vertical position only and ensure the storage area is correctly secured.
- ✓ DO NOT store gas cylinders in areas where temperature exceeds 50°C. DO NOT use direct heat on a cylinder. Always keep gas cylinders cool.
- x DO NOT attempt to repair or modify any part of a gas cylinder or valve, and DO NOT puncture or damage a cylinder.
- x DO NOT obscure or remove any official labels from a cylinder. Always check the gas identity before use. Avoid getting gas cylinders oily or greasy.

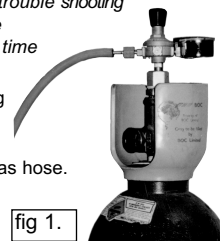
2. SPECIFICATIONS & INTRODUCTION

Model No:	SUPERMIG185/8.V3	SUPERMIG195/9.V3	SUPERMIG220.V4	SUPERMIG235.V3
Welding Current:	30-185A	30-195A	40-220A	35-235A
Wire Capacity steel:	5kg	5-15kg	5-15kg	5-15kg
Duty Cycle:	100% @60Amps	100% @60Amps	100% @70Amps	100% @80Amps
Cooling System:	Forced Air	Forced Air	Forced Air	Forced Air
Gas Type:	CO ² /Argon mix & Argon	CO ² /Argon mix & Argon	CO ² /Argon mix & Argon	CO ² /Argon mix & Argon
Torch:	Euro Non Live	Euro Non Live	Euro Non Live	Euro Non Live
Power Input/Efficiency:	230V 1ph 5.9kVA	230V 1ph 6.0kVA	230V 1ph 6.2kVA	230V 1ph 7.8kVA

IMPORTANT: These instructions contain information you require to prepare your machine for welding, together with a maintenance and trouble shooting section. If you have no previous experience the instructions are not intended to show you how to become a welder. Should you have no experience, we recommend that you seek training from an expert source. Mig welding is relatively easy to perform, but does require a steady hand and time practising under supervision with scrap metal as it is only with continued practice that you will achieve the desired results.

INTRODUCTION: These Supermigs are compact power sources, that operate on a forced air cooling system to slow transformer heating in order to increase the duty cycle. They also have a non live torch to prevent the risk of accidentally striking an arc. Your Supermig is designed to operate with two diameters of welding wire: 0.6mm, & 0.8mm. The 185 will accommodate a 5kgs wire spool, whilst the 195, 220 & 235 will accommodate 5 to 15kgs wire spools. All Models are equipped with: ✓ Torch, ✓ Mini reel of 0.6mm wire, ✓ Regulator, ✓ Gas hose.

fig 1.



3. ASSEMBLY & PREPARATION

3.1. Wheel Assembly

- 3.1.1. Turn machine upside down, and remove the screws attached to the bottom front. Use these screws to attach the front castor wheels.
- 3.1.2. Take the rear axle and fit a wheel to one end by placing a washer, then the wheel, a second washer and then insert a split pin.
- 3.1.3. Pass the axle through the two brackets under the gas cylinder carrier, then fit the other washer, wheel, washer, split pin.

3.2. Connecting the gas cylinder

- 3.2.1. When using Argon or Argon mixtures, use the Bull Nose Adaptor. If you intend to use CO₂ gas, the regulator will fit directly onto the cylinder. Fit the Bull Nose Adaptor to the cylinder with a spanner.
- 3.2.2. Fit the gas regulator on the Bull Nose Adaptor and connect it to the machine gas hose (fig.1).
- 3.2.3. Set the regulator flow rate to 5-8 litres/min depending on the material to be welded, and whether there are draughts which are strong enough to disturb the gas flow.

3.3 Mobile use of welder with gas cylinder attached. The welder should only be transported with a small or medium gas cylinder attached. *Do not transport the welder with a large cylinder attached.*

3.4. Fitting a reel of wire Wire capacity: (Mild Steel). 5 - 15 kilos. (5 kilos for 185/8)

- 3.4.1. Push reel of wire over reel holder end springs and onto reel holder ensuring the spool rotates clockwise, with the wire drawing off reel from the top (see white arrow in fig 2). Large spools of wire have a guide hole which must be pushed onto plastic pin located at the end of the reel holder. This pin will stop larger reels from free wheeling.
- 3.4.2. To secure the reel of wire take the plastic spacer and identify the two cut outs at one end (fig 2a). Place the spacer over the holder end springs and onto the reel holder ensuring the two cut outs are facing inward toward the reel of wire (fig. 2).
- 3.4.3. Undo the wire lock screw and lift the wire feed lever up to the right (fig 2).
- 3.4.4. Straighten about 40-50mm of spool wire (*do not allow wire to uncoil*), and gently push wire through the plastic guide and through the 6 or 8mm roller groove (see 6.3), and through to the torch (fig. 3).
- 3.4.5. Carefully return the tension arm and secure wire with the wire lock screw.
- 3.4.6. Remove gas cup (fig 3.3.6.a) and contact tip (b) from end of torch as follows:
 - a) Take torch in left hand with the torch tip facing to the right.
 - b) Grasp gas cup firmly in your right hand.
 - c) Turn gas cup **clockwise only (c)** and pull cup out to the right.
 - d) Unscrew copper contact tip (*right hand thread*) to remove.

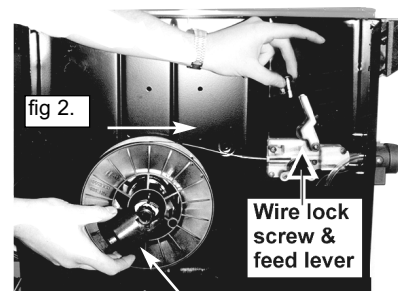


fig 2a.

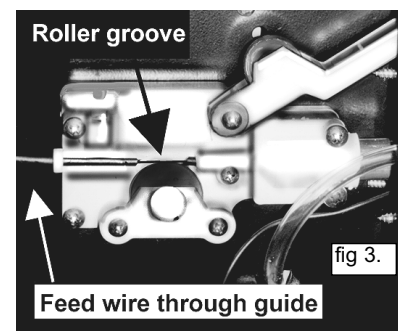
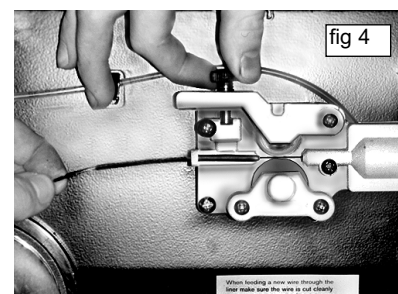
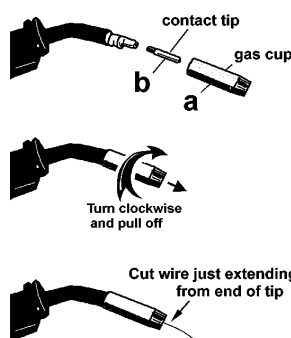


fig 3.3.6.

- 3.4.7. Check welder is switched off "0", and that the earth clamp is away from the torch tip. Connect the welder to the mains power supply and set the voltage switch to one.
- 3.4.8. Set the wire speed knob to position 5 or 6. Keep the torch cable as straight as possible and press the torch switch. The wire will feed through the torch.
- 3.4.9. When the wire has fed through, switch welder off, unplug from mains.
 - a) Take torch in left hand and screw contact tip back into place.
 - b) Grasp gas cup in right hand, push onto torch head and turn **clockwise only**. *Do not turn gas cup anti-clockwise, as this will damage the internal spring.*
 - c) Cut wire so that it is just protruding from the cup.



3.5. Setting wire tension. (fig 4).

IMPORTANT: You must set the correct tension. Too little or too much tension will cause problematic wire feed and result in poor welding.

- 3.5.1. Tension between rollers is checked by slowing down the wire between your fingers. If top feed roller skids the tension is correct. Use as low a tension as possible, too high a tension will disfigure wire and result in a blown fuse.

3.6. Clutch adjustment. Note: It is essential that the clutch is adjusted correctly.

- 3.6.1. Once the wire is fed through the torch, switch on the machine and set the wire speed to maximum.
- 3.6.2. Depress torch switch and release quickly. If the spool overruns it indicates that the clutch is too loose.
- 3.6.3. Tighten the clutch (located in the centre of the wire spool holder fig 2) with a screwdriver and test the machine as above until the wire stops over running.

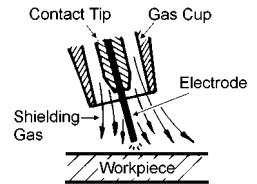
Note: DO NOT over tighten the clutch as this will cause wire feed problems and strain the motor.

- 3.7. **Euro Connection.** Your welder has a Euro Torch Connection. Line up pins in the torch with the appropriate holes in the machine, push in and tighten knurled knob (fig. 5). When welding is finished remove torch and store in a safe place. *Note: damage to torches and cables is not covered by warranty.*



4. MIG/MAG WELDING

A spool of welding wire is positioned on the welder's spool holder and automatically fed through an insulated liner in the torch to the tip. The torch assembly consists of a switch, liner, gas hose, and control cable. The switch activates the wire feed roller and the gas flow. Conversely, releasing the switch stops the wire feed and gas flow. The weld current is transferred to the electrode (the wire) from the contact tip at the end of the torch. A gas cup fits over the contact tip to direct the gas flow towards the weld ensuring that the arc welding process is shielded from oxidising air contaminants. The shielding gas also assists heating of the weld materials. The torch is connected to the positive side of a DC rectifier, and the negative clamp is attached to the workpiece.



4. 1. PREPARATION FOR WELDING

IMPORTANT: BEFORE YOU COMMENCE, MAKE SURE THE MACHINE IS SWITCHED OFF AT THE MAINS. IF WELDING A CAR, DISCONNECT THE BATTERY OR FIT AN ELECTRONIC CIRCUIT PROTECTOR. WE STRONGLY RECOMMEND THE USE OF SEALEY "PROSAF/12V OR 24V IN ORDER TO PROTECT SOPHISTICATED ELECTRONICS. ENSURE YOU HAVE READ & UNDERSTOOD THE ELECTRICAL SAFETY INSTRUCTIONS IN CHAPTER 1.

4.1.1. Connecting the Earth Lead

To ensure a complete circuit, the earth lead must be securely attached to the work piece that is to be welded.

- Best connection is obtained by grinding clean the point of contact on the workpiece before connecting the earth clamp.
- The weld area must also be free of paint, rust, grease, etc.
- When welding a vehicle, be sure the vehicle battery is disconnected or fit an Electronic Circuit Protector available from your Sealey dealer.

4.1.2. **Power switch (fig B).** Set the switch to position 1 or 2 for welding up to 2mm thickness. Use settings 3,4,5,6. for thicker welds.

4.1.3. **Setting the welder controls. (fig A)** In principle, the lower the amperage required, the slower the wire speed. See setting chart for voltage and corresponding wire speeds.

Note: these settings are only a guide and will vary according to the operators experience.

4.1.4. Welding mild steel

To weld mild steel you can use CO2 gas for most tasks where spatter and the high build up of weld do not pose a problem. (Welding with a long arc reduces penetration and widens the arc. This in turn results in more spatter. A long welding arc can be appropriate for welding butt joints in thin materials. Welding with a short arc (at the same weld settings) results in greater penetration and a narrower weld and reduces the amount of spatter.)

To achieve a consistent spatter free and flat weld, **you must** use an **Argon/CO2 mixture**.

4.1.5. **To weld aluminium use:** ✓ Argon gas, ✓ 0.8mm Contact Tip (AK957), ✓ 0.8mm Aluminium Wire, (MIG/2/KAL08).

4.1.6. **Spot Welding.** Spot welding may be carried out as shown in fig.C below.

It will be necessary to fit a spot welding gas cup. (Sealey part No. 120/722150)

- Overlapping metal sheets with a maximum thickness of 0.8 mm may be welded as indicated.
- Alternatively they may be welded edge to surface as indicated.
- For thicker sheet pre drilled holes holes may be employed.

4.1.7. Use the wire feed control in conjunction with the spot weld timer below it. To activate the timer turn the knob clockwise. The settings indicated in the black portion of the chart are for guidance only and may vary with operators experience.

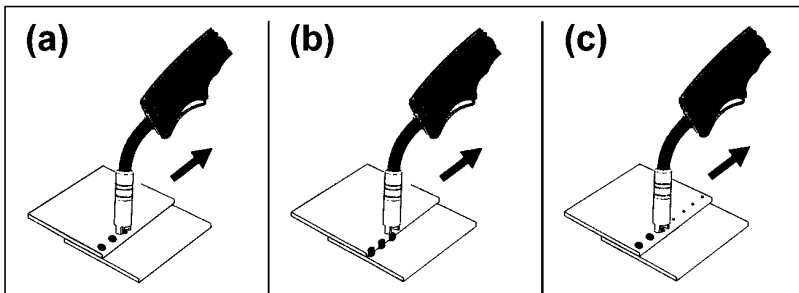


fig. C

IMPORTANT.

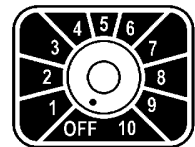
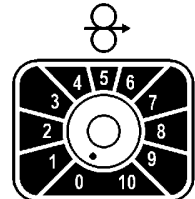
Should you have no welding experience, we recommend you seek training from an expert source to ensure your personal health & safety. Good Mig welding may be achieved only with continued, supervised practice.

SETTINGS SHOWN AS GUIDE ONLY

Wire 0.6mm Steel Argon / CO2 Mix						
Voltage Step:	1	2	3	4	5	6
Wire Speed:	5	6	7	8	9	10
Spot Welding Timer						6

fig. A

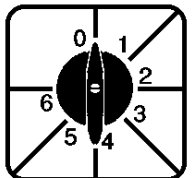
Wire Feed Control



Spot Welding Timer

fig. B

Power / Volts



4.1.8 **OVERLOAD PROTECTION.** Thermostatic overload protection is provided. When an overload has occurred, leave the unit to cool. The thermostat will automatically reset the unit when the temperature has returned within limits

GUIDE TO RATINGS PLATE AND SYMBOLS (For actual ratings of your model refer to front panel.

For further clarification refer to British Standard EN 60974-1)

Made in European Community ▶	MADE IN C.E.	N.	◀ Position for Serial Number
Welder model type ▶	Type: SUPERMIG 220		
Single Phase Transformer and Rectifier (or 3 phase) ▶		EN 60974-1	◀ British Standard number
MIG/MAG welding symbol ▶		40A/16V - 170A/22.5V	◀ Power output range shown as minimum and maximum welding current and the corresponding conventional load voltages
Indicates a welding power source suitable for supplying power to welding operations carried out in an environment with increased hazard of electric shock. ▶		U₀ V 18.7 + 34	◀ Duty Cycle (X) ◀ Rated weld current (I ₂) ◀ Conventional load voltage (U ₂)
		X 15% 60% 100%	
		I₂ 170A 85A 70A	
		U₂ 22.5V 18.25V 17.5V	
	Rated no-load voltage: (a) Peak value in case of direct current (b) Peak and r.m.s. value in case of alternating current		
Indicates an alternating current power supply and 1 or 3 phases as required by specification. ▶		U₁ V 230	◀ Maximum effective supply current
International standard relating to moisture ingress. ▶	IP 21	I₁ max A 32.5	
		I₁ eff A 12.5	

5. MAINTENANCE

5.1. Wire feed unit

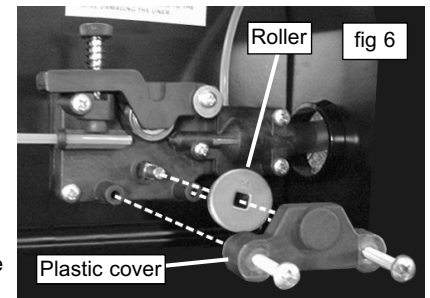
Check the wire feed unit at regular intervals. The feed roller wire guide plays an important part in obtaining consistent results. Poor wire feed affects welding. Clean the rollers weekly, especially the feed roller groove, removing all dust deposits.

5.2. Torch

Protect the torch cable assembly from mechanical wear. Clean the liner from the machine forwards by using compressed air. If the liner is clogged it must be replaced.

5.3. Changing Feed Roller

(**IMPORTANT:** Adjust the feed roller to the corresponding wire size.) There are two grooves on the feed roller, 0.6mm and 0.8mm. Always use the groove on the outside of the roller, (the groove nearest to you). To remove the feed roller, undo the two screws and remove the plastic cover (fig 6). Clean and turn, or if damaged change the feed roller and replace the plastic cover accordingly.



5.4. Contact Tip (to remove tip follow steps in 3.3.6. and to replace 3.3.9. a & b very carefully).

The contact tip is a consumable item and must be replaced when the hole becomes enlarged or oval. The contact tip **MUST** be kept free from spatter to ensure an unimpeded flow of gas.

5.5. Gas Cup (to remove cup follow steps in 3.3.6. and to replace 3.3.9. a & b very carefully).

The gas cup must also be kept clean and free from spatter. Build up of spatter inside the gas cup can cause a short circuit at the contact tip which will result in either the fuse blowing on the printed circuit card, or expensive machine repairs. To keep the contact tip free from spatter, we recommend the use of Sealey anti-spatter spray (MIG/722307) available from your Sealey Dealer.

5.6. Replacing the Liner

Wind the wire back on to the spool and secure it. Unscrew the torch from the machine and undo the brass nut. The liner should now be visible. Pull it out and replace with a new one.

5.7. Changing gears

An inexperienced welder can allow spatter to build up in the tip and shroud. In severe cases this can block the feed causing gear stripping in the drive motor. To check if the gears are worn depress the button on the torch with the set switched on. If the gears are worn, a grating sound will be heard coming from the wire feed motor, you may also observe the feed roller vibrating instead of rotating. Should this be the case, open the gearbox, remove the worn or damaged gears and replace with new ones.

5.8. Changing Fuses

The fuse is located on the auxiliary transformer and is mainly blown for the following reasons:

6. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY (Numbers refer to chapter and item heading)
1. Power source stops	Overheating protection activated due to overload	Protection automatically resets when transformer has cooled (about 15 min).
2. No weld current, fuse blowing in 13amp plug	Rectifier blown	Replace rectifier.
3. No weld current	Bad connection between clamp & workpiece Break in earth lead Break in torch lead	Clean or grind contact surface and weld area. Repair or replace earth lead. Repair or replace torch.
4. Feed motor not working, lamp is on	Fuse blown Gear damaged or worn Motor defective	Replace fuse 1.5 amp. (Chapter 5). Replace gears. (Chapter 5). Replace motor (Contact service agent).
5. Wire does not feed, feed roller rotates	Pressure roller improperly adjusted Dirt, copper, dust, etc, has collected in torch liner Gas cup (Nozzle) or tip defective Deformed wire	Adjust tension. Clean the liner from the machine forward. Use compressed air. If too much dirt, replace the liner. (Chapter 5). Replace gas cup (nozzle) and/or tip. (Chapter 5). Check roller tension and adjust it if necessary (Chapter 3).
6. Wire feeds unevenly.	Dirt, etc, in liner Gas cup (Nozzle) or Tip defective Gas cup (Nozzle) spattered Feed roller groove clogged Feed roller groove deformed Pressure roller tension improper	Clean the liner from the machine forward. Use compressed air. Replace gas cup (nozzle) and/or tip. (Chapter 5). Clean or replace gas cup (nozzle) (Chapter 5). Clean feed roller. (Chapter 5). Replace feed roller. (Chapter 5). Adjust tension. (Chapter 3).
7. Unstable arc.	Incorrect settings Impurities in weld area Worn or defective gas cup (nozzle)	Check settings. (Chapter 4). Clean and/or grind workpiece. (Chapter 4). Replace gas cup (nozzle). (Chapter 5).
8. Porous weld	No gas Gas cup clogged Draft blowing away shielding gas Rusty or dirty joints Torch too far from or at wrong angle to work Gas leak Faulty Electrovalve	Open gas cylinder, regulate gas flow. Clean or replace cup. (Chapter 5). Screen off welding site or increase gas flow. Clean or grind the workpiece (Chapter 4). The distance from gas cup to workpiece should be 8-10mm Check hoses, connections and torch assembly. (Chapter 6). Press the gas cup in correction position. Clean out or replace
9. Electrode sticking in gas cup (nozzle)	Worn or defective gas cup (nozzle) Electrode deformed Wire speed too slow	Replace gas cup (nozzle). (Chapter 5). Check roller tension. (Chapter 3). See recommendations for wire speed.
10. Irregular weld head	Torch incorrectly held Wire weaving in weld pool	Use correct torch angle. Check roller tension and adjust as needed. (Chapter 3).
11. Weld bead too narrow and raised	Weld current too low Weld speed too high	Increase power and wire speed. (Chapter 4). Move torch slower and weave a little more.
12. Weld bead too wide	Weld current too high Weld speed too low Arc too long	Decrease power and wire speed. (Chapter 4). Move torch faster and weave less. Bring torch closer to workpiece.
13. Poor penetration	Weld current too low Arc too long	Increase power and wire speed. (Chapter 4). Bring torch closer to workpiece.
14. Excessive penetration	Weld current too high weld speed too slow incorrect distance of torch to workpiece	Decrease power and wire speed. (Chapter 4). Move torch faster. Torch distance should be 8-10mm.
15. Fuse blowing	Tension too great Gas cup contact tip clogged	Release tension. (Chapter 3). Clean gas cup and contact tip. (Chapter 5).