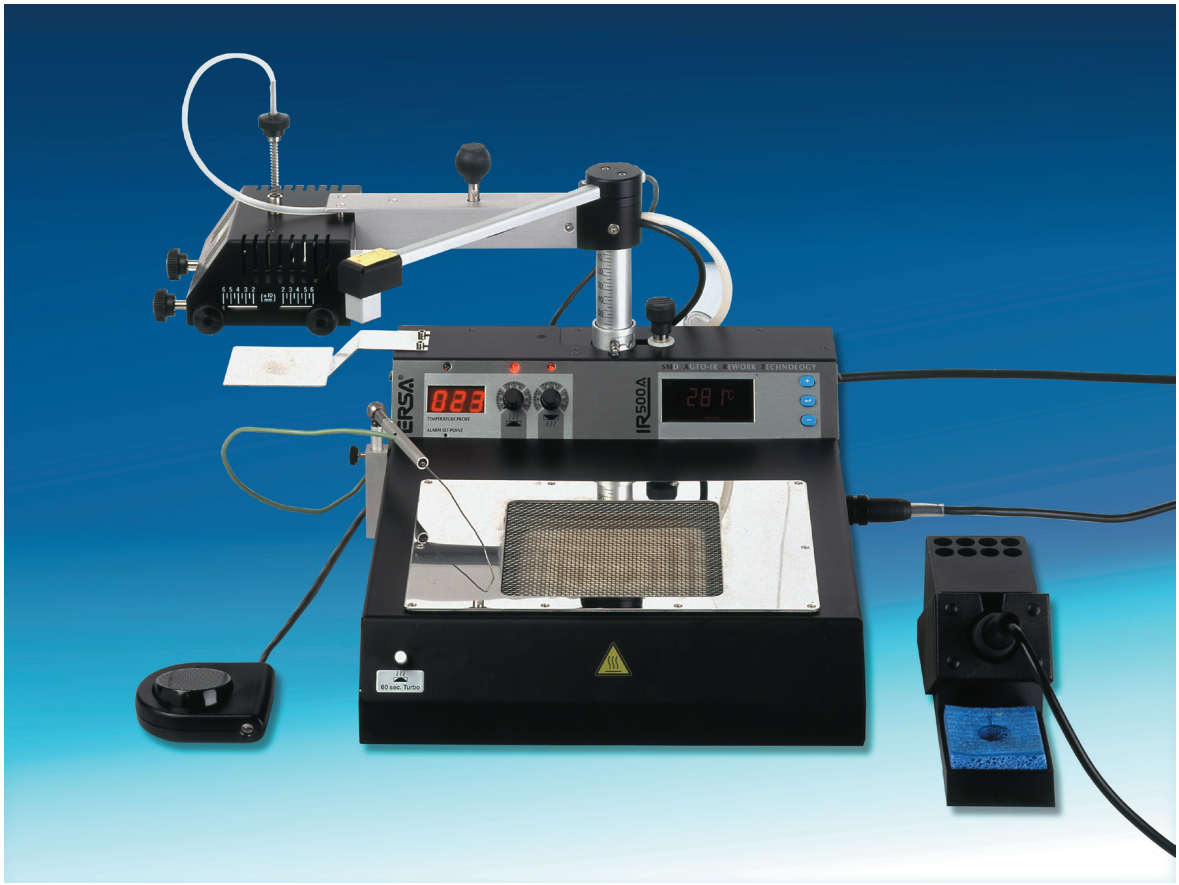


Operating Instructions

ERSA IR 500 A
SMT / BGA Rework System

3BA00011-00 01

Contents:

1. Introduction

1.1 Product information

Thank you for purchasing an ERSA IR 500 A Infrared Rework System. The ERSA IR 500 A SMT / BGA Rework System is the ideal semi-automatic solution for rework tasks on SMD and plated-through or mixed-population printed circuit boards. Its compact design and user-friendly handling, which requires no nozzles or templates, makes this system unique in its class. In addition to the benefits of the dark IR system, and integration of the digital 2000 A soldering station, which are described below, further options using 6 different soldering and desoldering tools are available for all rework applications.
The following pages of this manual will show you how to bring the system into operation, and how to work safely with it. Our Service Team will be pleased to answer any questions that you may have:

ERSA GmbH
Leonhard-Karl-Straße 24
97877 Wertheim
Germany

Tel.: +49 (0 93 42) 800-0
Fax: +49 (0 93 42) 800-100

Email: info@ersa.com
Internet: www.ersa.de

1.2 General information on Operating Instructions

The aim of these Operating Instructions is to provide you with information on the application of this product and its correct use. Information is also given on maintenance, fault elimination, and replacement and wear parts.
The Operating Instructions detail the delivery specification; start-up; and correct operation of the unit. Please note the following symbols: their purpose is to make this manual easier to use.

This symbol appears in front of safety information. Severe injury or even death may result from disregarding this information!

Attention!

"Attention" appears in front of instructions which should be observed to avoid damaging the unit.

2. Technical Specifications

IR 500 A Main unit

Upper IR power emitter:	1 x 200 W (emitter surface 60 x 60 mm)
Lower IR power emitter:	1 x 400 W (emitter surface 120 x 120 mm)
Total system power	600 W
Wavelength of IR emitter	2 - 8 µm
Power supply	230 VAC 50Hz (115VAC 60 Hz)
Fuse	3.15 AT (6.3AT)
Equipment class	1
Display	7-segment display
Operation	Potentiometer
Connecting cable	approx. 2 m
Weight	approx. 7 kg
Increase in temperature during process	between 0.3 and 1.5 K/s
Temperature recording system	NiCrNi thermocouple (K type)
Positioning	Laser class II
Footprint	300 x 380 mm (W x D)
Total height	165 - 230 mm
Maximum lift	65 mm
Working distance from upper emitter	15 - 40 mm
max. working depth	approx. 170 mm

For technical data on the DIGITAL 2000 A soldering station, consult the enclosed "ERSA DIGITAL 2000 A" Operating Instructions. (3BA00044-00)

3. Safety Instructions

Do not use your IR 500 A until you have read and understood the safety information contained in this chapter.

The IR 500 A is exclusively designed for soft soldering of electronic components onto printed circuit boards. The manufacturer cannot be held liable for any damage resulting from incorrect use, or use that does not comply with the specifications.

The system may not be used to heat inflammable or explosive materials, as to do so constitutes a fire hazard. The product may not be left unattended while it is heating up.

The upper and lower emitters on the units become extremely hot during operation. Flammable items, fluids and gases must be kept beyond the operating range of the unit! Never allow skin, or materials that are susceptible to heat damage, to touch the hot parts of the casing!
The heat energy in the upper and lower emitters is sufficient to inflict severe burns to hands only a few minutes after the unit has been switched on. Allow the unit to cool down before transportation!

A Class II semiconductor laser is used in tandem with the laser positioning aid. Never look directly into the laser beam. It could damage your eyesight.

Only experienced and qualified electrical specialists may carry out repairs. The unit contains high-voltage wiring and cables. Incorrectly performed repairs will endanger life!

4. Start up

4.1 Scope of delivery package

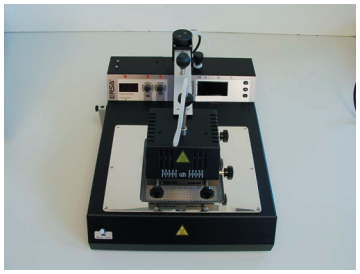
Check the content of the packaging to make sure it is complete. This consists of:

- IR 500 A base unit with integrated DIGITAL 2000 A soldering station
- Mains connection cable
- K-type temperature sensor
- Laser positioning aid, including holding frame, 2 screws, 2 hexagon socket screw wrenches
- Component storage tray
- Finger switch
- 1x 5 mm push-on type silicon suction cup, 2x 8 mm push-on type silicon suction cup
- Tech tool soldering iron
- Storage tray stand
- Operating Instructions IR 500 A
- Operating Instructions DIGITAL 2000 A
- Safety Instructions

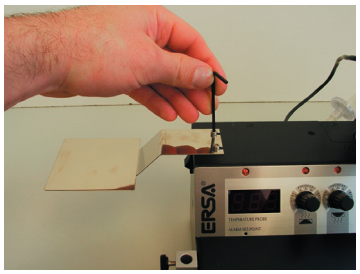
If components are missing or are damaged, contact your supplier.

4.2 Switching on for the first time

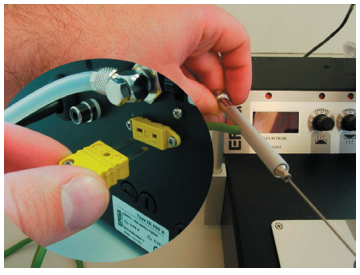
4.2.1 Setting up and connecting the units



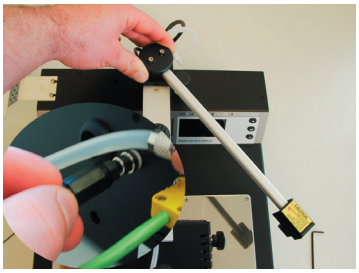
- Unpack the IR 500 A unit.
- Place the unit on a solid and even work surface.



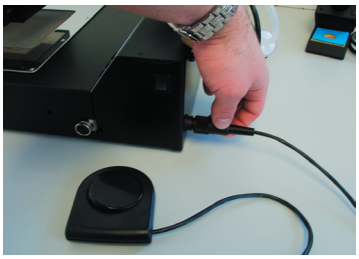
- Fit the supplied metal storage tray to the IR500A base unit. Use the hexagon socket screw wrench for this.



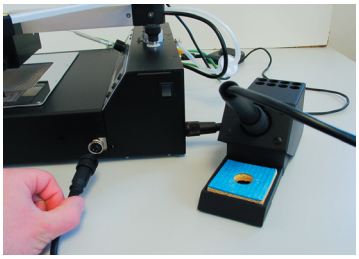
- Fit the thermocouple, then connect it to the plug socket at the back of the unit.



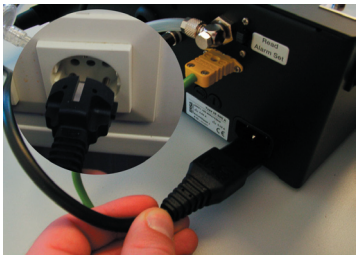
- Open the cover panel using both hexagon socket screw wrenches. Place the laser in the opening provided in the cover panel, and fasten it with both screws. Then connect the chinch connector to the appropriate socket on the back of the unit.



- Connect the finger switch to the socket provided for this on the back of the unit.



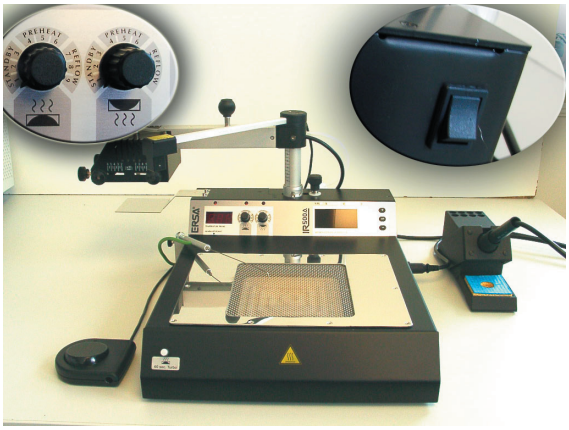
- Connect the Tech tool soldering iron to the integrated digital 2000 A soldering station IR 500 A base unit. The socket is on the right side of the casing.



- Connect the IR 500 A unit to the the power socket using the connector cable provided.

Attention!
Observe the power supply voltage on the type plate. An incorrect input voltage may severely damage the unit.

4.2.2 Switching on



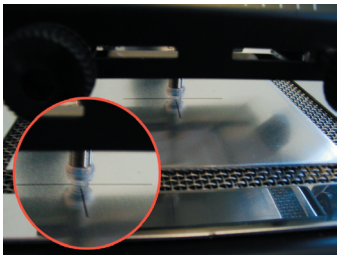
- Set both potentiometers to the left end-stop.
- Switch the IR500A Rework System on. The button on the left outside face of the unit is used to control and regulate the upper and lower heaters. The switch on the right outside face of the casing is used for the Integrated Digital 2000 A Soldering Station.

4.2.3 Setting up laser positioning aid

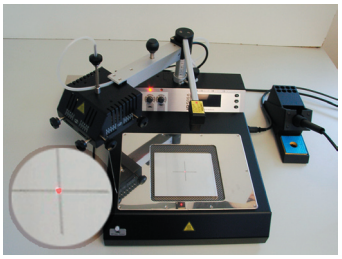
Make sure that the heating elements have cooled down.
Check that the potentiometers are set to minimum.
Do not activate the turbo switch on the front of the casing:
you could sustain burns if you fail to comply with this instruction.

The laser positioning aid must be set up following the initial assembly; this only needs to be carried out once. You will need a printed circuit board or a metal plate to do this.

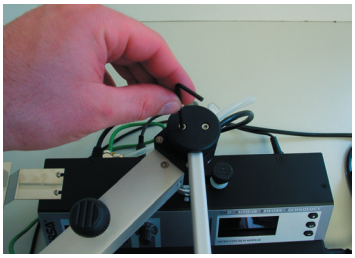
Note: If you have access to a printed circuit board holder, you may use this for the adjustment work.



- Draw a cross on it using a thin waterproof marker pen. Then place it on the lower heater and align it so that when it is pressed down the vacuum suction cup precisely meets the centre of the cross.



- Swivel the upper emitter arm to one side through 45 degrees. Adjust the laser so that its point is located precisely in the centre of the cross.



- You can make this adjustment by tightening both hexagon socket screws.
  Test to make sure that the position of the pipette corresponds with the laser pointer by carrying out these steps again.

5. Functional Description

For information on the operating principle of the integrated Digital 2000A soldering station, consult the ERSA Digital 2000 A Operating Instructions.

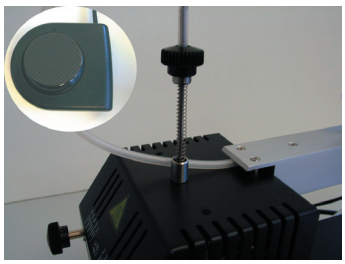
5.1 Functional elements of IR 500 A

Display
The IR 500 A Rework System is equipped with two separate heating zones. The lower heater is controlled via a thermocouple inside the heating plate. The LED indicator lights up via the left potentiometer as soon as the preset temperature has been reached.
The duty cycle of the upper heater is variable. The LED light above the right potentiometer indicates the pulse frequency. The energy level is set using both potentiometers.
The left potentiometer controls the energy level of the lower heater. The right potentiometer controls the upper heater. In normal operating mode the actual temperature measured at the temperature sensor is continuously displayed.

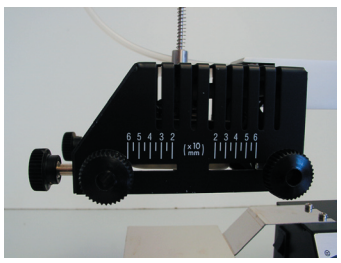
Turbo button
If you press the turbo button the highest available energy level in the lower heater is activated for 60 seconds. During this working step the turbo button lights up red. During this time there is no temperature control.

Note: This function is particularly useful when soldering heavy-mass printed circuit boards. See "Chapter 5.2 Controls"

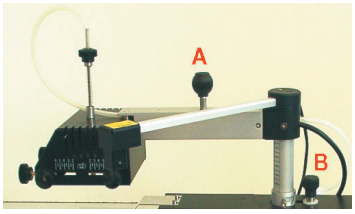
Laser pointer
The laser positioning aid serves to set up components prior to the rework process. The laser point on the component should be identical with the operating point of the vacuum pipette which is in the centre of the radiant heater.
If this is not the case, the position of the laser must be adjusted. (see Chapter 4.2.3)



Vacuum pipette
The vacuum pipette removes the desoldered component from the printed circuit board. The pipette is placed on the component shortly before the solder melts. As soon as the melting point has been reached, the spring force lifts the component off the printed circuit board.
The vacuum pump may be switched on and off via the finger-switch. The pipette can be equipped with a range of silicon suction cups. These are available for the ERSA in different sizes and materials.



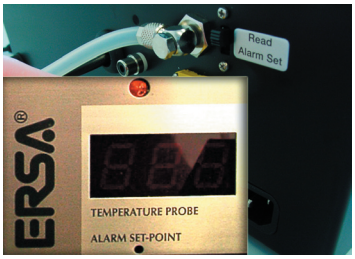
Aperture system
The aperture system may be adjusted using the knurled nuts so that IR radiation only strikes components that are to be desoldered. The range of adjustment is from 60 x 60 mm to 20 x 20 mm.
Neighbouring components will be protected from overly high temperatures provided that the adjustment has been correctly made.



Upper emitter arm
The height of the upper emitter arm may be adjusted using button B.
Note: The heat energy that is transmitted to the soldering point increases as the working distance between the upper heater and the printed circuit board decreases.
At A (see illustration), there is a handle for changing the position of the upper emitter. To do this, gently lift the upper emitter, swivel it into the required position and lower it back down.

Temperature sensor
The temperature sensor determines the component temperature. This is shown in the left-hand display on the unit. The thermocouple is a NiCrNi sensor (K type).
In addition, a flexible temperature sensor wire may be connected to the channel of the digital 2000 A unit. This will enable you to carry out twin-channel temperature measurements during the rework process (e.g. printed circuit board and component).

Note: During the rework process it is important to ensure that the sensor has a good contact with the component. Adhesive kapton (silicon) tape can be used to fix an optional thermocouple wire to components.



Alarm Set Point
The unit is equipped with an alarm setpoint function.
You can set the temperature at the unit. This should always be 12 degrees Celsius higher than the melting point of the solder.

Melting point of solder = 183˚C
Alarm Set Point = 183˚C + 12˚C = 195˚C

As soon as this temperature is reached during the rework process, an acoustic signal is given accompanied by a visual signal from the LED above the display. This warning is an indication that the upper emitter arm should be swivelled into the rear position and the components cooled down.

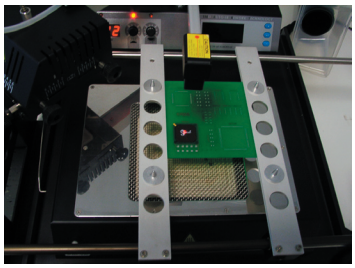
To change the setting, switch the unit on and set the switch at the back to < Alarm Set >. 195 degrees Celsius now appears in the display.
If the melting point of your solder is 183 degrees Celsius, for example, adjust the potentiometer below the display using a small screwdriver until 183 degrees Celsius appears. Then set the switch on the back of the unit to its original position.

Note: The standard delivery setting of the IR 500 A is 195 °C!

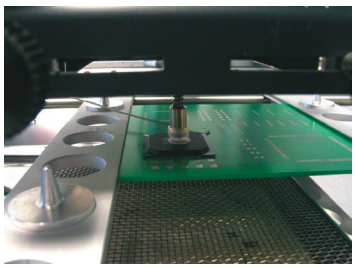
5.2 Rework Process

This chapter shows you all the steps required during the rework process. Chapter 5.2.1 describes the desoldering, and Chapter 5.2.2 describes the soldering of a standard BGA. The parameters used can vary between applications. For large components on a high-mass printed circuit board or lead-free applications, you will need to increase the heat energy and extend the preheating periods. You may use standard values for small components and thin printed circuit boards. The process of finding and optimising the correct parameters depends highly on the experience of each individual operator.

5.2.1 Desoldering

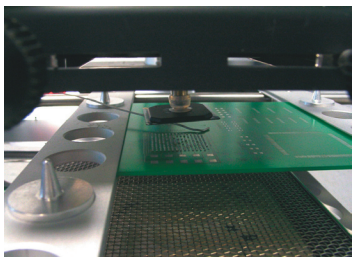


- Place the printed circuit board on the board holder and position it so that the laser point is in the centre of the BGA. Now set the following parameters.
  Lower heater: Level 7 / Upper heater: Level 8
  Heat the printed circuit board to approx. 70 degrees Celsius using the lower heater. Then swivel the upper emitter from the 45 degree position over the printed circuit board.

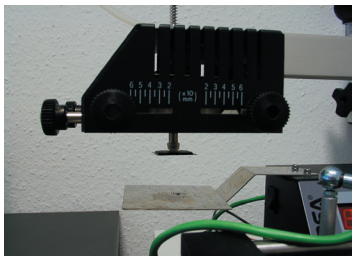


- Once the melting point has been reached, activate the vacuum using the finger switch and place the pipette on the BGA. A beeping sound and LED above the temperature display also indicate that the melting point has been reached (*Alarm Set Point*).

Note: If the pipette is placed on the component too early, this reduces the service life of the silicon suction cup!

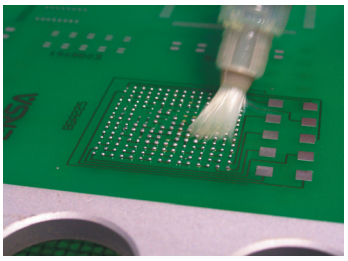


- As soon as the solder for the BGA has melted, it is lifted off the printed circuit board by the spring force of the pipette.
  Now swivel the upper emitter into the rear position. This will automatically reduce the heat energy in the upper heater.

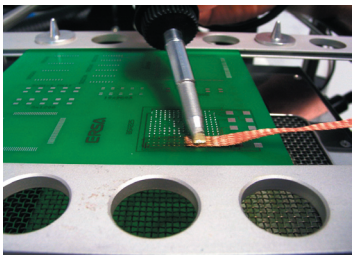


- Activate the finger switch to switch off the vacuum. The component will then drop onto the storage tray. Now reduce the energy level of the lower heater to 0 and cool the printed circuit board using the optional fan.

5.2.2 Soldering

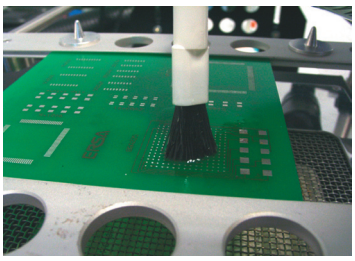


- To solder a component back on, you must first prepare the printed circuit board. This includes the removal of excess solder.
  Firstly, apply a small quantity of flux to the solder points where excess solder is attached. To do this, you can use a flux dispenser pen as shown in the illustration.
  (ERSA flux dispenser pen, order number: *4FMJF8001-PEN*)



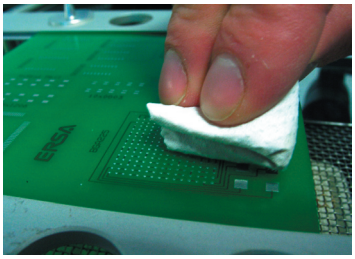
- Place the desoldering wick on the soldering points where excess solder is attached. Use the Tech tool soldering iron to heat up the desoldering wick. You can move the wire carefully across the soldering points as soon as the solder beneath it reaches reflow.

Note: If the wick is dragged across soldering points that have not fully melted, they may be torn off or damaged!



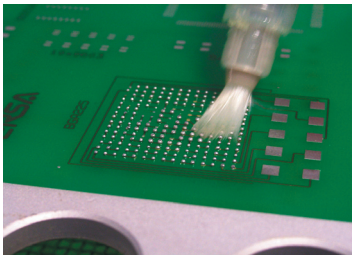
- Apply a flux cleaner to remove residual flux from the soldering points. ERSA supplies a „flux remover“ for this purpose. This has a special brush, which is also suitable for dealing with excess dirt contamination.

  (ERSA flux remover, order number: *0FR200)*

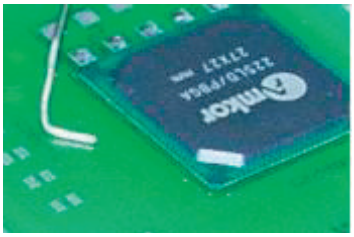


- Use a lint-free cloth to remove residual flux from the soldering points. Apply only a light pressure to the soldering points to avoid damaging them.

Attention: The printed circuit board may also still be hot!

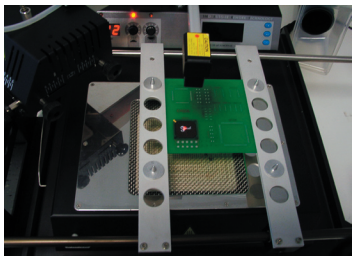


- To solder on a new BGA, apply flux to the soldering points again.



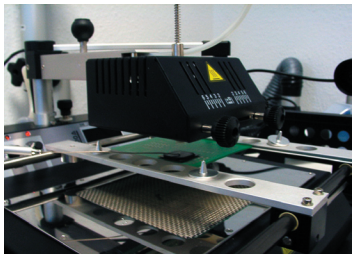
- Place the component on the printed circuit board manually or by using a special ERSA placing system. Fix the position of the thermocouple so that its tip is in contact with the printed circuit board next to the BGA making sure that no air gap is present.

Note: If an air gap is present between the temperature sensor and the printed circuit board during the rework process, a temperature will be displayed which is considerably lower than the actual temperature of the component. This may cause it to be damaged!



- Place the printed circuit board on the board holder and position it so that the laser point is in the centre of the component. Now set the following parameters. Lower heater: Level 7 / Upper heater: Level 8

  Heat the printed circuit board to approx. 70 degrees Celsius using the lower heater. Then swivel the upper emitter from the 45 degree position over the printed circuit board.



- Once the melting point has been achieved, and the component solder reaches reflow, wait until the Alarm Set Point has been reached. This normally takes between 10 seconds and a maximum of 20 seconds.
  Then swivel the upper emitter back into the rear position.
  Cool down the printed circuit board with an optional fan.
  (Order number: 0IR5500-13)

6. Troubleshooting and fault elimination

This chapter deals with malfunctions that may occur during the operation of this unit. The most frequently asked questions are listed below. Several possible explanations are also provided for each problem listed.

Attention:
Only experienced and qualified electrical specialists may carry out repairs. The unit contains high-voltage wiring and cables.
Incorrectly performed repairs will endanger life!

The unit is not working and the display does not light up.

- Is the power cord connected to the socket outlet?
- Is the unit switched on?
- Are the fuses OK? (Fuses are located next to the power supply socket)

The lower heater does not heat up when the unit is switched on.

- Is the energy level potentiometer set to 0?

The temperature gauge does not display a change in temperature.

- Is the Alarm Set switch active?
- Is the thermocouple connected?
- Is the thermocouple plug connector correctly plugged in?

The soldering iron does not heat up.

- Is the soldering unit switched on?
- Is the soldering iron connected to the IR 500 A unit?

The vacuum function cannot be switched on.

- Is the finger switch connected to the IR 500 A unit?

The component will not lift off when desoldering with the vacuum pipette:

- Is the vacuum pump switched on?
- Is there a vacuum at the silicon tube?
- Is the silicon tube damaged?
- Is the filter on the back of the IR 500 A obstructed or blocked?

7. Service and Maintenance

There are no fixed maintenance and repair intervals to be observed for the IR 500 A unit.
However, several checks should be carried out on a daily basis to make sure that the rework process is problem-free.

- A visual check of the silicon suction cup on the vacuum pipette must be carried out every day before work commences. As soon as this begins to turn yellow and appears brittle it must be replaced.

- The filter on the back of the IR 500 A should be checked on a monthly basis. If this begins to turn yellow, it must be replaced to protect the vacuum pump.

- For information on maintenance and repair of the integrated Digital 2000A soldering station, consult the enclosed Operating Instructions.

Always use a dry cloth to clean the units.

Note: The silicon suction cup and the heating elements are wear parts and are therefore not included in the warranty!

8. Spare Parts and Options

Designation	Order number
IR 500 A Rework System	0IR500A
Printed circuit board holder (optional)	0IR4500-01
Cooling fan for boards, 230V (optional)	0IR5500-13
Silicon suction cup, 8 mm	0IR4520-01
Silicon suction cup, 5 mm	0IR4520-02
Silicon suction cup, 2 mm	0IR4520-03
Viton suction cup, 8 mm	0IR4520-04
Viton suction cup, 5 mm	0IR4520-05
Viton suction cup, 3.5 mm	0IR4520-06
Temperature control board, degrees Celsius	0IR4500-24
Temperature control board, Fahrenheit	0IR4500-26
Motherboard 230V	0IR4500-25
Motherboard 115V	0IR4500-41
Heating element for upper emitter, 230 V	0IR4500-09
Heating element for upper emitter, 115 V	0IR4500-43
Heating element for lower emitter, 230 V	0IR4500-10
Heating element for lower emitter, 115 V	0IR4500-35
Heating element for lower emitter + TC, 230 V	0IR4500-44
Heating element for lower emitter + TC, 115 V	0IR4500-34
Laser positioning aid	0IR4500-02
Vacuum pump	0IR4500-18
Complete filter unit	0IR4500-23
Complete vacuum pipette	0IR4500-22
Temperature sensor	0IR4510-01

Temperature sensor cable with plug	0IR4500-02
Finger switch	0IR4500-04
Component storage tray	0IR4500-03
Stainless steel grille cover for lower emitter (optional)	24544
Adhesive tape for reflector (1 m)	0IR4500-39
IF 8001 Flux-Pen with flux	4FMJF8001-PEN
Flux Remover	0FR200
Adhesive kapton tape	0IR4500-07

9. Warranty

The warranty period is specified by ERSA GmbH in its current general terms and conditions of sale, delivery, and payment.

ERSA GmbH will only uphold this warranty if the unit is returned in its original packaging.

Great care was taken when compiling these Operating Instructions. However, the manufacturer assumes no liability for the contents, completeness and quality of the information contained in these instructions. The contents will be updated and modified in line with the latest developments.

All data, product information, and procedures published in these Operating Instructions were determined using state-of-the-art technical equipment and to the best of our knowledge and ability.
However, this information is non-binding, and does not free the user from his or her responsibility to check the equipment before using it.

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