Temperature Technology Ltd.

SR48 Bench Welder
Operations & Instruction Manual

Whatever stage of development your production line is in, TTL have the products to help you produce temperature sensors quicker, easier and more efficiently.

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1.0 What is Capacitance Welding?

An electrical charge at a preset energy level is stored. This charge is then released across two electrodes, the positive electrode being the workpiece. This discharge of stored energy is sufficient to weld the workpiece.

Capacitance welding is generally used for the welding of similar and dissimilar wires (thermocouple junction welds) and for impact welding wires to a conductive material.

2.0 Installation and set up.

2.1 Mains connection.

The mains lead supplied is connected to the IEC socket at the rear of the SR80 and should then be connected to a standard 240V / 50Hz supply unless otherwise stated.

2.2 Footswitch connection.

If using an optional footswitch, plug the 3.5mm jack into the footswitch socket on the instrument.

2.3 Wire holding pliers connection.

Plug the wire holding pliers into one of the red 4mm sockets on the front panel, labelled x1 or x2 (see initial settings).

2.4 Viewing filter attachment.

Slide the viewing filter over the argon shield housing - this will be easier if the bottom ends of the filter are pulled slightly apart with thumbs.

Note that the filter must be attached to protect the eyes from welding flashes, even if goggles are worn the filter should be attached to prevent the possibility of arc-eye from non-operators.

3.0 Operation and controls.

3.1 Initial settings.

Switch on the mains supply with the rocker switch built into the IEC connector on the rear panel - the green lamp and the meter light will be illuminated.

Choose an energy range to suit the size of wires to be welded by plugging the pliers into the appropriate red socket x1 or x2. Note that the black COM socket is only used with accessories such as the impact welding attachment.

Adjust the charge meter reading using the potentiometer appropriate to the size of wires to be welded. The numbers on the potentiometer knob correspond approximately with the meter reading and may be used for repeating a setting for a particular job.

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3.2 Energy settings.

The following table is a guide only for welding type K thermocouple materials. These may be varied by experience to give the best weld for this and other materials.

	Wire diameter (mm)	
Meter Reading	x1 output	x2 output
2	0.1mm	0.2mm
4	0.2mm	0.35mm
6	0.25mm	0.5mm
8	0.35mm	0.7mm
10	0.45mm	0.9mm

3.3 Preparing wires.

Insulated wires should have their insulation stripped sufficiently to allow at least 2mm to protrude when gripped in the pliers. They should be laid side by side and in contact and the ends square and level. With smaller diameter wires it will be found advantageous to twist them together before trimming. This also applies when welding stranded wires together or stranded wires to solid wires, e.g. when fitting flexible leads to platinum detectors.

3.4 Weld action.

Press and hold the weld switch or foot switch and with the wires to be welded gripped in the wire holding pliers, bring the wires up to the carbon electrode (positioned centrally on the front panel).

This action will cause the charge to jump across the electrode, thereby welding the wires.

The weld switch or foot switch may now be released after which the capacitors will recharge as indicated by the meter. During recharging the red 'WAIT' lamp will be illuminated and welding is prevented before the recharging is complete.

4.0 Specific applications.

4.1 Thermocouple junctions.

Thermocouple junction welds are the most common application for the SR48 and as such the instructions given under 3.4 should be followed.

Fig 4.1
Thermocouple
Junction Weld

In summary, the thermocouple wires should be prepared as stated in 3.3. The prepared wires should then be gripped in the wire holding pliers, making sure that they are in contact with each other and then with the weld switch (or footswitch) depressed, offered to the carbon electrode. The resulting discharge will weld the wires thus forming the thermocouple junction. See fig 4.1

4.2 Impact welding.

This is the term used for welding wires to a metal (conductive) surface. This type of application is common when thermocouples are required to be welded to a chassis or framework for testing or heat treatment applications.

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The optional welding clip attachment should be plugged into the 'COM' socket on the front panel. The clip should then be attached to the surface close to where the wires need to be attached.

The prepared wires are then gripped in the wire holding pliers and then pressed on to the surface to which they are to be attached.

The weld switch (or footswitch) is then depressed and the resulting discharge will weld the wires to the surface after which the weld clip can be removed.

See fig.4.2 above.

4.3 Pt100 elements.

The SR48 can be used for attaching wires to Pt100 (or other types of sensing element) to manufacture resistance thermometers.

Where possible, the element lead wires should be lightly twisted around the prepared extension in reversed plane (see fig 4.3a) wires to ensure a good contact. These wires are then gripped in the wire holding pliers. If the wires cannot be twisted (eg if using a muliticore cable) then hold in pliers in a 'V' shape.

Fig 4.3a

Fig 4.3b

The weld switch (or footswitch) should be pressed and the wires offered to the carbon electrode in the centre of the front panel, the resulting discharge will weld the wires.

The element wires can the be straightened (see fig 4.3b) and insulated as appropriate.

4.4 Weld quality.

Examine the weld using the magnifying glass supplied. A good weld will produce a spherical ball of metal on the end of the wires. A flat bridge between the wires indicates too low an energy setting. A flattened hemisphere indicates that the energy setting is too high.

5.0 Specifications.

General Specifications:
Energy output: 0 to 48Joules via selectable outputs.
Weld capacity: Up to 2 x 1.1mm dia.
Power supply: 220/240Vac or 100/120Vac to order.
Weight: 4Kg.
Dimensions: 310 x 230 x 120mm.

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Indicators and Controls:
LED indication: Mains on.
Meter: Percent of max. charge
Weld switch: Activates weld
Potentiometer: Sets energy level.

Accessories included:
Welding goggles, Plier electrodes, Spare carbon electrodes, Allen key, Magnifying glass, Mains lead and viewing filter.

Accessories optional:
Footswitch, Impact weld earth lead and croc-clip, Pen and plate welding jig.

6.0 Maintenance.

Apart from carbon electrode replacement, the SR48 contains no user serviceable parts. In the event of failure, please return the welder, carefully packed, to the distributor from which it was purchased who will arrange for the necessary repair.

6.1 Carbon Electrode Replacement.

After considerable use, the carbon electrode will need attention. The carbon may be trimmed in a drill or lathe chuck using a metal file to give an included angle of about 30° with the tip approx. 2mm dia. To remove the carbon electrode, first remove the viewing filter and then slacken the grub screw (using the 2mm allen key provided) on the right-hand side of the electrode holder and withdraw the electrode. When fitting a new or trimmed electrode, insert it into the holder and tighten the grub screw (do not overtighten) and replace the viewing filter.

7.0 Safety and tips.

Always use the red viewing filter to protect the eyes from the welding flashes. A bench lamp positioned over the welder will permit the work and carbon electrode tip to be easily seen.

Accidental over-setting of the energy level can result in flying particles and it is strongly recommended that the welding goggles supplied are used at all times.

If the pliers become pitted or soiled, clean the faces by pulling through a piece of folded fine emery paper whilst applying slight pressure to the handles.
Keep a notebook by the welder and make a record of the settings for each type of job, noting wire size, materials, energy range and meter reading.

Where a particular size of wire can be welded on either range, choose the range that will give the highest meter reading.

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8.0 MODEL SR-48 LOW COST WELDER

WELDER UNIT FUNCTION CHECK

1 x MAINS LEAD ☐

1 x SET OF WELDING PLIERS ☐

1 x INSTRUCTION MANUAL ☐

1 x VIEWING FILTER ☐

1 x MAGNIFYING GLASS ☐

2 x SPARE CARBON ELECTRODES ☐

1 x PAIR WELDING GOGGLES ☐

SERIAL NO.: .....

CHECKED BY: .....

DATE: .....

CE Marked.

The HSC-1 complies with EMC directives and safety requirements.

The SR50 complies with EMC directives and safety requirements.