

CIR-KIT WELD 450

TRACK WELDING MACHINE

INSTRUCTION MANUAL

CIR-KIT WELD 450

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SERIAL NUMBER:.....

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DECLARATION OF CONFORMITY

EC Conformity Mark



Description of Product

TRACKWELDER

Name, Type, Batch or Serial Number

CIRKIT WELD 450

Standards

BS EN 292 Basic Principles of Design 1993

BS EN 60204 Electrical Equipment of Industrial Machines 1993

PR EN 50100 Safety of Machinery Electrosensitive Safety Devices 1993

BS EN 414 Rules for Drafting and Presentation of Safety Standards

BS EN Safety of Machinery – Risk Assessment

Place of Issue

Ringwood, Hants

Name of Authorised Representative

Ian Roper

Position of Authorised Representative

Director

Declaration: I declare that as the authorised representative, the above information in relation to the supply/ manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of (89/392/EEC) Directives

Signature of Authorised Representative _____

Date _____

CHECK LIST

The following equipment has been packed and checked before despatch.

Please un-crate the *CIR-KIT WELD 450* very carefully. Also, please ensure that *ALL* of the equipment is unwrapped from its individual packing *BEFORE* the packaging is discarded.

IMPORTANT NOTE:

THE GUARANTEE ON THIS EQUIPMENT WILL BE INVALIDATED IF DAMAGE IS CAUSED THROUGH MISHANDLING OR WRONG INSTALLATION.

PACKING LIST

1	x	WELDER			
1	x	BI-OPTIC (With Adjustable Support)			
2	x	15x EYEPIECES			
1	x	EL20 Long Reach Cir-Kit Weld 450 Electrodes (0.020")			
1	x	MAINS POWER LEAD			
1	x	REEL OF SAMPLE RIBBON CU40	3M	0.10mm x 0.075mm (Metric)	
			10'	0.004"x 0.003"	(Imperial)
1	x	REEL OF SAMPLE RIBBON CU60	3M	0.15mm x 0.075mm (Metric)	
			10'	0.006"x 0.003"	(Imperial)
1	x	REEL OF SAMPLE RIBBON CU80	3M	0.20mm x 0.075mm (Metric)	
			10'	0.008"x 0.003"	(Imperial)
1	x	FIBER GLASS CLEANING PENCIL			
1	x	REPAIR TOOLS (Pack of 3 tools)			
1	x	ELECTRODE SETTING BLOCK			

SAFETY INSTRUCTIONS

The *CIR-KIT WELD 450* is an extremely safe machine to use. However, some precautions must be adhered to when working or repairing it:

- Never connect the *CIR-KIT WELD 450* to any voltage or frequency other than that stated on the label at the back of the machine.
- Never fit a higher current rated fuse than 5 amp
- Never remove the *top* cover with the mains plug still connected.
- Only a qualified electrician should carry out repair work on the circuitry, etc.
- Use only SEETRAX replacement parts to repair the *CIR-KIT WELD 450*.
- Never put your face nearer than 6" (152mm) to the Electrodes when a weld is being made. Splatter from tin/lead deposits, may cause burning or eye damage.
- Do not operate with wet hands.
- Do not leave the machine switched on when not in use other than to charge batteries.

INTRODUCTION

A few minutes of your time spent now reading through this handbook, could save you many hours later and will ensure that you will get the very best from your *CIR-KIT WELD 450*.

The *CIR-KIT WELD 450* is a complete Repair Station with all the necessary equipment needed to repair open circuits and reduced width tracks on populated and bare PCB's. No other equipment is required. The CHECK LIST on page 4 of this handbook contains a detailed check list of what the *CIR-KIT WELD 450* package contains.

The welder - a constant current, microprocessor controlled, parallel gap type - used in conjunction with SEETRAX CU Series Plated Copper Ribbons is a very cost effective means of repairing the faults that so often occur during the manufacture of PCB's.

Repairs to track with open circuits are made by welding a short length of ribbon across the track break, thereby bridging the defect. Different widths of ribbon are supplied to suit most track widths. Adhesive should be used to ensure a long length of ribbon (10mm and above) if used, is held firmly to the substrate. The advantage of repairing open circuits by welding copper ribbon across the defect is that it is an extremely fast, flux free, permanent repair.

Welds can be made onto electroplated copper (of varying quality) and tin/lead plated tracks if the solder is bared back to the copper track beneath. Please note, welding through a tin/lead deposit should be avoided, as some splatter or 'side ways' spreading of tin/lead will almost definitely occur and could possibly short track the track and a good copper to copper weld will not be achieved.

Copper ribbon cannot be detected electrically; being copper it is the same as the damaged track.

Repairs to open circuits on PCB's carried out on the *CIR-KIT WELD 450* will meet numerous manufacturing specs, including BS6221.

Repairs can be Roller Tinned, Hot Air Levelled or Tin/Lead Plated and fused without fear of lifting, fracturing or peeling.

In addition to repairs PCB's, fine wires, such as motor and solenoid winding tails can be successfully welded to terminals and pads, using the *CIR-KIT WELD 450*.

TECHNICAL DATA

MACHINE SPECIFICATION

MACHINE BASE SIZE	31" x 26"	(786mm x 656mm)
MAXIMUM HEIGHT (INCL OPTICS)	20"	(500mm)
WEIGHT	128lbs	(58Kgs)
MAXIMUM PANEL SIZE	30" x 30"	(762mm x 762mm)
WELD HEAD PRESSURE	0.6 - 1.5 Kgf 1.25 - 3.5 lbf 6 - 15 NEWTONS (MANUAL SETTING)	
BASE FRAME	STEEL BOX TUBE	
WORK TABLE	OPAQUE GLASS	
CONTROL COVER	GLASS-FIBRE	
WELD HEAD MOVEMENT	FOOT PEDAL ACTUATOR	
ELECTRODES	MOLYBDENUM (OVER PLATED)	
POWER INPUT	100/110 or 220/240 VAC (SELECTABLE) 50/60 Hz 3.0 / 1.5 AMP 1 PHASE + NEUTRAL + GROUND	
OUTPUT CURRENT	0 - 500 A MAX (SELECTABLE)	
WELD TIME	0.2 - 29.0 m/sec (SELECTABLE)	

CONTROLS

PROGRAMMABLE MEMORY MODE	99 SETTINGS
MANUAL POWER MODE	MANUAL OVERRIDE
WORK LIGHT	12 VOLT MULTI-POSITIONAL (VARIABLE OUTPUT)
OPTICS	FIXED 7.5X - 15X

TOOLS SUPPLIED

3 X DIFFERENT RIBBON SIZES
3 X TOOLS
1 X FIBRE GLASS CLEANING PENCIL
1 X PAIR ELECTRODES EL20
1 X ELECTRODE SETTING BLOCK

See check list on page 4 for a full list of parts supplied.

QUICK INSTALLATION PROCEDURE

For people with previous experience of the Cir-Kit Weld 450. Inexperienced people should refer to the full instructions in the INSTALLATION PROCEDURE on page 9.

To adjust the foot cable and electrodes

Set the height adjustment on the front of the machine to 0 mm adjust the electrodes so there is a 4 mm gap between the bottom of the electrodes and the glass table. Make sure that the electrodes are both at the same height by bringing them down gently on to a piece of abrasive paper and if you gently pull the paper forward, 2 equal lines should be made on the paper.

Next with the height setting still at 0 mm put a piece of paper under the electrodes and gently push down on the foot pedal until the paper is clamped, this should be firmly clamped without trying to weld and the adjusting screw will have stopped moving. You should still have approximately $\frac{1}{4}$ of the downward foot pedal movement left. Now pushing a little more on the foot pedal, the white arm below the height adjustment screw should continue to move down giving a gap of 2-3 mm between the nut and the white arm, compressing the spring and putting clamping pressure on the electrodes, the welder should now try and weld, beep and show the clean light.

This 2-3 mm movement of the white arm will ensure that there is pressure on the electrodes which is needed to give a good electrical contact to measure the current flow / resistance. If there is insufficient pressure, the machine will not sense the correct welding times. To increase the spring pressure wind the 2 knurled nuts upwards.

If it welds early or not at all adjust the foot pedal cable to achieve this setting.

Welding settings

The settings on the welding machine can be very difficult to control if you start changing both amps and time settings. We have found that if you leave the time setting always at 3.40 mil seconds and always adjust the amps up or down this gives much better results.

The machine is designed to adjust the time setting for itself, therefore it will not always use the 3.40 mil seconds set but will sense the welding resistance and cuts the time accordingly to its threshold setting.

Only for experienced operators

If the threshold is set to 65 this will give a weak weld, 70 is normal and 75 is a very aggressive weld. To adjust threshold setting push both amps and time button together and adjust with + or - (on older machines, the version number of the software will display on power up. version 5 or before the threshold setting was 120).

For normal welding the time should be 3.40, threshold 70 and only adjust the amps starting low and working up to achieve a good weld.

Approximate values

Cu40	(0.004")	0.10mm	Time 3.40	Amps 80	Threshold 70
Cu60	(0.006")	0.15mm	Time 3.40	Amps 100	Threshold 70
Cu80	(0.008")	0.20mm	Time 3.40	Amps 130	Threshold 70
Cu10	(0.010")	0.25mm	Time 3.40	Amps 160	Threshold 70

INSTALLATION PROCEDURE

- Having unpacked the *CIR-KIT WELD 450* from its crate, check all of the components against the Packing Check List, and familiarise yourself with all parts listed.
- Place the *CIR-KIT WELD 450* on a solid table or workbench, (recommended height 30ins (760mm), depth 34ins (860mm)) with an open back, i.e. not against a wall. The machine must be out of direct sunlight, free from vibration and not near chemicals, i.e. plating tanks.
- Bring the Foot Pedal Switch around the back of the machine to a comfortable position under the table or bench.
- **IMPORTANT NOTE: Do not have the Foot Pedal Switch cable laying on top of the table or bent at an angle from the machine back. It must lie in a straight, vertical line from the machine to the floor, otherwise the operation of the Weld Head will be jerky.**
- Assemble the Microscope, as instructed in the Microscope Instruction Manual ().
- Mount the Microscope onto the *CIR-KIT WELD 450's* Support Bracket and secure by locking the screws on the Microscope Bracket Assembly. Plug in work lamp.
- To adjust the foot cable and electrodes slacken the brass clamp plates and slide the electrodes under the clamps. Lift the electrodes and position the Setting Block under the electrodes so that the tips of the electrodes touch the lower step (4mm from the base). Hold the electrodes against the 0.25mm shim to keep them parallel. Tighten the clamps plate screws. Remove the Setting Block.
- Set the height adjustment on the front of the machine to 0 mm adjust the electrodes so there is a 4 mm gap between the bottom of the electrodes and the glass table. Make sure that the electrodes are both at the same height by bringing them down gently on to a piece of abrasive paper and if you gently pull the paper forward, 2 equal lines should be made on the paper.
- With the height setting still at 0 mm put a piece of paper under the electrodes and gently push down on the foot pedal until the paper is clamped, this should be firmly clamped without trying to weld and the adjusting screw will have stopped moving. You should still have approximately $\frac{1}{4}$ of the downward foot pedal movement left. Now pushing a little more on the foot pedal, the white arm below the height adjustment screw should continue to move down giving a gap of 2-3 mm between the nut and the white arm, compressing the spring and putting clamping pressure on the electrodes, the welder should now try and weld, beep and show the clean light. This 2-3 mm movement of the white arm will ensure that there is pressure on the electrodes which is needed to give a good electrical contact to measure the current flow / resistance. If there is insufficient pressure, the machine will not sense the correct welding times. To increase the spring pressure wind the 2 knurled nuts upwards.

- If it welds early or not at all adjust the foot pedal cable to achieve this setting.
- Place the repair tools in the front cover pockets.
- Connect mains lead into the sockets at rear of machine.
- Check voltage switch on the machine back is showing the corresponding voltage to your mains supply.
- **IMPORTANT NOTE: If voltage is wrong, DO NOT proceed with installation and DO NOT switch the machine on. Contact SEETRAX or your local SEETRAX Distributor. If the voltage is correct SWITCH ON O/I. See Figure 2, page 20).**
- Adjust the Work Light position.
- YOUR CIR-KIT WELD 450 IS NOW READY TO WORK!!
- PLEASE TURN TO OPERATING INSTRUCTIONS - PART 1, page 12.

MICROSCOPE INSTRUCTION MANUAL

OPERATING INSTRUCTIONS - PART 1

- 1) Place a chair in front of the *CIR-KIT WELD 450's* table. Place the Foot Switch in front and slightly to the right of the chair.
- 2) Place a scrap PCB (or assembly) to be repaired onto the work base with the damaged PCB track under the electrodes.
- 3) Switch on the electrical power to the machine and depress the Power Switch marked O/I, (Figure 2, Page20). The work Light and display will illuminate, and a No 7 will appear in the display before the last setting used.
- 4) Focus Microscope as per MICROSCOPE INSTRUCTION MANUAL on page 11.
- 5) Adjust, by means of the Thickness Adjuster (black metal knob), and the Weld Head Assembly to the desired workpiece thickness. The centre line on the Pressure Adjuster should then be aligned to the scale to the left of it. (Figure 3, page 21). Whilst operating the Thickness Adjuster, you should not operate the Foot Pedal Switch.
- 6) The gap between the Electrodes of 0.015" (0.4mm) should have been initially set. If further adjustments are required they can be made by turning the two knurled gap adjusters. To decrease the gap, release the right-hand one by turning anti-clockwise (towards operator) and at the same time, turn the left-hand one clockwise (also towards operator), until the desired gap is reached. Both Gap Adjusters should be firmly 'nipped up' when the gap has been set but should NOT be over tightened. To increase the gap, reverse the above procedure. The adjustments should be viewed through the Microscope and not with the naked eye. Feeler gauges can be used but the setting is not crucial.

IMPORTANT NOTE:

The Electrodes must be parallel to each other and of identical length. Adjustments can be made by releasing either or both screws and re-aligning by viewing through the Microscope. If the Foot Pedal Switch is depressed to adjust the exact height of the Electrodes, it is essential that a piece of flat, non-conductive material is placed under the Electrodes otherwise damage to the work table may occur.

- 7) Depress the Time Switch (mS) and adjust up or down, using the adjust buttons + or -, until the desired level is displayed on the screen. Repeat the procedure with the Amp (A) setting and Lamp (L).

IMPORTANT NOTE:

Refer to RECOMMENDED SETTINGS on page 23 of this manual for the recommended settings for specific track widths. However, as copper composition varies considerably, these are only guidelines. Adjustments will inevitably have to be made for fine-tuning.

- 8 To store in memory depress Store Button (S) followed by either, adjust buttons + or -, until a vacant memory channel is selected. Depress (S) again. The Time, Amps and Work lamp intensity has now been stored in that channel. The display will return to either Time or Amps.

The above procedure can be repeated up to 99 times.

- 9 To recall any memory channel, depress Recall (R), followed by adjust buttons + or - until the channel number is displayed Depress (R) again and the Amps or Time allocated to that channel will be displayed. The *CIR-KIT WELD 450* will operate at that energy level and work lamp intensity.
- 10 To operate in a manual mode, use the Time, Amps and Work lamp intensity with the adjust buttons + or -, but do not press the Store (S) button.
- 11 Clean the PC Track with the Glass Fibre Cleaning Pencil supplied. Remove dust, etc.

Select a repair ribbon from the spools supplied, ie the nearest in width to the PC track that you intend to repair.

- 12 With the damaged track positioned under the Electrodes, but slightly to the left, slowly depress the Foot Pedal Switch and by viewing through the Microscope, lower the Electrodes onto the track. Once the Electrodes are in contact with the track, final adjustment of the PCB to the Electrodes can be made.

IMPORTANT NOTE:

Once contact between the Electrodes and the PC track has been made, do not continue to exert pressure on the Foot Pedal Switch as the weld circuitry will automatically be fired, which may damage the track further.

- 13 The settings on the welding machine can be very difficult to control if you start changing both amps and time settings. We have found that if you leave the time setting always at 3.40 mil seconds and always adjust the amps up or down this gives much better results.

The machine is designed to adjust the time setting for itself, therefore it will not always use the 3.40 mil seconds set but it senses the welding resistance and cuts the time accordingly to its threshold setting. (see threshold settings at end of this section only for experienced operators)

Approximate values

Cu40	(0.004")	0.10mm	Time 3.40	Amps 80
Cu60	(0.006")	0.15mm	Time 3.40	Amps 100
Cu80	(0.008")	0.20mm	Time 3.40	Amps 130
Cu10	(0.010")	0.25mm	Time 3.40	Amps 160
Cu12	(0.012")	0.30mm	Time 3.40	Amps 180

- 14 Pick up the ribbon in your right hand and lay the ribbon on top of the damaged track. Making sure that the ribbon is lying flat, depress the Foot Pedal Switch slowly, thereby lowering the Electrodes onto the ribbon and PCB track. At this stage, do not exert further pressure on the Foot Pedal Switch but by viewing through the Microscope, make any final adjustments to the ribbon. When the ribbon is perfectly aligned to the PCB track and Electrodes, exert a steady pressure to the Foot Pedal Switch and the weld will automatically be made. Release pressure on the Foot Pedal Switch and return the Weld Head to its 'rest' position.
- 15 Move the PCB and welded ribbon to the left until the Electrodes are over the 'good' track and the ribbon is bridging the o/c (break) in the track. Repeat instruction 13.
- 16 By using the scalpel (knife), carefully cut off the excess ribbon.

THE REPAIR IS NOT COMPLETE

- 17 If a weld was not satisfactory, making a slight increase in Amps would ensure a permanent bond (weld) is made next time. An increase in Amps will break down resistance caused by oxidation, etc but should not be too excessive, otherwise the ribbon will be damaged. PLEASE REMEMBER: A good weld is made by a perfect combination of Amps and Time. If too much of either is used, damage will occur to the ribbon, track or substrate and in extreme cases, all three!
- 18 Note the Time and Amps readings on the display that you used to achieve your perfect weld. Also, note the track width, ribbon width and if the track was copper or tin-lead plated. Further adjustments or complete re-settings can be made at a later stage, if required, by repeating the above operation.
- 19 Repeat steps 6 to 16 using different size ribbons, tracks or track finishes and put the figures into the *CIR-KIT WELD 450's* memory by selecting Programme Switch.
- 20 If reduced width tracks are to be repaired, follow procedures 11 to 16. If a length of over 3/8" (10mm) is to be repaired, the ribbon should be secured in the centre by applying a thin coat of adhesive between the track and substrate and the ribbon welded at both ends.
- 21 Small short circuits can be removed by cutting with a Scalpel.
- 22 After the repairs have been made to a PCB, it can be processed in any of the following ways:-

HOT AIR LEVELLED
TIN-LEAD PLATED AND IR OR OIL FUSED

ROLLER TINNED
LACQUERED
SOLDER MASK COATED
WAVE SOLDERED
LEFT AS BARE COPPER or
'TOUCHED UP' USING A SOLDERING IRON

- 23 If you experience any process problems, please refer to RECOMMENDED SETTINGS on page 23.

If the machine is fitted with version 5.0 or later software, this shows for a moment when first switching on. It incorporates a user adjustable weld threshold. This function allows the user to vary the weld limit voltage to suit differing types of PCB, flexibles etc.

THRESHOLD SETTINGS

To enter this mode simultaneously press Current and Time pushbuttons, the Current and Time LED's adjacent to the buttons will both be illuminated.

A number between 0 and 250 will be displayed, the default power up setting for this number is 70. This has proved to be an average setting and the machine will usually be set at this value.

The threshold should be left at 70 until you have some experience with various welds and different materials.

If it has been necessary to deviate from this number then the new value will be in the memory. The factory settings are obtainable by pressing Current and Time together.

An operator welding flexible circuits, for example, may require a less aggressive weld, in which case he would set a lower Threshold Voltage setting e.g. 68. The setting for that particular job should be stored in the normal manner.

NOTE: If a different Threshold Voltage has been set the setting will be retained even if the power is switched off. When the machine is next switched on it will remember all of its last settings and default to these values.

If a memory store is Recalled, all the settings will be as stored previously, including the Threshold Voltage.

Approximate welding settings with threshold

Cu40	(0.004")	0.10mm	Time 3.40	Amps 80	Threshold 70
Cu60	(0.006")	0.15mm	Time 3.40	Amps 100	Threshold 70
Cu80	(0.008")	0.20mm	Time 3.40	Amps 130	Threshold 70
Cu10	(0.010")	0.25mm	Time 3.40	Amps 160	Threshold 70
Cu12	(0.012")	0.30mm	Time 3.40	Amps 180	Threshold 70

OPERATING INSTRUCTIONS – PART 2

Here are some Questions and Answers that may be of help to you in understanding the CIR-KIT WELD 450

WHAT IS THE CIR-KIT WELD 450?

It is a constant current, microprocessor controlled, parallel gap welder with additional repair tools.

WHAT CAN THE CIR-KIT WELD 450 BE USED FOR?

For the repair of open circuits (o/c) or reduced width tracks on printed circuit boards (PCB's), and for welding fine wires, such as solenoid or motor leads to terminals.

HOW DO I REPAIR A PCB?

Simple! Detect the o/c by visual inspection or electrical testing. Place the pcb on the *CIR-KIT WELD 450* base with the o/c track under and slightly to the right of the weld head electrodes. Select a repair ribbon of suitable width from the choice of three supplied, and with the hand tool supporting it, lay it on top of the damaged track. Select a power/time setting and bring the electrodes down and into contact with the ribbon, by operating the foot pedal switch. The weld is automatically made. Move the pcb and ribbon along, thereby, bridging the o/c with the ribbon. Repeat the weld procedure. Cut off excess ribbon with the scalpel provided. Job complete.

WHAT FURTHER MANUFACTURING PROCESS WILL THE REPAIRED TRACK NOW WITHSTAND?

Just about any process, as the repair is a weld and not a soldering operation. Electroplate, tin/lead and reflow it. Hot Air Level it. Even Roller Tin it and of course, a Solder Mask can be applied over it.

WHAT ADJUSTMENTS DO I REGULARLY NEED TO MAKE TO THE CIR-KIT WELD 450?

Very few:

- Select thickness of PCB on weld head
- Switch to preset power setting or manual adjust.
- Adjust electrode gap for different ribbon widths.

DO I NEED TO WAIT FOR THE CIR-KIT WELD 450 POWER PACKS TO CHARGE BEFORE USING EACH TIME?

No. After its initial charge (1 hours), it is always ready to use.

(PLEASE NOTE: If the machine is not in continual use, it should be periodically, ie weekly, switched on for a minimum of 2 hours to re-charge).

WHAT EFFECT DOES THE PRESSURE SETTING HAVE ON THE WELD?

The adjustable pressure control of the electrodes is to ensure the optimum electrical contact between track and ribbon. Insufficient pressure will cause excessive heating between ribbon and electrode and produce a cold weld, or the ribbon sticking to the electrode. Excessive force will damage the ribbon, track or substrate.

WHAT EFFECT DOES THE ELECTRODE GAP HAVE ON THE WELD?

The larger the gap width, the more power required and therefore the higher the heating effect.

WHAT EFFECT DOES TIME HAVE ON THE WELD?

Think of the 'time' adjustments as just 'fine tuning'. Higher time settings will give more heat.

WHAT IS THE MINIMUM TRACK I CAN REPAIR?

The standard reel ribbon width sizes are:

- 0.003" (0.075mm)
- 0.004" (0.10mm)
- 0.005" (0.13mm)
- 0.006" (0.15mm)
- 0.008" (0.20mm)
- 0.010" (0.25mm)
- 0.012" (0.30mm)
- 0.013" (0.38mm)
- 0.020" (0.50mm)
- 0.040" (1.00mm)

WHAT IS THE MAXIMUM WIDTH I CAN REPAIR?

Any width. Just weld the ribbon side by side.

WHAT CAN I DO ABOUT A REDUCED WIDTH TRACK OVER A LONG LENGTH OF SAY, 2" (50mm)?

Weld as before but this time, lay the ribbon on a coat of adhesive on the bare laminate. (Not under the area to weld).

WHAT IS THE RESULT IF THE TIME/AMPS SETTINGS ARE INCORRECT?

- Too high amps = Open circuit (o/c)
- Too low amps = No weld or shallow weld or 'dry joint'
- Too high time = Burning or softening of substrate or o/c
- Too low time = No weld or small weld area

VERY IMPORTANT NOTE.

IF THE TIME/AMPS SETTINGS SELECTED ARE FAR TOO HIGH FOR THE PARTICULAR MATERIAL BEING WELDED, THE MACHINE WILL NOT ATTEMPT TO OPERATE. IN THIS CASE YOU MUST LOWER THE SETTINGS MANUALLY AND RE-TRY.

WILL THE WELD DAMAGE THE SUBSTRATE?

No! Some slight discoloration of the outer coat may occur but it is not normally visible to the naked eye, and does not affect the insulation properties of the laminate.

WHAT RIBBON CAN I USE AS THE REPAIR AGENT?

SEETRAX CU series is the ribbon we recommend. It is a reel copper ribbon with just a "flash" of tin-lead plating on it to prevent oxidation.

ARE THE REPAIRS TO PCB'S BY WELDING ACCEPTED BY WORLD SPECS?

Yes! BS6221 and some others, allow this type of repair.

WILL I BE ABLE TO SEE THE REPAIR?

If the repair is coated at a later stage, by tin-lead or similar deposit, it is unlikely if viewed with the naked eye. Under 5X magnification, it may be visible.

HOW DO I KNOW WHEN THE ELECTRODES NEED TO BE CLEANED AND HOW DO I GO ABOUT IT?

Epoxy deposits can be cleaned off the electrodes with fine sandpaper (600 grit, supplied). Any deposits between the electrodes can be cleaned by sliding a piece of paper, not sandpaper, between them. Cleaning is required only when a weld is unsatisfactory, the electrodes are not firing or when the contaminator alarm advises you.

WHAT ARE THE ELECTRODES MADE OF?

Molybdenum Carbide.

HOW ABOUT MAINTENANCE?

The *CIR-KIT WELD 450* has been designed to run with very little maintenance. In fact, an occasional clean of the electrodes is just about all you need to do on a day-to-day basis.

See page 27.

CAN I ADJUST THE ELECTRODE POSITION FRONT TO BACK?

Yes. Follow these instructions to move the Electrodes, either back or forward if the repair ribbon is sliding off the track. For only very fine adjustments the electrodes can be slightly bent as they are very strong and will not break.

- Release A, B, C, D
- Move Electrodes back
- Tighten A, B, C, D

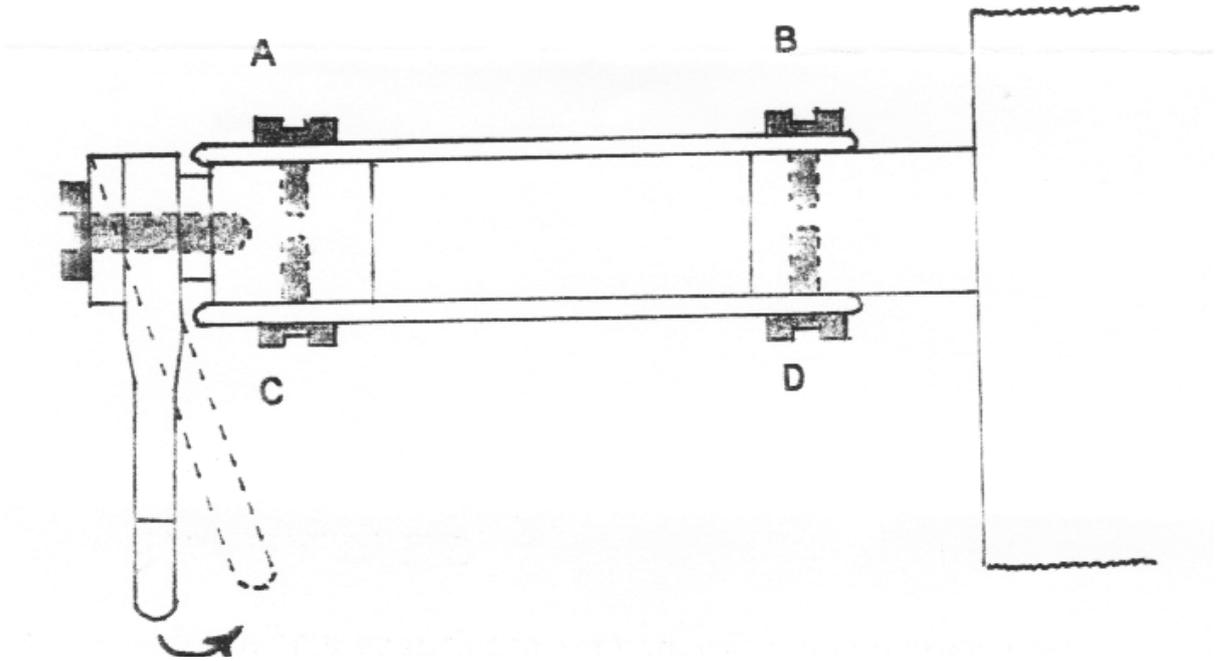


Figure 1

FRONT PANEL - (PART NUMBER 1055)

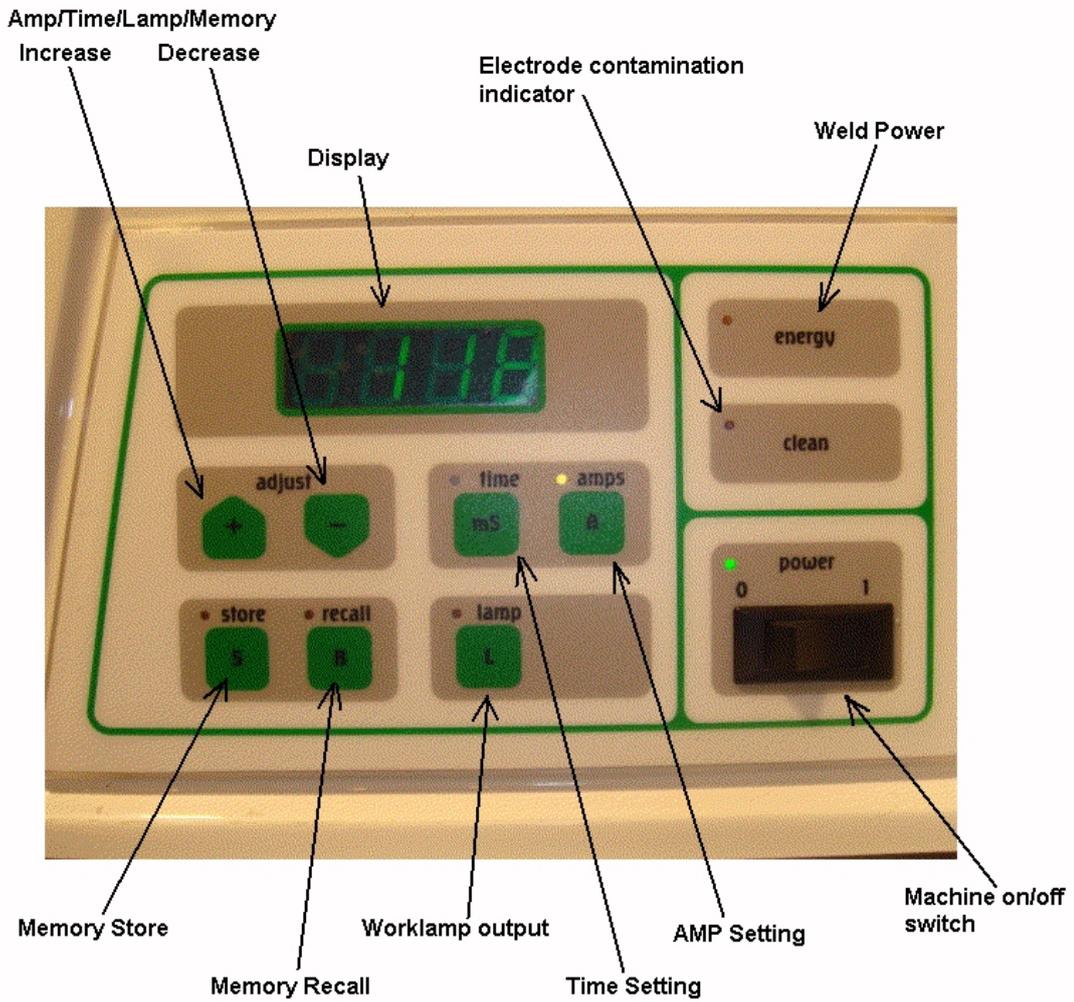


Figure 2

WELD HEAD PRESSURE + PCB THICKNESS ADJUSTERS

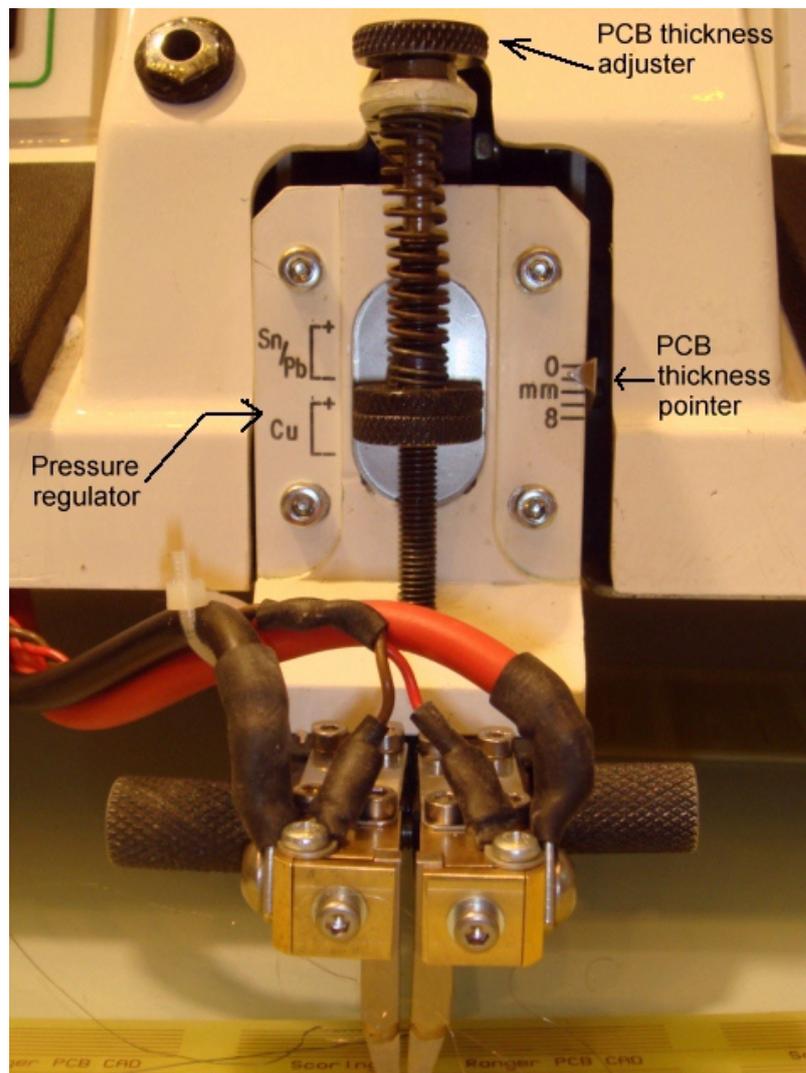


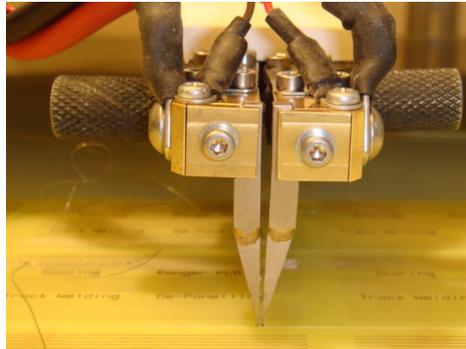
Figure 3

Pressure Regulation: Align centre of knurled adjuster ring to suit type of PCB material (see Pressure Settings)

PCB thickness adjuster: Align pointer to approximate PCB thickness

PRINCIPLES OF GAP WELDING

The *CIR-KIT WELD 450* employs a closed loop system that 'looks' at the weld as it is taking place, and modifies the power output accordingly. This loop is essential as during the weld the temperature rises and the resistance of the workpiece also rises, causing the heat to be automatically reduced.



POSITIONING OF ELECTRODES RELATIVE TO AN OPEN CIRCUIT

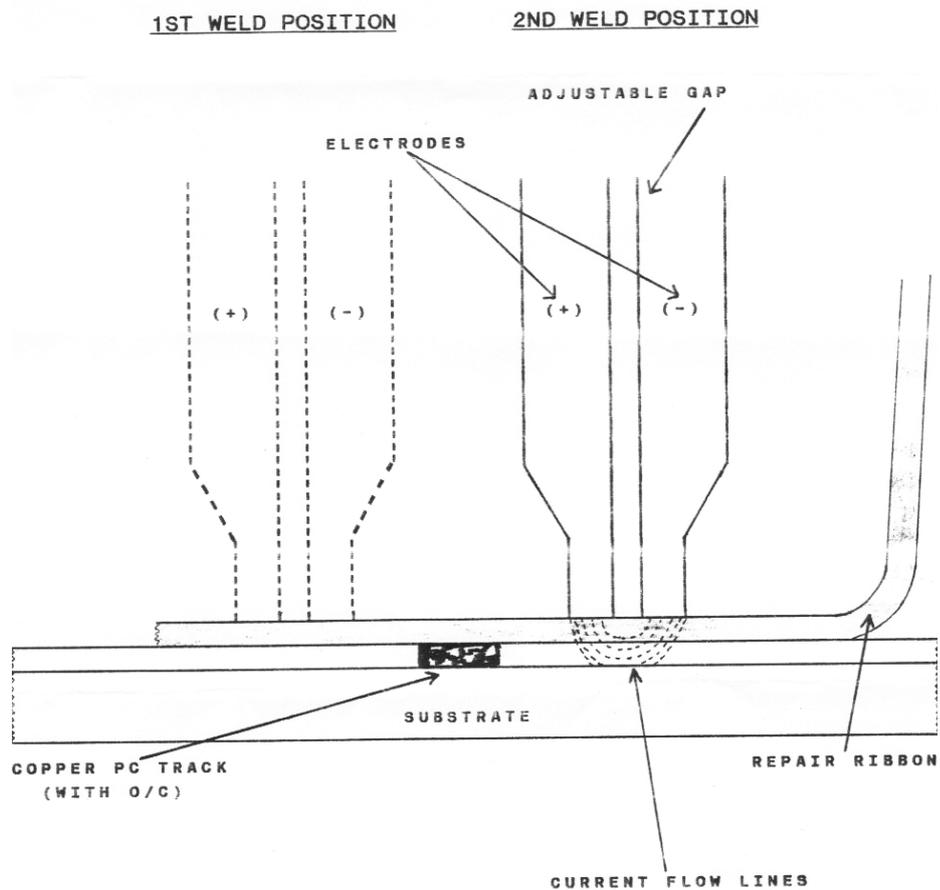


Figure 4

RECOMMENDED SETTINGS

Firstly, it must be stressed that a good weld can only be made onto a **GOOD** section of track or pad.

Copper thickness, width, quality, cleanliness, coatings (ie tin-lead), will all affect the settings and adjustments will have to be made if a perfect weld is to be achieved.

Therefore, the settings shown below are **ONLY GUIDELINES** and should be thought of as a **STARTING POINT ONLY**. Trial and error will determine the actual settings you require for your job. All settings are based on 1oz (35 micron) copper tracks.

Good quality, clean copper track
Electrode Gap 0.008" (0.20mm)
Threshold 70 (default)

<u>RIBBON SIZE</u>	<u>TIME</u>	<u>AMPS</u>
0.004 (0.1mm)	3.4	100
0.006 (0.15mm)	3.4	120
0.008 (0.20mm)	3.4	150
0.010 (0.25mm)	3.4	170
0.012 (0.30mm)	3.4	190

REMEMBER!

IF THE AMPS SETTING IS *too low* OR *too high*, THE CIR-KIT WELD 450 WILL TRY TO WELD, BUT WILL REDUCE THE OUTPUT TO PROTECT THE TRACK FROM FURTHER DAMAGE. THIS IS SUBJECT TO THE CORRECT ELECTRODE GAP SETTING.

SPARE PARTS LIST

QUANTITY:	PART NO:	DESCRIPTION:
1 OFF	1070	FRONT CONTROL DISPLAY PANEL
1 OFF	1050	MAIN PRINTED CIRCUIT BOARD
1 OFF	1060	MICRO PROCESSOR
1 OFF	1410	OPTO SWITCH
1 OFF	1340	MAIN POWER FUSE
1 OFF	CU 30	REPAIR RIBBON 100ft 0.003" X 0.003" 30M 0.075mm X 0.075mm
1 OFF	CU 40	REPAIR RIBBON 100ft 0.004" X 0.003" 30M 0.10mm X 0.075mm
1 OFF	CU 50	REPAIR RIBBON 100ft 0.005" X 0.003" 30M 0.13mm X 0.075mm
1 OFF	CU 60	REPAIR RIBBON 100ft 0.006" X 0.003" 30M 0.15mm X 0.075mm
1 OFF	CU 80	REPAIR RIBBON 100ft 0.008" X 0.003" 30M 0.20mm X 0.075mm
1 OFF	CU100	REPAIR RIBBON 100ft 0.010" X 0.003" 30M 0.25mm X 0.075mm
1 OFF	CU120	REPAIR RIBBON 100ft 0.012" X 0.003" 30M 0.30mm X 0.075mm
1 OFF	CU150	REPAIR RIBBON 100ft 0.015" X 0.003" 30M 0.38mm X 0.075mm
1 OFF	CU200	REPAIR RIBBON 100ft 0.020" X 0.003" 30M 0.50mm X 0.075mm
1 OFF	CU400	REPAIR RIBBON 100ft 0.040" X 0.004" 30M 1.00mm X 0.100mm
1 OFF	EL15	LONG ELECTRODES 0.015" (0.38mm)
1 OFF	EL20	LONG ELECTRODES 0.020" (0.50mm)
1 OFF	EL30	LONG ELECTRODES 0.030" (0.75mm)

THE ELECTRODES ARE AVAILABLE IN EITHER LONG OR SHORT LENGTHS

LONG	=	42mm
SHORT	=	29mm

DESCSCRIPTION	CODE
COMPLETE MACHINE - 450	
ELECTRODE SHORT 10 THOU	ES10
ELECTRODE SHORT 15 THOU	ES15
ELECTRODE SHORT 20 THOU	ES20
ELECTRODE SHORT 30 THOU	ES30
ELECTRODE LONG 10 THOU	EL10
ELECTRODE LONG 15 THOU	EL15
ELECTRODE LONG 20 THOU	EL20
ELECTRODE LONG 30 THOU	EL30
REEL RIBBON CU 30 0.003" 0.08mm	CU30
REEL RIBBON CU 40 0.004" 0.10mm	CU40
REEL RIBBON CU 50 0.005" 0.13mm	CU50
REEL RIBBON CU 60 0.006" 0.15mm	CU60
REEL RIBBON CU 80 0.008" 0.20mm	CU80
REEL RIBBON CU 100 0.010" 0.25mm	CU100
REEL RIBBON CU 120 0.012" 0.30mm	CU120
REEL RIBBON CU 150 0.015" 0.38mm	CU150
REEL RIBBON CU 200 0.020" 0.50mm	CU200
REEL RIBBON CU 400 0.040" 1.00mm	CU400
REEL RIBBON CU3S - 1OZ (Silver Only)	CU3S
REEL RIBBON CU 4 - 1 OZ (Copper or Silver)	CU4 (S)
REEL RIBBON CU 5 - 1 OZ (Copper or Silver)	CU5 (S)
REEL RIBBON CU 6 - 1 OZ (Copper or Silver)	CU6 (S)
REEL RIBBON CU 8 - 1 OZ (Copper or Silver)	CU8 (S)
REEL RIBBON CU 10 - 1 OZ (Copper or Silver)	CU10 (S)
REEL RIBBON CU 12 - 1 OZ (Copper or Silver)	CU12 (S)
REEL RIBBON CU 15 - 1 OZ (Copper or Silver)	CU15 (S)
RIBBON HOLDER	1030
FIBREGLASS STICK	1040
MAIN PCB	1050
MICROPROCESSOR BOARD	1060
FRONT PANEL DISPLAY BOARD	1070
COMPLETE ELECTRONIC ASSEMBLY	1080
FOOT PEDAL CABLE (6 Ft)	1090
COMPLETE FOOT PEDAL ASSEMBLY w/o CABLE	1100
FOOT PEDAL CABLE (7 Ft)	1110
ADJUSTING BLOCK ASSEMBLY	1120
CUTTERS	1220
TWEEZERS	1230
ADJUSTING BLOCK SCREWS (PAIR)	1240
LAMP 20W 12V	1260

MICRO SWITCH	1330
POWER FUSES	1340
EMX MICROSCOPE	1350
EYE PIECE 15X MAG	1360
RUBBER EYE PIECES	1370
BATTERIES SET OF 4	1380
OPTO SWITCH	1410
ELECTRODE SETTING BLOCK	1420
ELECTRODE HOLDER & CLAMP PLATE (PAIR OF EACH)	1440
INSULATOR BLOCK (no screws)	1390
INSULATOR BLOCK (with screws)	1400
STAINLESS STEEL CONNECTOR PLATE (SET OF 4)	
COMPLETE WELDING HEAD	
SLIDE BEARINGS	1450
Knurled Nuts / Spring / Screw	
Box	
Transformer	
BATTERIES (set)	1430

MAINTENANCE

DAILY:

Clean Electrodes as required. NOTE: This may be as often as every 10 welds.

Ensure gap between Electrodes is clear of debris.

Replace Microscope dust cover after use.

3 MONTHLY:

Remove Electrodes and thoroughly clean them. Clean electrode holders before replacing the electrodes.

Clean covers and worktable with a light detergent.

IMPORTANT NOTE

ISOLATE POWER TO MACHINE ELSEWHERE BEFORE CLEANING

ANNUALLY:

Lightly lubricate Foot Cable and Spring Head Mechanism. (Do not oil excessively).

IMPORTANT NOTES:

THE *CIR-KIT WELD 450* USES RECHARGEABLE POWER PACKS. IN THE EVENT OF THE MACHINE NOT BEING USED REGULARLY, THE POWER MUST BE SUPPLIED TO THE MACHINE AT LEAST ONCE A WEEK FOR A PERIOD OF NOT LESS THAN FOUR HOURS. FAILURE TO DO SO WILL AFFECT THE FUNCTION OF THE MACHINE AND YOUR SEETRAX WARRANTY.

DO NOT PLACE ANY ITEMS OF ANY WEIGHT INCLUDING PCB'S ON THE TOP OF THE MACHINE AS THIS CAN CAUSE THE MACHINE TO BEND, AND REDUCE THE ELECTRODE GAP TO THE GLASS WORKING AREA. (72MM) SHOULD BE THE APPROX. DISTANCE BETWEEN GLASS AND BOTTOM OF ALLOY TRAY (ITEM 2). THIS WILL INVALIDATE YOUR MACHINE WARRANTY

PROBLEMS?

YOU HAVE PROBLEMS?

We are sorry to hear this! Your machine was thoroughly tried and tested by our QA Department a full production environment, at your requested voltage/frequency, before shipment, so we know it was OK when it left us.

ONE OF 3 SITUATIONS HAS OCCURRED:

1. YOUR MACHINE HAS BEEN DAMAGED IN TRANSIT

In this instance, we will repair the equipment and invoice you. You can then claim on your insurance! This is of course, assuming you insured the machine during transit. (CIF sales included).

2. THE MACHINE HAS NOT BEEN INSTALLED CORRECTLY OR IS NOT BEING USED IN THE WAY IT HAS BEEN DESIGNED.

Have you Read the Instruction Manual???

WHAT WE CAN DO

We will advise correct operation, repair any damaged components returned to us (postage paid by your company) and replace them as soon as possible, and invoice you accordingly.

3. THE MACHINE IS MALFUNCTIONING DUE TO A COMPONENT FAILURE SINCE IT LEFT OUR COMPANY.

We are sorry if this is the case! (These things happen even with a Quality Assurance system as tight as ours!!).

WHAT WE CAN DO

We will advise you of what action to take. We will replace any faulty component returned to our company address (postage paid by your Company) within the agreed warranty period, free of charge. Thereafter we will advise you of the cost of replacing the faulty component prior to returning the repaired or new component to you and invoice you accordingly.

IF IN DOUBT, PLEASE ASK US OR YOUR LOCAL SEETRAX LTD AGENT.

WARNING: - **UNDER NO CIRCUMSTANCES SHOULD THE FOOTSWITCH OF THE CIR-KIT WELD MACHINE COME INTO CONTACT WITH THE ELECTRODES OR BATTERY TERMINALS. THIS WILL CAUSE A SHORT AND POSSIBLY A FIRE AND SERIOUS DAMAGE TO THE WELDING MACHINE**

WARRANTY CLAUSE

- Replacements will be supplied for parts found to be defective in workmanship or material, under normal one shift conditions, within six months from the date of the shipment, upon receipt of the defective parts at our factory. All necessary items or equipment supplied by us with this equipment are subject to the warranty issued by, or considered standard practice, by the respective manufacturers and is warranted or guaranteed by us accordingly.

There will be a charge for service calls made by our technicians if these calls are a result of a failure to follow the installation/operating/maintenance instructions supplied. These charges will be made at our normal service charge rate. No claims will be allowed for production whether or not related to the use, or delivery of any equipment, or for any consequential damage or business loss incurred by buyer. No allowance will be made for repairs or alterations unless specifically authorised by Seetrax CAE Ltd.

- Consumable items (i.e. Electrodes, ribbons etc.) supplied with the machine are not covered by this warranty.
- Warranty is invalidated if genuine Seetrax CAE Ltd replacement parts are not used (unless specifically authorised).

Important:

Always quote machine's serial number when ordering spare parts/service.

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