



# Operating Manual

## Smashweld 190 & 250



**Please ensure that this  
Instruction Manual is made  
available to the user of  
the equipment.**



## DECLARATION OF CONFORMITY

**ESAB Ltd.,**

Declare hereby that:

**ESAB Smashweld 190 & 250**

**Part No. 367 902 880, 367 903 880**

**From Production Serial No. 99AXXXX**

- are manufactured in accordance with the Council Directive 73/23/EEC (1973-02-19) and 89/336/EEC (1989-05-03) amended by Council Directive 93/68/EEC relating to electrical equipment designed for use within certain voltage limits.
- conform with the protection requirements of Council Directive 89/336/EEC, amended by Council Directives 91/236/EEC, 92/31/EEC and 93/68/EEC relating to electromagnetic compatibility.
- are manufactured in accordance with EN60974-1 Safety Requirements for Arc Welding Equipment.
- are manufactured in accordance with EN50199 Electromagnetic Compatibility for Arc Welding Equipment.

On behalf of Esab Group UK Ltd  
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.....  
**P G Dodd**  
Managing Director

Date: June 1998



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## WARNING



This welding equipment has been designed, manufactured and tested to the highest standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner and your attention is drawn to any maintenance instructions that are contained in this manual.

In general, all welding equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are small and the benefits in performance reliability and safety are significant. Left alone, they can put the equipment, and you, at risk.

Have this equipment regularly inspected and maintained by an approved service centre.



## WARNING



**ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.**

### **ELECTRIC SHOCK - Can Kill**

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves, or wet clothing.
- Insulate yourself from earth and work.
- Ensure your working position is secure.

### **FUMES AND GASES – Can be Dangerous to Health**

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

### **ARC RAYS – Can injure Eyes and Burn Skin**

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

### **NOISE– Excessive noise can damage hearing**

- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risks.

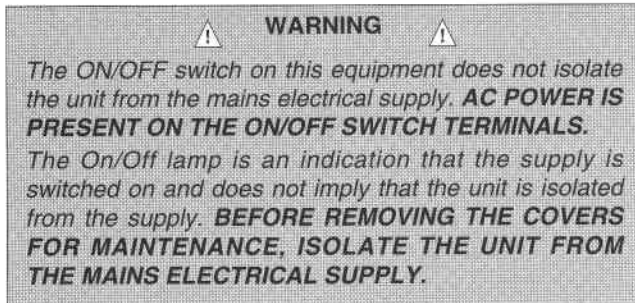
**READ AND UNDERSTAND THE INSTRUCTION MANUAL  
BEFORE INSTALLING OR OPERATING AND SEE WMA PUBLICATION 237  
'The arc welder at work' AVAILABLE FROM THE MANUFACTURER.**

**PROTECT YOURSELF AND OTHERS**

## SAFETY

In any arc welding or gouging operation, it is the responsibility of the user to observe certain safety rules to ensure his personal safety and to protect those working near him.

Read all safety articles relevant to arc welding published by the WMA. Pay particular attention to any CAUTION or WARNING Notes included in this manual. CAUTION indicates possible equipment damage. WARNING indicates possible hazard to life.



### 1. Electrical

Treat electricity with respect. Even the open circuit voltage of this equipment can be dangerous. Adjustments to the torch or replacement of torch parts should be undertaken with the mains supply isolated from the unit.

If damaged torch cables or torch components are found, the unit must be disconnected from the mains and defective parts must be replaced using only Murex spare parts.

Do not work on live circuits or cables. Disconnect the main power supply before checking the machine or performing any maintenance operation.

Be sure the case of the welding machine is properly connected to a good electrical earth.

Have the wiring for the welding machine installed by a qualified electrician. All connections must be made according to specifications in force and to general safety standards.

Do not stand in water or on damp floors while using an arc welder or cutter. Do not use in the rain.

Do not operate with worn or poorly connected cables. Inspect all cables frequently for insulation failure, exposed wires and loose connections.

Do not overload cables or continue to operate with overheating cables. Cables which are too small for the current carried will overheat, causing rapid deterioration of the insulation.

Pay attention that live parts of the torch do not touch any metal which is connected to the earth cable. Fix an insulated hook to hang the torch on when it is not in use.

### 1. Ventilation

Do not weld or cut on containers which have held combustible or flammable materials, or materials which give off flammable or toxic vapours when heated, without proper cleaning.

Locate the welding/cutting operation far enough from any vapour-type degreaser using trichlorethylene or other chlorinated hydrocarbons as solvents. The ultraviolet light from the arc can decompose these vapours into toxic gases at a considerable distance from the arc, even though the concentration of the gases is low enough to be undetectable by smell.

Be sure to provide adequate ventilation for removal and dilution of fume and gases. Fume exhaust facilities near the arc, or a ventilated helmet should be used when cutting in confined spaces or on toxic material.

### 2. Glare

Never look at the arc without wearing eye protection. Always use the proper protective clothing, filter glasses, and gloves. Be careful to avoid exposed skin areas. Do not use cracked or defective helmets or shields.

Never strike an arc when there is someone near who is not protected from the strong light of the arc.

Warn bystanders who are not aware of the dangers of ultraviolet light.

### 3. General

Take care when lifting the unit.

Ensure that cylinders are secured by chains.

Locate the unit so that there is adequate air flow to the ventilation louvres.

Always dress correctly to protect against glare, radiation and spatter.

### 4. Fire

Ensure that the correct type of fire extinguisher is available in the welding area.

Do not weld near flammable materials or liquids, in or near explosive atmospheres, or on pipes carrying explosive gases.

### 5. Vehicle Electrics

When working on motor vehicles, remove the battery and any circuitry which may be damaged by the arc.

Whilst welding be aware of the possibility of 'hidden wires' behind panels or bulkheads.

### 6. Warning



Switch off before accessing areas which contain moving parts. Particular care should be taken when accessing the wire feed mechanism.



## INTRODUCTION

The Smashweld 190 & 250 are Transformer/Rectifier MIG/MAG welding power sources fitted with an integral wire feed system. Both units are capable of continuous spot and stitch welding using CO<sub>2</sub> or Argon rich gases.

A 42 volt a.c. output is available to power a CO<sub>2</sub> heater - see Fig 1.

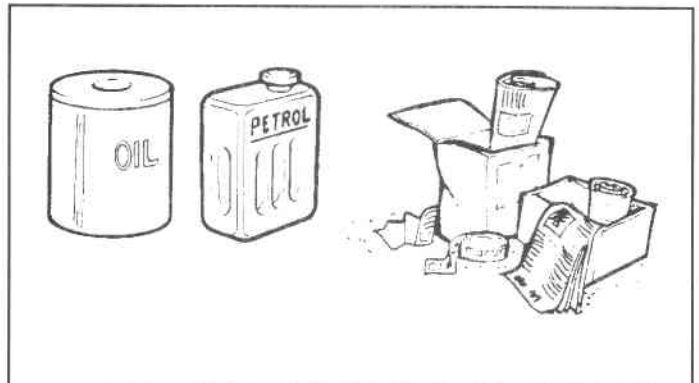
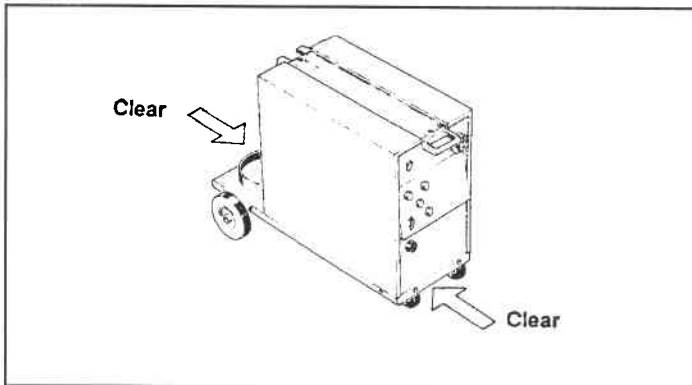
Protection against the effects of overheating is provided by thermal protection devices mounted on the transformer assembly and rectifier bridge. In the event of overheating, power to the unit is interrupted and the fault lamp is illuminated. The protective devices automatically reset when cools.

**NOTE**  
If the fault light comes on whilst welding, do not switch off but leave the unit switched on with the fan running until the protection devices reset. If the fault persists call for technical assistance.

**WARNING!**  
If the fault lamp lights more than once or the fault lamp lights repeatedly after resetting, isolate the unit from the mains supply (remove the supply fuses) and call for technical assistance (from your Esab Service Centre Network).

## INSTALLATION

Installation must only be undertaken by a qualified electrician or suitably trained person.



Place the unit so that the vents are clear of any obstruction to ventilating air.

Remove all flammable materials from the area

### 42Vac Heater Connection.

Feed the cable through the grommet in the back panel and connect the wires to the terminal block marked 0 & 42V on the auxillary transformer (see Fig. 1).

Clamp the cable firmly in the panel mounted clamp provided.

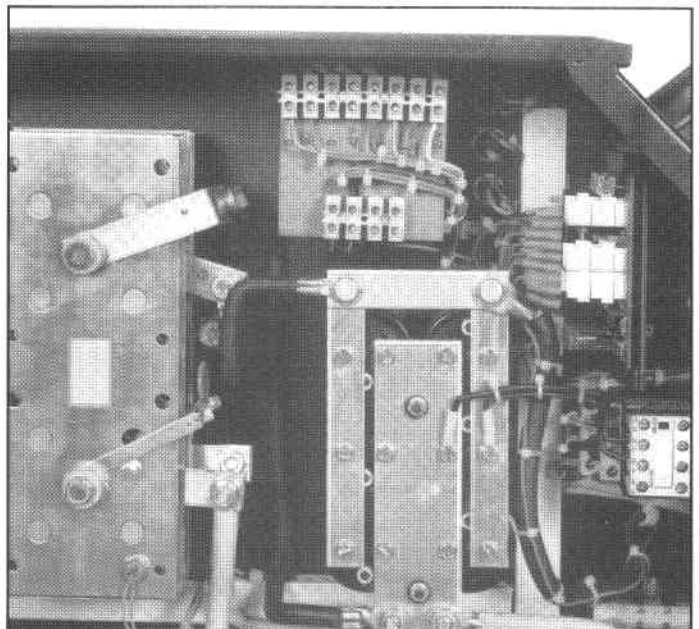


Fig 1.

**WARNING!**  
Installation work must be performed by a trained, competent electrician. Do not permit untrained persons to repair this equipment.

**WARNING!**  
Be sure that all primary power to the machine has been externally disconnected. Open wall disconnect switch or circuit breaker before attempting inspection or work inside the power source.



## INSTALLATION

### INITIAL SETTING UP

1. Check the ON/OFF switch is 'OFF'

#### WARNING!

*This switch does not isolate the unit from the mains electrical supply.*

2. **Feed Roll**

Before connecting the gas supplies, ensure that the equipment is set up for the type and size of wire to be used.

3. **Work Return Lead**

Connect the work return lead between the work return socket and a clean area on the work piece.

### WELDING WIRE

#### Fit the reel of welding wire:

1. Remove the hand nut from the hub.
2. Place the reel of wire on the hub so that the wire will be drawn off from the bottom. Ensure that the pin on the hub locates in the hole in the side of the reel. Replace hub hand nut.
3. Release the end of the wire from the side of the reel but do not allow the coils to loosen. Cut off the kinked portion and remove any sharp edges from the end of the wire. This should be done every time the wire is threaded through the equipment.
4. Release the pressure roll arm.
5. Thread the wire through the inlet guide under the feed roll and into the outlet guide, for approximately 150mm until the wire protrudes from the torch connector by approximately 50mm.

Lock the pressure roll arm so that the welding wire is clamped into position in the groove.

6. Check that the torch lead is laid out straight and connect the torch to the adaptor, ensuring that the wire enters the liner correctly.
7. Remove the nozzle and contact tip from the torch. Using the torch switch, feed the wire through the torch. Thread a contact tip over the wire and screw it into the torch. Tighten the contact tip with the key provided.
8. Fit the nozzle

#### WARNING!

*The wire, contact tip and wire feed mechanism are 'live' when the torch switch is pressed.*

9. Press the torch switch and check that the wire feeds smoothly from the torch.

#### Do not overtighten the adjusting screw

10. Cut off the wire to protrude 10mm from the torch connector.

### REPLACEMENTS AND ADJUSTMENTS

1. **Guide Tube Removal**

- (a) Release the pressure roll.
- (b) If the guide tube will move freely, push it forward out of the torch adaptor using a pencil or soft wooden dowel rod, then withdraw it from the torch adaptor using a pair of long nose pliers.

If the guide tube does not move freely, it may be necessary to drive it out using a hard wooden dowel or old guide tube.

#### NOTE

*Do not use a screwdriver or metal tool to push out the tube. Use of such a tool may damage the end of the guide and impair wire feeding.*

2. **Feed Roll Changing**

Remove the feed roll retaining screw. It may be necessary to give the screwdriver a sharp twist to avoid turning the motor.

Drop the pressure arm and pull off the feed roll. When replacing the feed roll, note the wire size which is stamped on the face of the roll. The required size must face outwards when the roll is refitted. Ensure that the Woodruff Key is not lost.

Fit the feed roll and lock the pressure arm. Refit the retaining screw giving it a sharp twist with the screwdriver to tighten.

3. **Feed Roll Pressure**

Correct feed roll pressure will provide smooth, uninterrupted feeding of the wire. Inspection of the wire should reveal only slight marks from the feed rolls and no deformation of the wire. Use of the correct pressure is especially important when feeding aluminium wires.

**The pressure should be just enough to provide positive wire drive without slipping.**

4. **Overrun adjustment**

Tighten or unscrew the hub tension nut in the centre of the wire reel hub until sufficient hub friction is achieved to prevent overrun.

#### NOTE

*Do not overtighten or the wire will slip in the feed rolls.*



**OVER TEMPERATURE INDICATOR**  
(see Note 1)

**ON/OFF SWITCH**

With this switch in the ON position power is applied to the fan and control circuits. (see Note 2)

**t<sub>2</sub> - 'ON' TIME CONTROL**

For spot welding and 'stitch on' time.

**t<sub>2</sub> - 'OFF' TIME CONTROL**

For 'stitch off' time.

**VOLTAGE SELECTOR SWITCH**

**WORK RETURN LEAD SOCKET**

**MODE SELECTOR SWITCH**  
Continuous/Spot/Stitch

**OPTIONAL DIGITAL METER KIT**

**WIRE FEED SPEED (CURRENT) CONTROL**



**Note 1: Over Temperature Indicator Lamp**

The indicator will illuminate and the power source will be inhibited if the temperature of internal components becomes excessive. Should this occur, leave the power source to idle for a few minutes to cool down, do not switch the power source off as this will remove power from the cooling fan.

**Note 2: ON/OFF Switch**

**WARNING**

The ON/OFF switch on this equipment does not isolate the unit from the mains electrical supply. **AC POWER IS PRESENT ON THE ON/OFF SWITCH TERMINALS.**

The On/Off lamp is an indication that the supply is switched on and does not imply that the unit is isolated from the supply. **BEFORE REMOVING THE COVERS FOR MAINTENANCE, ISOLATE THE UNIT FROM THE MAINS ELECTRICAL SUPPLY.**

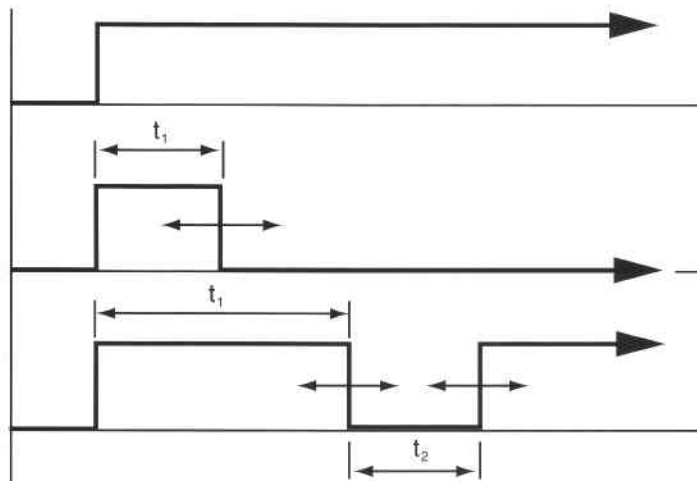
**CAUTION**

If this indicator lamp persistently operates do not use until the power source has been checked by an approved Service Engineer.

Continuous

Spot - t<sub>1</sub>

Stitch - t<sub>1</sub> and t<sub>2</sub>



**Welding Modes**





## WELDING NOTES

### Continuous (Bead) Welding

Produces a continuous weld whilst the torch switch is pressed.

1. Switch the process switch to the 'Continuous' welding position (left).
2. Set the voltage and wire feed controls to the appropriate positions for the material to be welded.
3. Trim the electrode wire so that approximately 3-5mm protrudes from the contact tip.

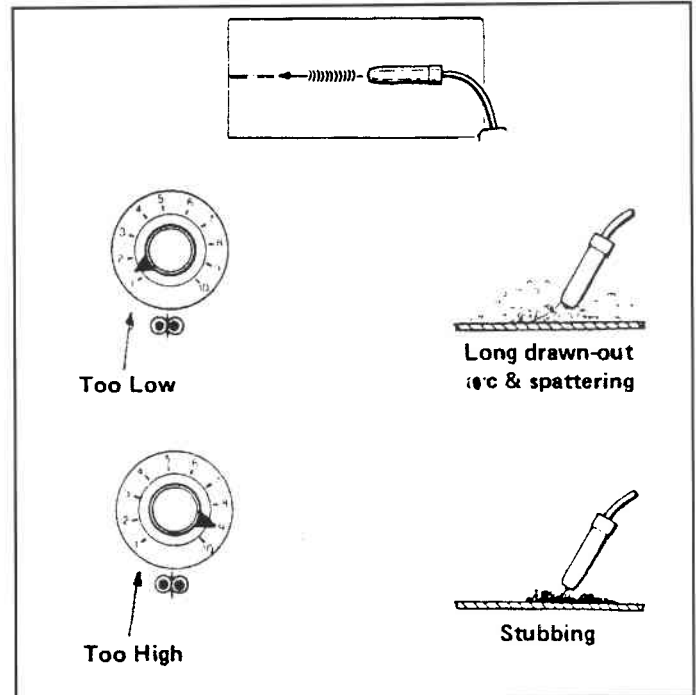
#### WARNING!

The wire, contact tip and wire feed mechanism are 'live' when the torch switch is pressed.

4. Position the torch over the seam to be welded as follows:
  - (a) Hold the contact tip approximately 10mm from the work surface.
  - (b) Hold the torch so that it makes an angle of approximately 70 degrees to the work surface.
  - (c) Position the torch so that the nozzle is parallel to the seam to be welded.
5. **WARN BYSTANDERS TO SHIELD THEIR EYES.**  
Lower your helmet.
6. Press the torch switch to strike an arc and, as the weld is deposited, push the torch slowly along the seam at a constant speed.
7. Using the wire feed speed control, adjust for a 'crisp' sounding arc.

#### NOTE

Low settings of wire speed feed will cause a long drawn out arc and spattering, high settings of wire feed will cause stubbing.



### Stitch Welding

The wire feed output is switched on and off repeatedly. This produces a lower heat input which is particularly advantageous when welding thin or poor quality materials as well as bridging gaps.

1. Select 'Stitch Welding' by turning the process switch to the right-hand position.
2. Set the 't<sub>1</sub>' and 't<sub>2</sub>' controls to the half way setting:  
Vary the time to obtain best results.  
**Lower on time = Lower duration of wire feed = Lower heat input.**
3. Because of increased burn-back towards the contact tip during interval welding the wire 'stick out' should be held to 6mm (not 3mm).

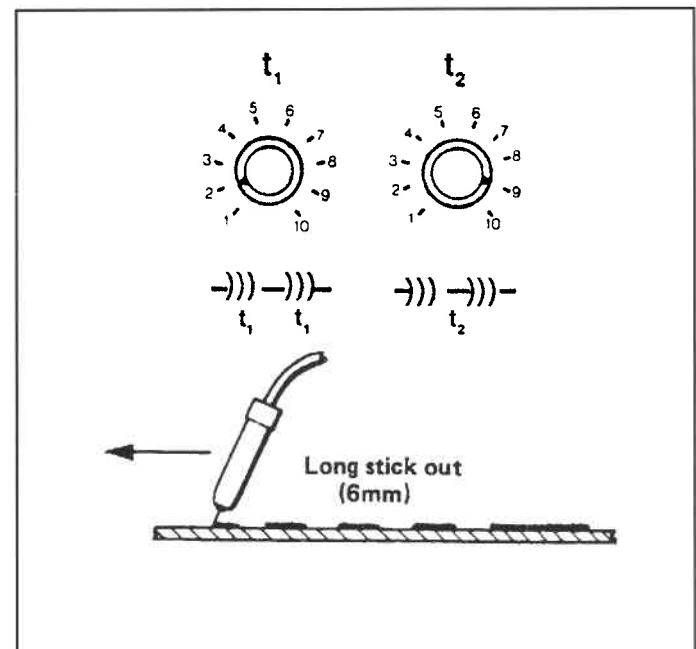
#### WARNING!

The wire, contact tip and wire feed mechanism are 'live' when the torch switch is pressed.

4. Press the torch switch and the welding process commences. When the 't<sub>1</sub>' weld time has elapsed the wire feed stops, causing the welding process to cease. After the pause time (t<sub>2</sub>), the wire feed re-starts. This procedure is repeated for as long as the torch trigger remains pressed.

#### NOTE

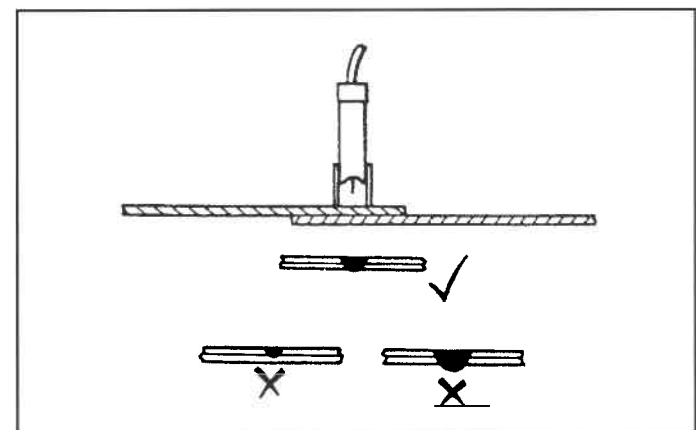
Low settings of wire speed feed will cause a long drawn out arc and spattering, high settings of wire feed will cause stubbing.



### Spot Welding

A circular spot is produced each time the torch switch is pressed. The spot weld time (t<sub>1</sub>) can be varied.

1. Select 'spot' welding by turning the process switch to the centre position.
2. Fit a spot weld nozzles to the torch.
3. Set the voltage and wire feed speed controls to near the maximum setting and carry out test welds on scrap materials as follows:
4. Position the support legs of the torch nozzle over the weld area.
5. Press the torch switch and hold the torch over the weld for a few seconds after the weld is complete. Adjust the spot weld time for best results.
6. Check for good weld penetration (small dimple showing on underside of the material).



<b>CONTINUOUS WELDING FAULTS</b>	
<b>FAULT</b>	<b>POSSIBLE CAUSE AND REMEDY</b>
1. Weld deposit 'stringy' and incomplete	1a. Torch moved over workpiece too quickly 1b. Gas mixture incorrect
2. Weld deposit too thick	2a. Torch moved over workpiece too slowly 2b. Welding voltage too low
3. Arc unstable, excessive spatter and weld porosity	3a. Torch held too far from the workpiece 3b. Rust, grease or paint on workpiece 3c. Insufficient shielding gas, check gas contents gauge, regulator setting and operation of gas valve
4. Wire repeatedly burns back	4a. Torch held too close to the workpiece 4b. Intermittent break in the welding circuit caused by: (1) Contact tip loose - tighten (2) Contact tip damaged - replace (3) Welding wire or liner corroded - replace wire or liner 4c. Wire feed slipping caused by: (1) Restriction in Liner (such as kinks) or contact tip - check and replace if necessary (2) Worn feed rolls - replace (3) Outlet guide or pressure roll adjustment incorrect
5. Burning holes in the workpiece	5a. Torch moved too slowly or erratically 5b. Welding volts too high 5c. Wire feed speed too high
6. Lack of penetration	6a. Torch moved too fast 6b. Welding volts too low 6c. Wire feed too low

<b>SPOT WELDING FAULTS</b>	
<b>FAULT</b>	<b>POSSIBLE CAUSE AND REMEDY</b>
1. Insufficient penetration	1a. Spot weld time too short 1b. Gap between metals to be joined too wide 1c. Wrong switch position 1d. Welding settings too low
2. Holes burnt through workpiece	2a. Spot weld time too long 2b. Gap between metals to be joined too wide 2c. Weld is too close to the edge of the material 2d. Weld settings too low
3. Wire sticks to contact tip or workpiece at the end of the weld	3a. Burn-off time incorrect - expert assistance required since burn-back must be accurately timed
4. Wire burns back	4a. Poor gas coverage 4b. Burn-back time incorrect (see 3 above)



# Smashweld 190 & 250

## Technical Notes

### SPECIFICATION

	SMASHWELD 190	SMASHWELD 250
<b>Input</b>		
Nominal Voltage	230V	230V
Phase	1	1
Frequency	50/60Hz	50/60Hz
Fuse rating at supply voltage	16A	30A
<b>Output</b>		
Open circuit voltage	18.5 - 33.5V	19 - 37V
Welding range	30 - 190A	40 - 250A
Rated output		
100% duty cycle	80A/17.5V	110A/20.5V
60% duty cycle	100A/19.0V	150A/21.0V
45% duty cycle	-	-
35% duty cycle	-	200A/24.0V
30% duty cycle	145A/21.5V	-
Control	8 position switched	12 position switched
Rating specification	EN60-974	EN60-974
Max. ambient temp	40 deg. C	40 deg. C
Insulation class	F and H	F and H
Spot weld timer	0.5 to 2 Sec	0.5 to 2 Sec
Stitch weld timer	0.5 to 2 Sec	0.5 to 2 Sec
<b>Dimensions</b>		
Height (with wheels)	686mm	686mm
Width (with wheels)	505mm	505mm
Depth (overall)	850mm	850mm
Weight	75kg	105kg



## ROUTINE MAINTENANCE

**WARNING!**

*Troubleshooting work must be performed by a trained, competent electrician. Do not permit untrained persons to repair this equipment.*

**WARNING!**

**BE SURE THAT ALL PRIMARY POWER TO THE MACHINE HAS BEEN EXTERNALLY DISCONNECTED. OPEN WALL DISCONNECT SWITCH OR CIRCUIT BREAKER BEFORE ATTEMPTING INSPECTION OR WORK INSIDE THE POWER SOURCE.**

The following maintenance procedure should be carried out **at least twice a year**.

1. Isolate unit from the mains supply. Remove side panels. Carefully brush away any dust which is found on the electrical parts. (If an air line is used to blow the dust off, be careful that the air jet does not force the dust into the electrical parts. Also be careful not to cause dust clouds which might harm personnel.)

**WARNING!**

*When using an airline to remove dust, use only DRY AIR at a pressure not exceeding 2 bar, and wear a mask and goggles.*

2. Complete an electrical safety test.
3. Check the torch at least once a day to ensure that the contact tip, nozzle and insulator are clean and in proper working order.
4. Whenever a new coil of wire has to be used, blow out the torch wire feed liner with an airline. See "Warning".
5. **Check each day** to see that the drive roll pressure is correct.
6. **Once each week** clean dirt and metal dust from around the drive rolls, and check that the drive roll is not excessively worn.

**CAUTION**

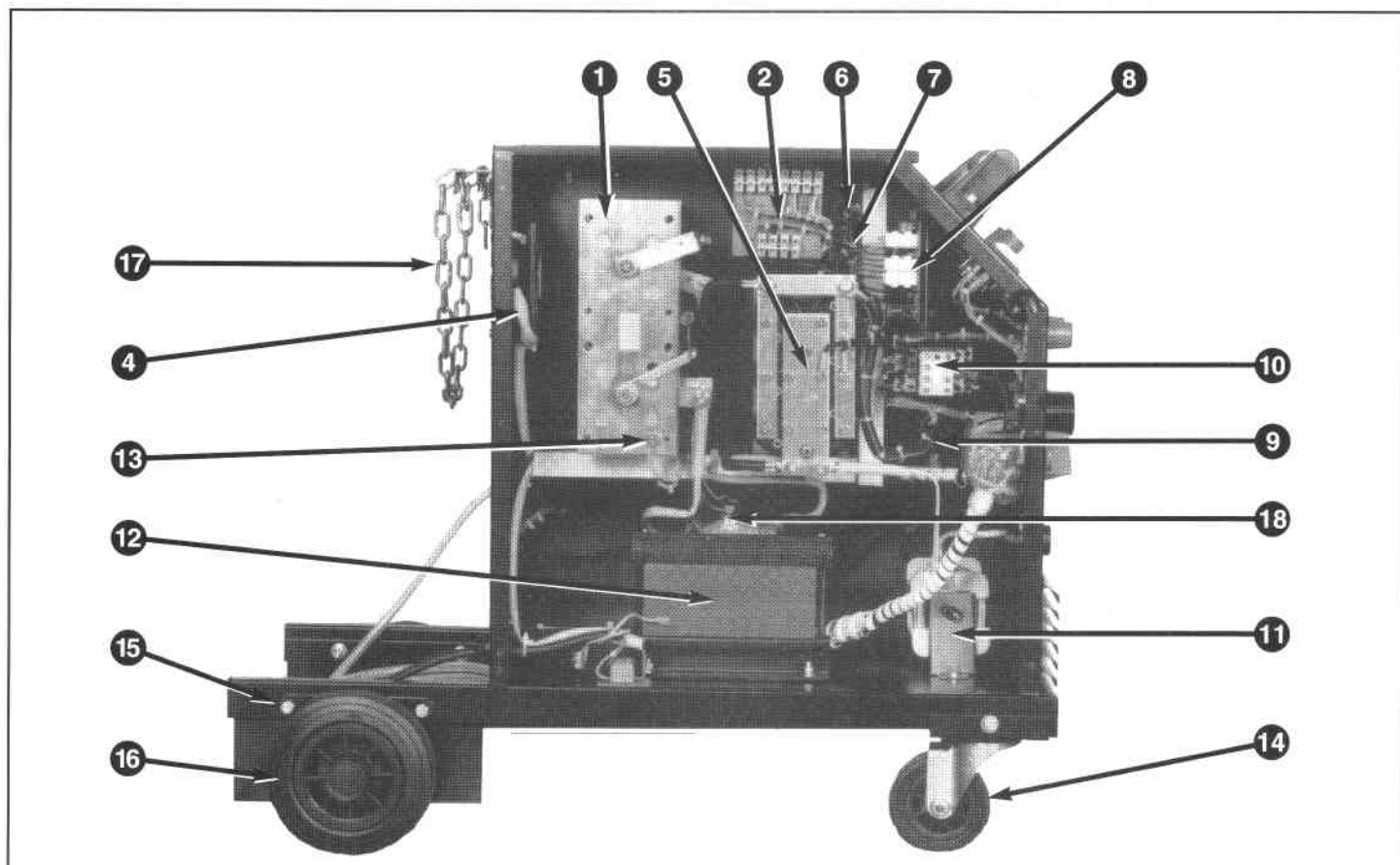
*When cleaning inside the wire feed unit, be careful not to force metal dust into the electrical components as this may cause a short circuit fault to occur.*

7. **At least once a month** check all connections to see that they are tight, check insulators and grommets for wear.



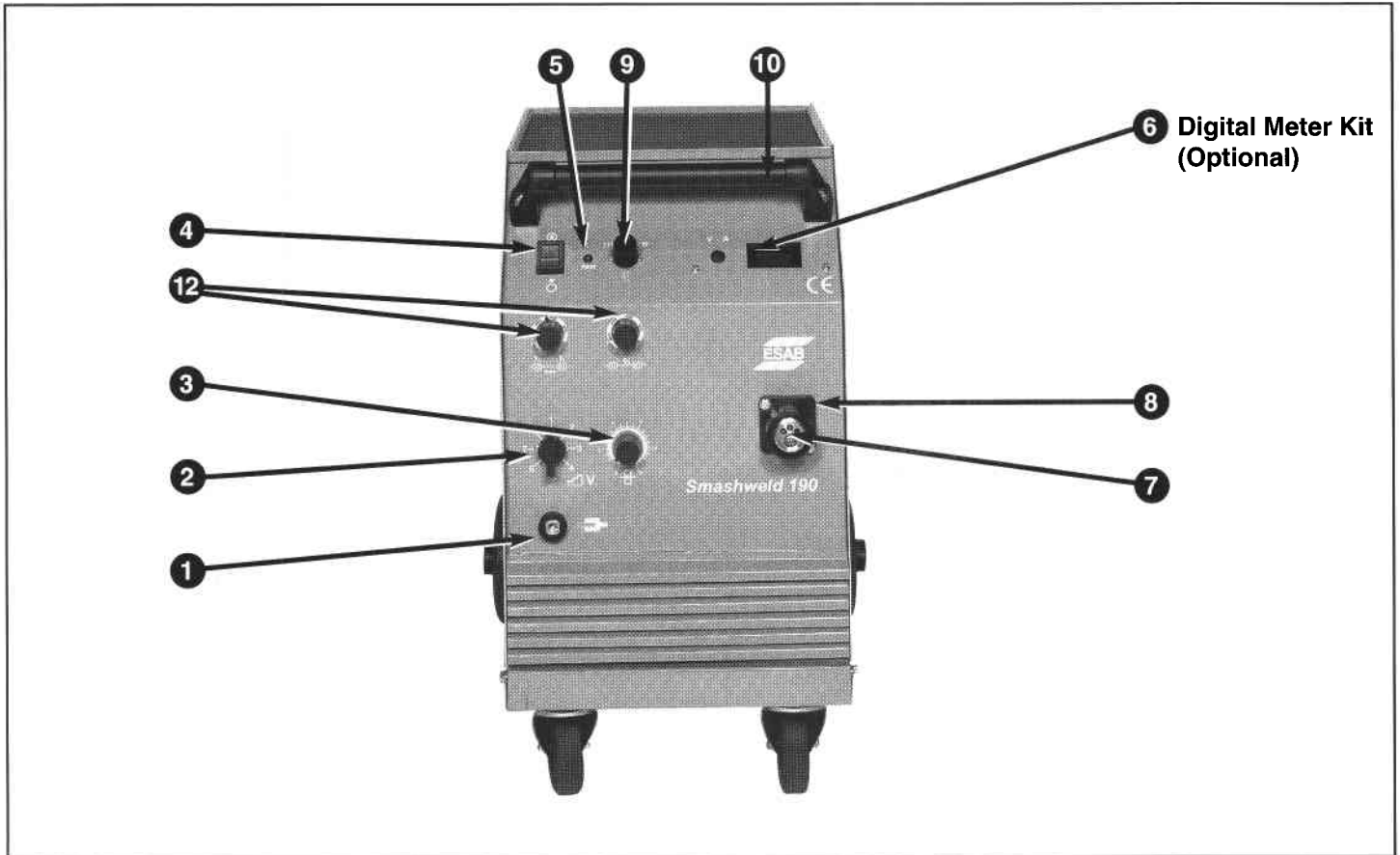






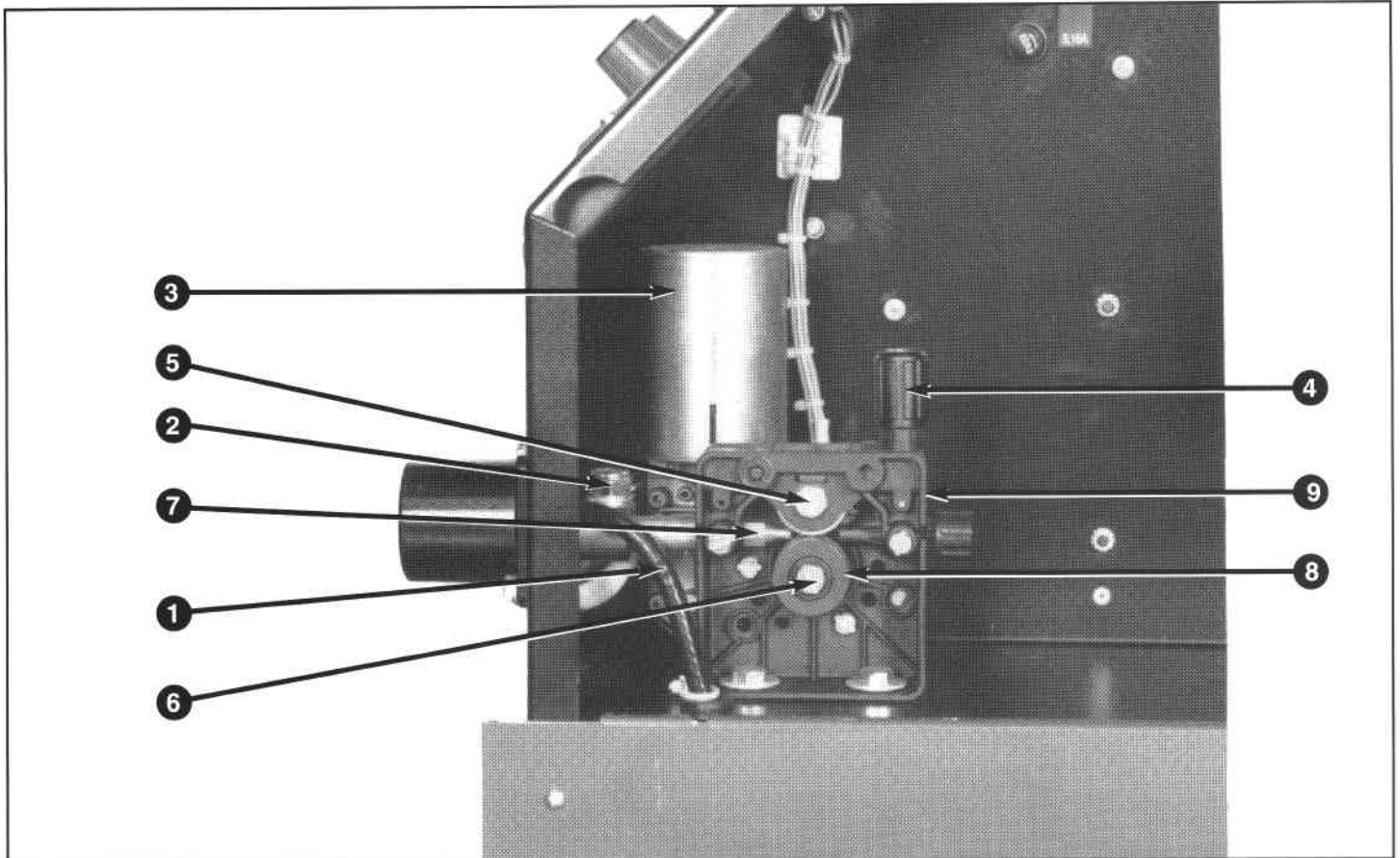
	DESCRIPTION	190	250
1	Diode bridge	1415531	1415532
2	Auxiliary transformer	1415528	1415528
3	Gas valve	1411464	1411464
4	Fan	1411477	1411477
5	Capacitor	1411461	1411461
6	Fuse holder 20mm	1411514	1411514
7	Fuse holder 30mm	1415559	1415559
-	Fuse 1.6A 30mm	1415019	1415019
-	Fuse 1A 20mm	1411490	1411490
-	Fuse 3.15A 20mm	1411486	1411486
-	Fuse 6.3A 20mm	-	-
8	Printed circuit board	1413467	1413467
9	Resistor	1413422	1413422
10	Main contactor	1415539	1415529
11	Inductor	1415540	1415541
12	Main transformer	1415535	1415536
13	Thermostat	1415558	1415558
14	Front castor tray (complete)	1415547	1415547
15	Axle assembly	1415548	1415548
16	Wheel	1413488	1413488
17	Chain	1412481	1412481
18	Thermal switch	1413463	1413463





	DESCRIPTION	190	250
1	DINSE Socket	1404314	17242
-	Plug for item 1	1380444	1380441
2	Switch 6 position	-	1411459
	Switch 8 position	1413440	-
	Switch 2 position	-	1415561
-	Knob for item 2	1413442	1413442
3	Potentiometer	1411472	1411472
-	Knob for item 3	1415545	1415545
4	Switch ON/OFF	1415556	1415556
5	Fault lamp	1413447	1413447
6	Digital Meter Kit (optional)	1415544	1415544
7	Central adaptor	1409035	1409035
8	Central adaptor shroud	1408699	1408699
9	Switch process select	1413448	1413448
10	Handle	1415546	1415546
12	Potentiometer	1413443	1413443
-	Knob for item 12	1415545	1415545





	DESCRIPTION	190	250
1	Guide tube	1413455	1413455
2	Clamp	1413453	1413453
-	Guide tube liner	1413456	1413456
3	Motor	1415530	1415530
4	Pressure device	1413102	1413102
5	Pressure arm complete	1413101	1413101
6	Feed roll retaining screw	1413104	1413104
-	Woodruff key	1411549	1411549
7	Inlet guide	1413103	1413103
8	Feed roll 0.6 - 0.8	1411470	1411470
	Feed roll 0.8 - 1.0	1411471	1411471
	Feed roll 1.0 - 1.2S	1411489	1411489
-	Reel hub assembly	1411467	1411467
9	Feed block casing	1413106	1413106











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**Pt. No. 367 880 882**  
**Issue 1 (1/99)**