

# **SEALEY** **POWER WELDERS**

## **ALUSPOT1500 INSTRUCTION MANUAL**



# SEALEY

# POWER WELDERS

# INSTRUCTIONS FOR: ALUSPOT1500

Thank you for purchasing a Sealey Aluspot 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. NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS, AND CAUTIONS. USE THIS PRODUCT CORRECTLY, AND WITH CARE, FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY.**

## 1. SAFETY INSTRUCTIONS

### 1.1. ELECTRICAL SAFETY

**WARNING!** It is the responsibility of the owner and the operator to read, understand and comply with the following:

You must check all electrical equipment and appliances to ensure that 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 a Residual Current Device (RCD) is used. It is particularly important to use an RCD with portable products that are plugged into a supply which is not protected by an RCCB. If in any doubt consult a qualified 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 business premises, to be tested by a qualified electrician, using a Portable Appliance Tester (PAT), at least once a year.

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 that the insulation on all cables and the product itself is safe before connecting to mains power supply.

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, and especially power connections, to ensure that none is loose.

1.1.6. **Important:** Ensure that the voltage marked on the product is the same as the power supply to be used.

1.1.7. DO NOT pull or carry the appliance by any of the input or output cables.

1.1.8. DO NOT pull power plugs from sockets by the power cable.

1.1.9. DO NOT use worn or damage leads, plugs or connections. Immediately replace or have repaired by a qualified electrician.

1.1.10. DO NOT use this product with a cable extension reel.


1.1.11. **DO NOT** use worn or damaged cables, plugs or connectors. Immediately have any faulty item repaired or replaced by a qualified electrician. When an ASTA/BS approved UK 3 pin plug is damaged, cut the cable just above the plug and **dispose of the plug safely**. Fit a new plug according to the following instructions (UK only).

a) Connect the **GREEN/YELLOW earth wire to the earth terminal 'E'**.

b) Connect the **BROWN live wire to the live terminal 'L'**.

c) Connect the **BLUE neutral wire to the neutral terminal 'N'**.

d) After wiring, check that there are no bare wires, that all wires have been correctly connected, that the cable outer insulation extends beyond the cable restraint and that the restraint is tight.

Double insulated products, which are always marked with this symbol,  are fitted with live (brown) and neutral (blue) wires only. To rewire, connect the wires as indicated above - **DO NOT** connect either wire to the earth terminal.

1.1.12. If an extension reel is used it should be fully unwound before connection. A reel with an RCD fitted is preferred since any appliance plugged into it will be protected. The cable core section is important and should be at least 1.5mm<sup>2</sup>, but to be absolutely sure that the capacity of the reel is suitable for this product and for others which may be used in the other output sockets, we recommend the use of 2.5mm<sup>2</sup> section cable. If extension reel is to be used outdoors, ensure it is marked for outdoor use.

### 1.2. GENERAL SAFETY

**Note: Spot welding produces sparks, fused metal projectiles and fumes which are dangerous.**

**WARNING - DANGER!: This is a discharge welder and uses large capacitors to store energy and then release it all in one go, user should be aware at all times of this characteristic and take suitable safety precautions.**

**WARNING: Unplug from power supply before connecting cables and accessories, or before performing maintenance or service.**

✓ Ensure that the welder and all cables are in good order and condition.

✓ Replace or repair damaged parts. *Use genuine parts only, unauthorised parts may be dangerous and will invalidate the warranty.*

✓ Keep the welder clean for best and safest performance.

✓ Locate the welder in a suitable work area and ensure that good ventilation is provided.

✓ Keep work area clean and tidy and free from unrelated materials and ensure that there is adequate lighting.

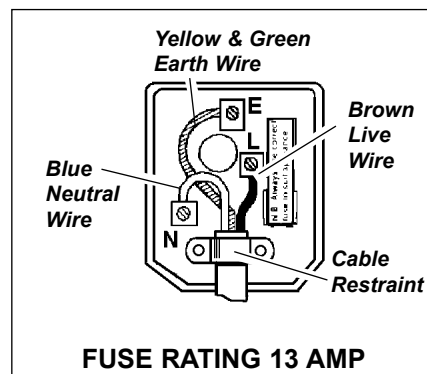
**WARNING: Ensure that no flammable or combustible materials are in, or near, the work area. Welding containers or pipes which hold, or have held, dangerous gases or substances may cause explosion or fire. Materials cleaned with chlorinated solvents, or varnished surfaces pose the danger of toxic fumes.**

**WARNING: Spot welding generates strong magnetic fields. Take great care to ensure that there are no items near your work area that may be attracted to the welding process and ensure that there are no items that may be damaged or adversely effected by operating the welder.**

**WARNING: Electronic watches may be damaged. Persons wearing heart pace-makers must not operate, or be in the area of, the welder.**

**WARNING: You MUST use safety goggles or a face shield when operating this equipment, such as the Sealey SSP9 or SSP10.**

**▲ DANGER! Permanent eye damage may result if you do not use the correct protection. Also wear safety gloves and dry, oil-free safety protective clothing to protect yourself from sparks and hot droplets of fused metal. Cover exposed flesh to avoid burns.**



- x DO NOT operate the welder if it or the cables are damaged.
- x DO NOT hold or touch the pieces to be welded. All workpieces must be suitably clamped.
- x DO NOT repeatedly switch the welder on and off as the dissipation of the energy in the capacitors can cause overheating and damage.
- x DO NOT place your hands near the electrodes - danger of burning and/or crushing.
- ✓ The operator must be fully trained in the use of the welder and must be aware of the potential dangers.
- ✓ The work area must be closed off in order to keep non-essential persons at a safe distance from the welding operation. Persons within the work area are subject to the same dangers as user.
- ✓ Remove ties, watches, rings and other jewellery and contain long hair.
- x DO NOT use the welder for any purpose other than that for which it is designed.
- x DO NOT use the welder in damp or wet locations, or outside when raining or snowing.
- ▲ **DANGER! DO NOT weld near inflammable materials, solids, liquids, or gases.**
- x DO NOT operate welder while under the influence of drugs, alcohol or other medication, or if tired.
- x DO NOT pull the welder by the cable, or the welding clamp.
- ✓ When not in use, switch off machine and remove the plug from the power supply. Store in a safe, dry childproof location.

**1.3. ELECTROMAGNETIC FIELDS**

When operating, the spot welder produces a very intense electromagnetic field which could cause malfunctions and/or damage to the following:

- Pace makers      Metallic prostheses      Watches
- Magnetic cards      Instrumentation      Data transmission systems or local telephone lines

**1.4. ELECTROMAGNETIC COMPATIBILITY**

Spot welding equipment which is connected to a public electricity supply can cause radio frequency interference (e.g. poor radio/television reception) for other supply users.

**2. INTRODUCTION**

A comprehensive repair solution for non-oxidised or non-treated aluminium sections and panels in one package. Capacitor discharge welding unit attaches studs, rivets, washers and nails to the aluminium surface, delivering power in a single strike. This energy release is so fast and effective that it will not damage surrounding areas - even if they are painted. Also suitable for stud welding steel (stainless and galvanized) and brass. The kit also includes a pulling rig and hooks used to apply tension to the repair area while working the surrounding metal. Optional slide hammer and stud kit also available. Turn aluminium repairs into additional workshop revenue. Also suitable for sign making and repair.

**3. CONTENTS & SPECIFICATION**

Unpack the product and check that there are no missing or damaged parts. If you do experience a problem contact your supplier immediately.

The kit consists of the following:

Aluspot1500 unit, earth cable with clamp, welding gun with associated cables, pulling rig system and accessories.

Power supply . . . . .230V - 1ph - 50Hz  
 Max. energy release . . . . .1500J  
 Spot period . . . . .1-3ms  
 Absorbed power . . . . .0.9kW  
 Insulation class . . . . .F  
 Casing protection rating . . . . .IP23

Dimensions (LxWxH) . . . . .430x170x290mm  
 Weight . . . . .17.1kg  
 Power factor at Smax (Cosφ) . . . . .0,8  
 Secondary no-load voltage (U<sub>0</sub>max) . . . . .12V  
 Duty cycle . . . . .20 studs / minute  
 Accessory option . . . . .Stud Welder Kit: 120.802108



## 4. INSTALLATION

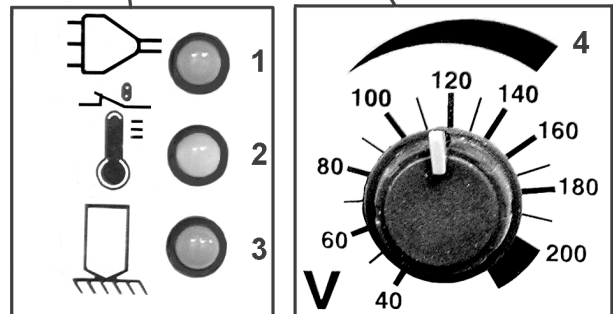
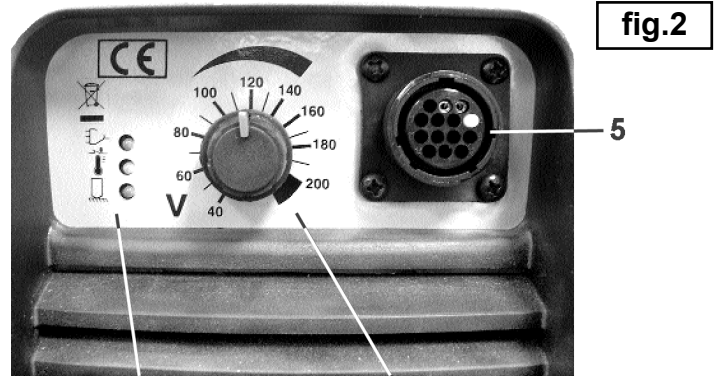
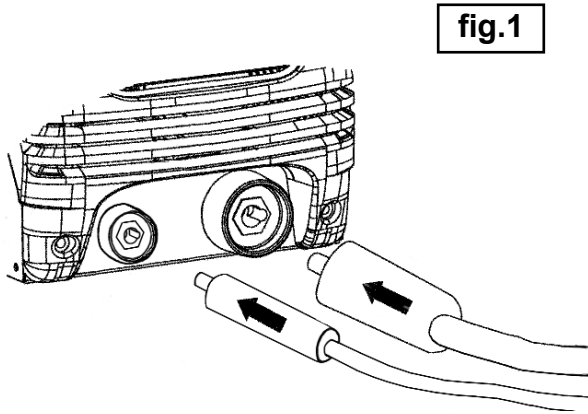
❑ **WARNING:** Mains power supply should not be connected before connecting cables and accessories.

### 6.1. CLAMP STUDDER & GROUND CABLE CONNECTION

- 6.1.1. Insert the two Dinse connectors into their corresponding sockets (fig.1).
- 6.1.2. Insert the control cable connector into the socket (fig.2.5).

### 6.2. ELECTRICAL CONNECTION

Ensure that the machine is compatible with your mains supply.



## 5. FRONT PANEL

1. Power supply voltage LED.
2. Thermal protection LED. This indicates that the welding process has stopped temporarily because of overheating.
3. Spot welding condition LED. To prevent hazardous conditions for the operator, the welder will check that the spot welding circuit is acceptable. Welding will only be allowed if the circuit impedance is sufficiently low ("good contact" condition).
4. Potentiometer for adjusting capacitor charge voltage. i.e. spot welding energy.
5. Socket for control cable connector.



## 6. OPERATING INSTRUCTIONS

### OPERATING PRINCIPLES FOR STUD WELDING WITH IGNITION SPOT STRIKE

The welding systems operate by the extremely fast (2-3 msec) discharge of a battery of capacitors allowing the welding of pins from 3 mm to 8 mm. This requires a fine control of both electrical power and physical pressure on the fixing to ensure a strong bond to the workpiece. The physical pressure is controlled by a dial in the rear of the handgun (fig.3) and the weld is triggered by application of the correct physical pressure. This technology can be used to weld studs on surfaces that are clean, but not oxidised, of mild steel, galvanised steel, stainless steel, aluminium and brass. This fast process does not alter the surfaces opposite the welding side i.e. with painted, pre-painted, plastic-coated and galvanised plate. It is not possible to weld hardened steel, oxidised or painted metal.

**Note:** The welder should not be switched on and off repeatedly because dissipation of the energy contained in the capacitors can cause overheating and damage.

### STUD WELDING TESTS

- 6.1. Before starting welding it is advisable to carry out a series of test welds to regulate the power source correctly and determine the most appropriate pressure to apply to the studder.
- 6.2. Prepare the test workpiece under identical conditions to the working conditions as regards thickness, earth connection area, piece size, material quality.
- 6.3. Connect the earth clamp as close as possible to the point where the work is to be carried out, remove any coating from the plate.  
**Note:** When working on doors, bonnets or bootlids, the earth clamp must be directly connected to these parts so as to prevent the passage of current through the hinges (long current travels will reduce the efficiency of the weld).

fig.4

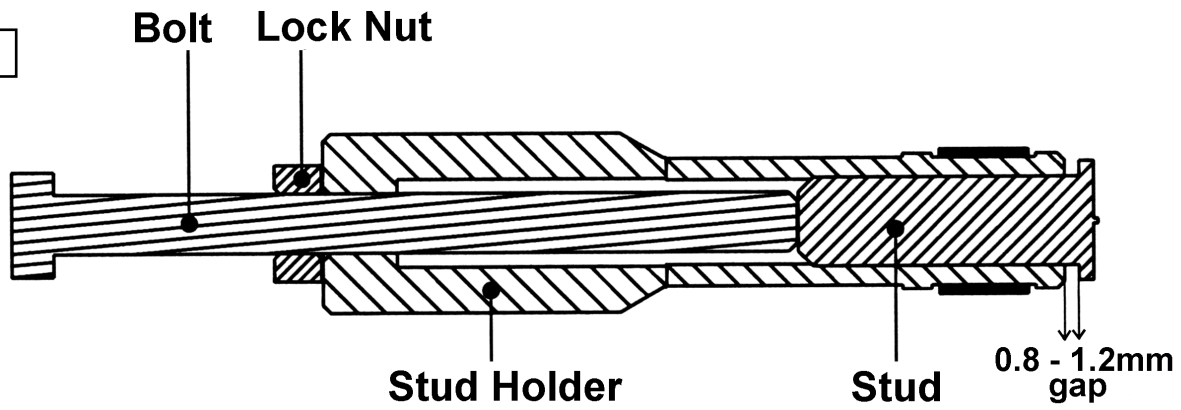


fig.5

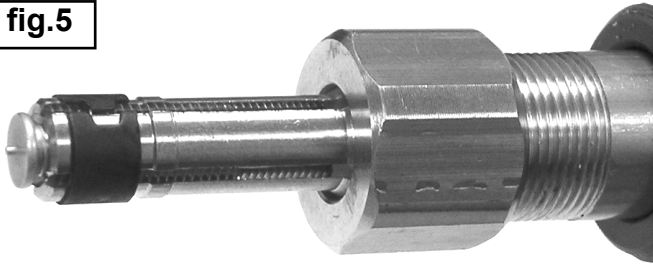
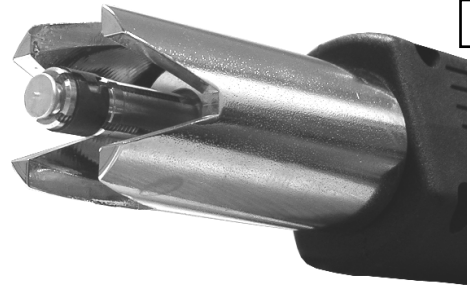


fig.6



- 6.4. Choose the stud to be welded (see Table C for stud/workpiece material compatibility), insert fully into the appropriate stud-holder with the correct diameter. Adjust the stud projection to 0.8-1.2mm using the adjusting bolt and then lock in place with lock nut (fig.4). Fully insert the stud-holder into the studder chuck, then lock in place with the locking nut (fig.5). Screw the metal head onto the studder (fig.6).
- 6.5. The base metal surface should be clean. Layers of paint, rust, slag, grease and coatings of unweldable materials should be removed from the welding area. Base metals with layers of slag, waste and rust should be cleaned perfectly.
- 6.6. Switch on the power source by pressing the main switch to the ON position ("I").
- 6.7. After adjusting the physical pressure spring by means of the adjuster at the rear of the studder (fig.3) and selecting the required voltage setting using the potentiometer (refer to table B on next page), position the stud directly on the surface of the workpiece (fig.7.2), ensuring the stud is at right angles to the surface (fig.8).
- 6.8. Press the studder against the surface until the four support fins mounted on the head of the clamp are in perfect contact with the piece (fig.7.3), this ensures the correct pressure as set by the physical pressure spring.
- 6.9. Pull the trigger, this will cause current to pass and the electric arc will spread all along the stud surface, which is pushed onto the metal surface (fig.7.4). **Warning:** DO NOT apply too much pressure to the stud. The melted metal solidifies, welding the stud. When the studder is extracted, it should be perfectly aligned with the stud so as not to deform the hot joint (fig.7.5).
- Note:** For a correct spot weld the larger sized studs (M5, M6) require high pressure, therefore the plate to be welded should have suitable mechanical characteristics. For this reason, do not use studs M5 and M6 in the bodyshop.
- 6.10. Carry out a number of welds, adjusting the voltage and pressure until perfect welds are obtained (see Table A), before proceeding to work area.

fig.7

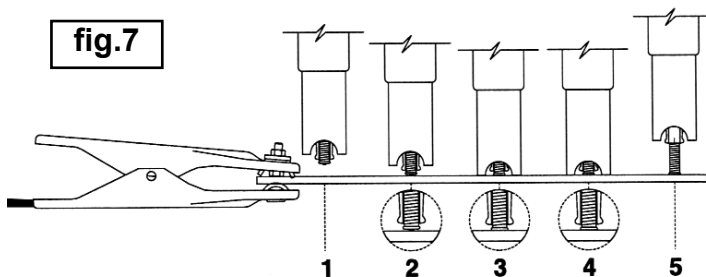
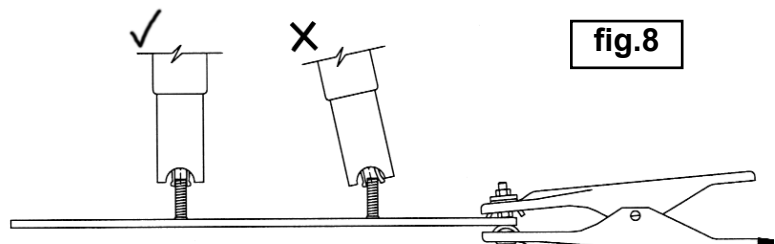


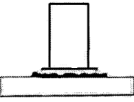
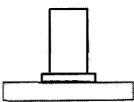
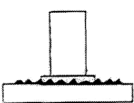

fig.8



## TABLE A

### STUD WELDING IMPERFECTIONS

To assess the quality of a weld, Table A shows possible imperfections that may be met during the welding process, and the corresponding remedies.

	Aspect of the joint	Possible cause	Remedy
1	 <i>Small sprays from welding around joint, no visible defect</i>	<i>Parameters correct</i>	<i>None necessary</i>
2	 <i>Gap between flange and base metal</i>	<ol style="list-style-type: none"> <li>1 <i>Welding energy too low</i></li> <li>2 <i>Insufficient support for metal</i></li> <li>3 <i>Pressure too high</i></li> </ol>	<ol style="list-style-type: none"> <li>1 <i>Increase welding energy</i></li> <li>2 <i>Improve support</i></li> <li>3 <i>Decrease pressure</i></li> </ol>
3	 <i>Large amount of spray around weld</i>	<ol style="list-style-type: none"> <li>1 <i>Welding energy too high</i></li> <li>2 <i>Pressure too low</i></li> </ol>	<ol style="list-style-type: none"> <li>1 <i>Decrease welding energy</i></li> <li>2 <i>Increase pressure</i></li> </ol>
4	 <i>Welding spray off-centre</i>	<i>Energy from magnetic disturbance of arc</i>	<i>Rotate the clamp around its axis. Reposition the earth clamp</i>

## TABLE B

Table B below shows the capacitor charge voltage values (adjustable using the potentiometer) and the pressure setting of the physical pressure spring according to the type of stud being welded.

**Note:** for ferrous materials, reduce the energy values given in the table by 20-30%.

Stud welding parameter setting		
Type of stud	Capacitor voltage (V)	Pressure setting
M3	80	2.5 - 3.0
M4	100	3.5 - 4.0
M5	140	6.0 - 6.5
M6	160	6.5 - 7.0
Nail	80	3.0 - 3.5
Terminal	110	4.5 - 5.0

## TABLE C

### WELDABILITY OF TYPICAL COMBINATIONS OF STUD AND BASE METAL FOR CAPACITOR DISCHARGE WELDING.

It is important to take particular care in studying resistance and deformation at the point where the stud and base metal are welded. For steel, special attention must be paid to fragility due to hardening. Stud material and resistance are allowed limited tolerances. The carbon content of steel studs should be < 0,2% (casting analysis). The weldability of a range of materials and the permitted combinations of stud and base metal are below in Table C.

Base Metal	Stud metal					
	Steel 0.2C copper plated	Stainless Steel	Brass Cu Zn 38	Al.Mg 3	Al.Si 12	Al. 99,5
Tensile strength Rm N/mm <sup>2</sup>	400	500	350	180	150	100
Steel up to 0.30 C%	A	A	A	x	x	x
Galvanised Steel	B	B	A	x	x	x
Stainless Steel	A	A	B	x	x	x
Brass	A	B	A	x	x	x
Copper	B	x	A	x	x	x
Al 99.5	x	x	x	A	B	B
Al Mg 1	x	x	x	B	A	B
Al Mg 3 - Al Mg5	x	x	x	B	A	B
Al Mg Si	x	x	x	B	A	B

A = Good weldability

B = Low weldability

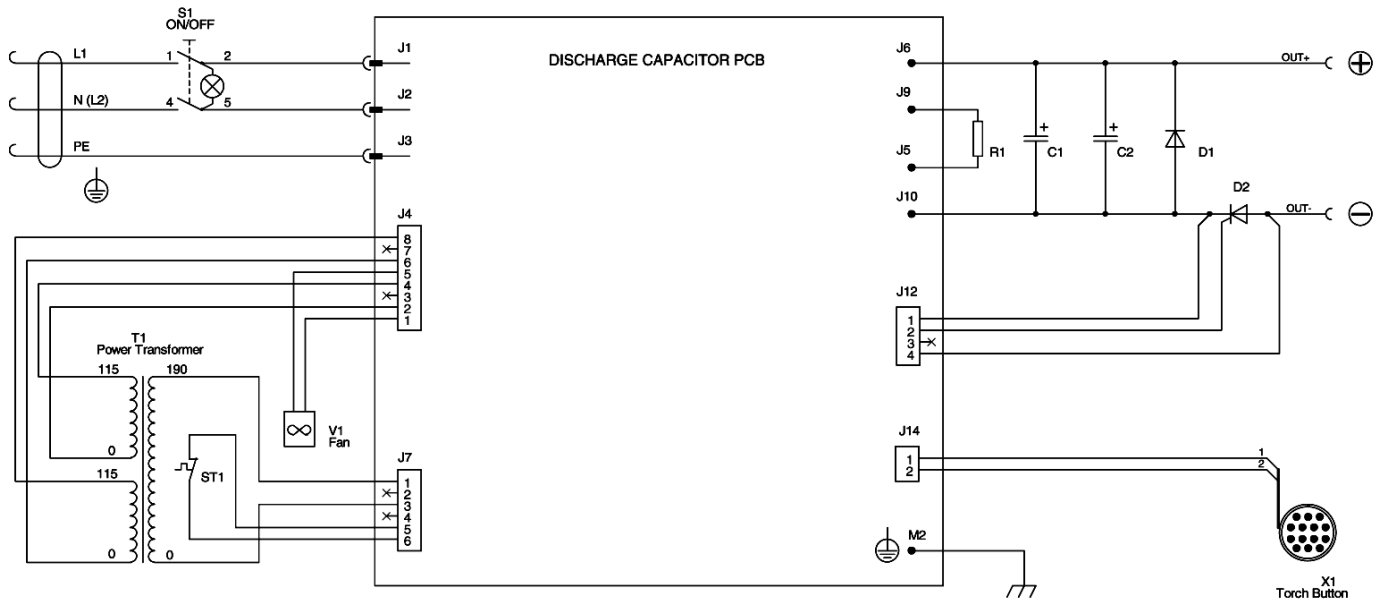
x = Unweldable



## 7. MAINTENANCE

- ❑ **WARNING! DO NOT** remove any panels without first switching the machine off and unplugging the unit from mains power supply. Due to the presence of capacitors, wait at least 5 minutes before commencing any work.
- ✓ Keep these instructions and diagrams where they can be found easily.
- ✓ The power supply cable and welding cables should be insulated and in perfect condition. Special attention should be paid to the areas subjected to bending and twisting: near the connector terminals, the earth clamp and studder input.
- ✓ Make sure the Dinse sockets (fig.1) are kept clean and properly tightened.
- ✓ The clamp to be connected with the base metal should make a good contact so as to prevent
  - heating
  - sparks
  - uneven current circulation
  - damage to the component where the pins are being welded
  - uneven welding quality
- x **DO NOT** allow dirt, dust or filings to get inside the welding machine.
- ✓ Ensure the cooling air is always able to circulate.
- ✓ Check fan operation regularly.
- ✓ Make sure the stud-holders make a tight lock on the pins, studs, rivets or fastens, with all the contact springs.
- ✓ The clamp-holder chuck should run freely along its complete stroke, without variations due to friction or foreign bodies.
- ✓ IF OPERATION OF WELDER IS UNSATISFACTORY, BEFORE CONSULTING YOUR SERVICE AGENT, ENSURE THAT:
  - with the main switch for the machine switched ON ("I"), the green LED is on, if not the problem is in the power supply line (cables, outlet and plug, fuses, excess voltage drop, machine fuses etc.).
  - the overheating safeguards have not triggered.
  - the welding parameters (charge voltage, type of pin; pressure applied to pin) are suitable for the work being carried out.

## 8. CIRCUIT DIAGRAM



### DECLARATION OF CONFORMITY

We, the sole importer into the UK, declare that the product listed below is in conformity with the following standards and directives.

#### ALUSPOT WELDER Model: ALUSPOT1500

73/23/EEC Low Voltage Directive  
89/336/EEC EMC Directive  
93/68/EEC Marking Directive



The construction file for this product is held by the Manufacturer and may be inspected, by a national authority, upon request to Jack Sealey Ltd.

Signed by Tim Thompson  
7th March 2006

For Jack Sealey Ltd. Sole importer into the UK of Sealey Power Welders.

**NOTE:** It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.

**IMPORTANT:** No liability is accepted for incorrect use of this equipment.

**WARRANTY:** Guarantee is 12 months from purchase date, proof of which will be required for any claim.

**INFORMATION:** For a copy of our latest catalogue and promotions call us on 01284 757525 and leave your full name and address, including postcode.



Sole UK Distributor  
Sealey Group,  
Bury St. Edmunds, Suffolk.

☎ 01284 757500  
☎ 01284 703534

🌐 [www.sealey.co.uk](http://www.sealey.co.uk)  
✉ [sales@sealey.co.uk](mailto:sales@sealey.co.uk)