Ersa IR 550 A plus
Microprocessorcontrolled Rework System

Operating Instructions

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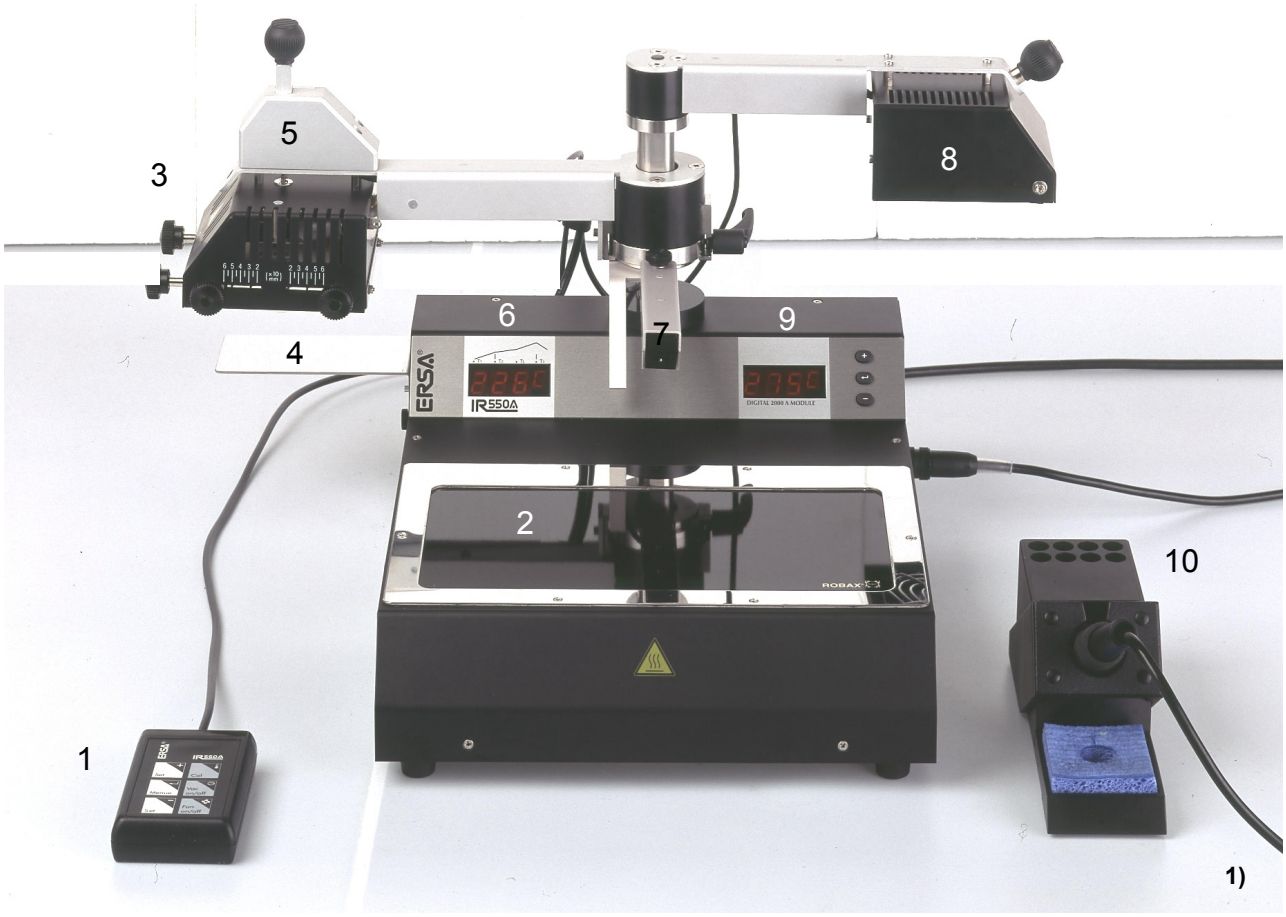
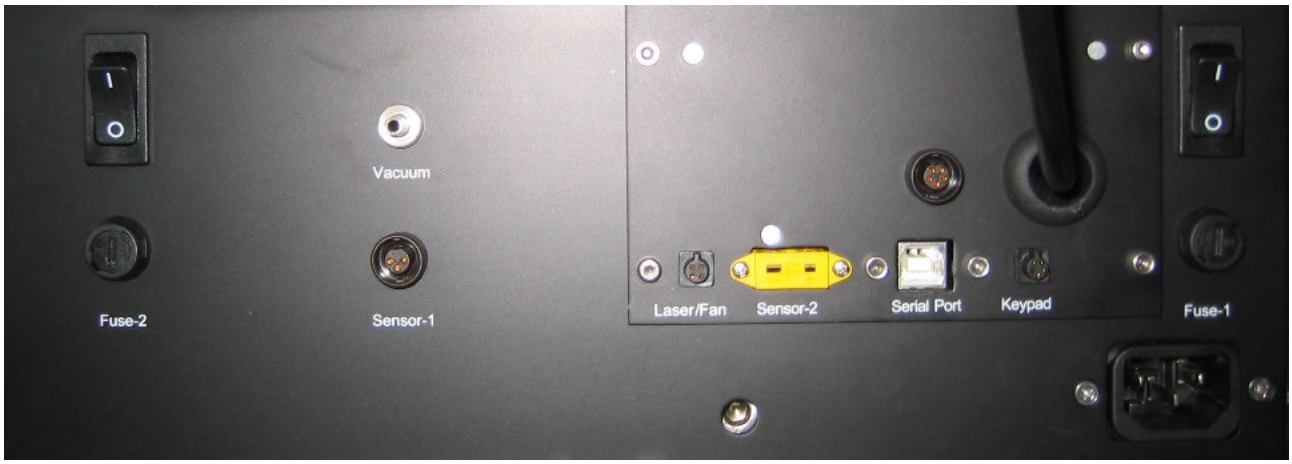
Pictures



1 External keypad
2 Bottom radiator (glass cover)
3 Top radiator (aperture system)
4 Component tray
5 Vacuum pipette
6 Display (LED)
7 Infrared sensor
8 Cooling fan and laser positioning device
9 DIGITAL 2000 A soldering station
10 TECH TOOL soldering iron and holder



Backside of the unit with connections

[1)] Pictures with optional available glass pane

We appreciate your decision to purchase our high-quality Ersa IR 550 A Rework System.

This device has been manufactured according to highest quality standards and was tested thoroughly before shipment. It is very easy in operation, nevertheless we suggest to read this manual before operating the system. If you have any additional questions to your equipment, please do not hesitate to contact us at:

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Content *Page*

1 Introduction

We appreciate your decision to purchase an ERSA IR 550 A Rework System. With this microprocessor unit which is also equipped with powerful infrared-heater and sensor technique, Ersa provides a rework soldering system to meet the highest requirements of modern industrial electronic production. Selective soldering processes during rework of surface mounted devices are the main fields of application of this valuable soldering system.

The unique IR-radiator technique by Ersa has been optimized within the IR 550 A. The programmable temperature control allows reproducible soldering results for nearly every application. At any time, the soldering process is monitored by a non-contacting infrared sensor and grants for optimal process control

Additionally, the IR 550 A provides an active cooling of the PCB. The integrated soldering station DIGITAL 2000 A completes the IR 550 A to a modern and flexible tool for any professional user.

The combination of IR 550 A with the Reflow Process Camera RPC 550 A or the Precision-Placement System PL 550 A creates a high-end workplace for modern rework in electronic production.

2 Technical Data

IR 550 A main unit:

Rating IR-top radiator	4 x 200 W (size 60 x 60 mm)
Rating IR-bottom radiator	2 x 400 W (size 135 x 250 mm)
Max. power consumption	1600 W
Wavelength of IR radiators	2 - 5 µm
Voltage	230 V ~, 50-60 Hz
Fuse	10 A, slow blow
Design	Safety category 1
Operation	external Keypad/PC
Interface	Universal Serial Bus (USB)
Display	integrated LED display
Power cord	approx. 2 m
Weight	approx. 9.75 kg
Warm-up time bottom radiator	90 s
Heat up rate during process	0.3 to 2 K/s
Dimensions	300 x 380 mm (B x T)
Height	315 mm
Max. travel (z-axis)	50 mm
Distance to top radiator (non-contacting sensor)	40 mm
Max. working depth	approx. 170 mm
Airflow cooling fan	72 m³/h

For technical data of DIGITAL 2000 A soldering station, please refer to the included operating instructions „Ersa DIGITAL 2000 A“. (3BA00044)

3 Safety instructions

3.1 General safety instructions

DANGER

Dangerous electrical voltage!

Serious injury or death from electric shock!

➢ Work on the electrical system or the machine electrical devices must be undertaken only by a skilled electrician or by properly trained people under the supervision and guidance of a skilled electrician in accordance with the electro-technical rules.

a) Disconnect mains plug from mains before opening any parts of the housing.

b) Use only original fuses with the specified current rating.

c) Use only voltage insulated tools.

d) In case of faults in the power supply, switch off the system immediately.

CAUTION

Irritating substances!

Personal injury or property damage when dealing with oils, greases, chemicals!

a) Read the rules applicable to the product safety data sheets before use!

DANGER

Hot supplies, hot excipients, liquid metal!

Risk of burns when dealing with fuels, additives and liquid metal!

a) Be aware of the in-house provision for protective clothing!

b) Work on the hot machine must only be carried out by trained and qualified personnel!

DANGER

Substances hazardous to health!

Risk of poisoning by inhalation or ingestion!

a) Flux fumes are produced during soldering. These are harmful to health. Do not eat, drink or smoke in places where soldering is carried out!

b) Traces of lead from the soldering adhering to a person's hands may access the human organism via food or cigarettes (health hazard). After touching solder, clean your hands thoroughly!

CAUTION

Toxic fumes!

Risk of poisoning by inhalation!

a) During soldering, gas emissions arise from the module or from the solder paste used. These gas emissions are harmful.

b) With respect to respiratory protection, the operator must observe the processing instructions specified in the safety data sheets of the solder pastes and fluxes used!

WARNING

Severe or fatal injuries from flammable substances! Fire and explosion hazard due to overheating!

a) Do not leave the machine running unattended!

b) The heating of highly flammable or explosive materials is prohibited!

⚠ WARNING

The machine malfunctioning is possible!

Personal injury or property damage due to improper commissioning or incorrect operation of the machine!

➢ Commissioning must be performed by trained and qualified staff only.

a) Inspect the machine for visible defects!

b) Check all safety devices for proper operation!

c) Wear suitable protective clothing for all types of work!

d) During commissioning, ensure switching on and off processes and monitoring directions are in accordance with the operating instruction manual!

⚠ DANGER

Risk of burns from hot surfaces!

a) Touching the heaters during use is forbidden!

⚠ CAUTION

Soldering systems with laser equipment!

a) Do not look directly into the laser beam and do not point the laser beam into the eyes of other persons!

3.2 Nationally valid safety and accident prevention regulations

For any work performed on the machine itself or on its electric or pneumatic equipment, the locally applicable accident prevention, safety and environmental protection regulations are to be observed.

3.3 Fire protection

a) When the system has been set up at the company, it must be assessed regarding its fire-safety.

b) The locally valid fire protection regulations must be observed.

4 Commissioning

4.1 Before commissioning

Please check that all components listed below are complete and undamaged:

- IR 550 A basic unit with integrated DIGITAL 2000 A soldering station
- External keypad with connection cord
- Power cord
- Spare silicone cup Ø 5 mm, Spare silicone cup Ø 8 mm
- TECH TOOL soldering iron
- Holder for soldering tool
- External K-Type thermocouple
- Stainless steel grid (for intensive bottom heating)
- USB cable for connection to a PC
- PC-Software *IRSoft** on CD-ROM
- IR 550 A operating instructions on CD-ROM
- DIGITAL 2000 A operating instructions (3BA00044)
- Safety instructions

* Current updated software is available at Ersa GmbH or on www.ersa.com.

Should the above components be damaged or incomplete, please contact your supplier.

Attention:
The top and bottom radiators of the unit get very hot during operating the system. Remove any combustible objects or liquids from the working area. Keep any flammable objects away from hot housing parts!

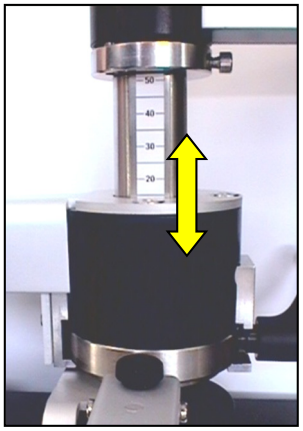
4.2 First start-up

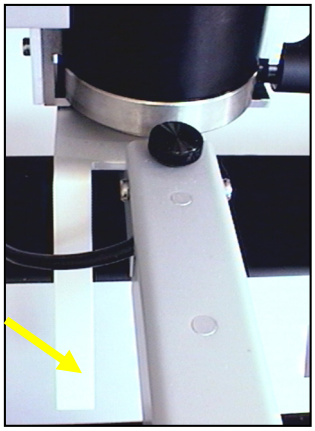
Please read through the operating instructions completely before commissioning. Procedure for commissioning:

4.2.1 Setting up

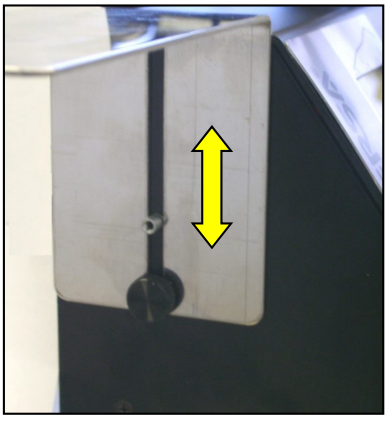
- Unpack the IR 550 A unit.
- Put the unit onto a plane, solid workbench.
- Swing both arms into their rear end position. They will snap in there.
- Vertical adjustment of top radiator and infrared sensor

  The arm of the top radiator is vertically adjustable together with the infrared sensor. Thus you can adjust the optimal working distance for each application.
  Open the clamping lever laterally installed at the top radiator fixture. Adjust the radiator so that the metal pin touches the PCB. Close the clamping lever again.



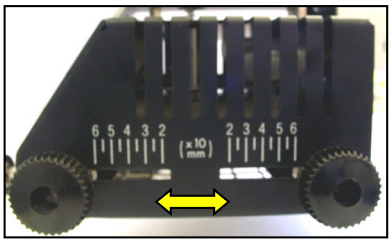


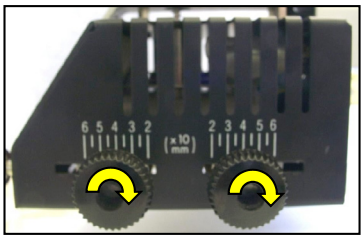
- Vertical adjustment of the component tray
  Unscrew the clamping screw of the component tray and dismount the component tray. Turn the tray by 180° and reinstall it so that the desktop is protected from heat radiation of the top radiator and that desoldered parts can be deposited on the component tray with the vacuum pipette. Adjust the component tray vertically according to the height of the top radiator and fix it.



- Aperture adjustment
  The aperture system of the top radiator can be adjusted continuously with four set screws from 20 x 20 to 60 x 60 mm. To adjust it, open all four screws. Then choose the size of the window and tighten the screws again.

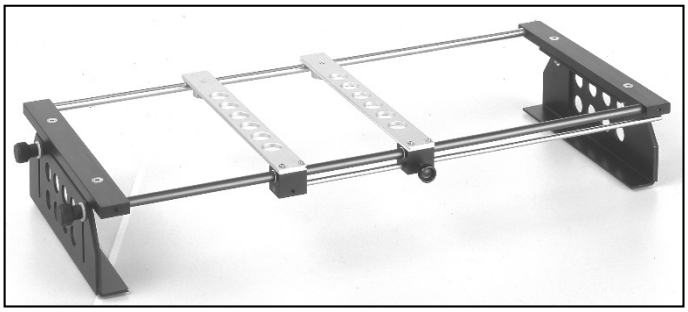
Attention!
The integrated slot apertures are reducing the irradiation in the border area. Sensitive components are not completely protected against irradiation! Sensitive components must be protected with reflective foil (0IR4500-40) or with standard aluminum foil.





Note:
During continuous operation the top radiator can become very hot, when the aperture window is very small. Increase window size to avoid safety switch off of the top radiator.

Usage of X-Y PCB Table (0IR5500-01)



For small PCBs (up to 170 x 170 mm) we recommend the PCB Holder PH 100. (See chap. 8 „Spare parts and options“)

If you do not use the IR 550 A together with the Reflow Process Camera RPC 550 A or the Placing System PL 550 A, we recommend the usage of the X-Y PCB Table.
Its height adjustment scale corresponds with the adjustment of the top radiator. When the PCB table and the top radiator are adjusted to the same level on their scales, the correct working distance (40 mm) is always given.

4.2.2 Electrical connections

- Check whether the supply voltage corresponds with the voltage stated on the type plate.
- Make sure that both main switches (basic unit IR 550 A and DIGITAL 2000 A) are set to 0.
- Connect the power cord to the power socket on the backside of the unit.
- Connect the external keypad to the jack for the keypad at the backside of the unit.
- Connect the USB cable with the corresponding USB jack (Serial port) on the backside of the unit and plug the cable to a USB port of a PC.

- To connect the DIGITAL 2000 A soldering station, please refer to chapter 4.2 of the DIGITAL 2000 A operating instructions (3BA00044)
- If required, connect the external thermocouple with the jack (Sensor 2) on the back of the unit.

4.2.3 Switching on

- Then switch on the IR 550 A base unit.
- After an automatic display check and the warm-up of the bottom radiator (90 seconds) the unit is ready for operation.


(flashing display)


(temperature display)

Temperature display during and after warm-up of the bottom radiator.

Note:
The bottom radiator is not preheated if the parameter Energy is set to 0 within the chosen program. This parameter can also be used to save energy and to avoid unnecessary heat up of the unit during working breaks.

During working breaks the bottom radiator can also be switched off via the *IRSoft* PC software.

4.3 Tips for the SMT Rework Process

The IR 550 A is especially designed for soldering processes on surface mount technology (SMT) PCBs. Here, above all, components with hidden solder connections like ball grid arrays (BGA) and chip scale packages (CSP) can easily be desoldered and soldered with the IR 550 A.
Other components like SMT-connectors and components in PTH-technology can be processed without any problems. The system is also suitable for lead free applications.

Before starting work with the IR 550 please check the following:

- PCB size and thickness
- Packaging density on the PCB
- Solder alloy (melting point)
- Component type
- Component size
- Surface of package

The IR 550 A can easily be adapted to these demands by setting the following parameters:

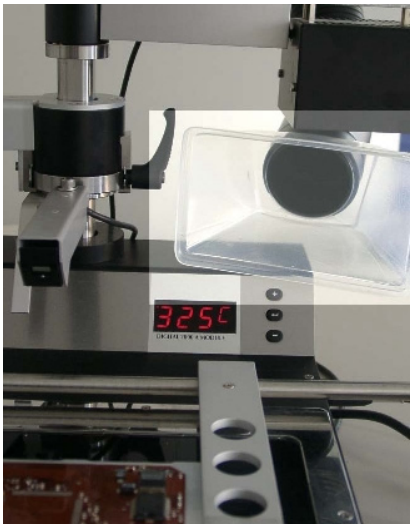
- Working distance of component and PCB towards top- and bottom radiator
- Aperture adjustment of top radiator (adjustable from 60 x 60 mm to 20 x 20 mm)
- Selection of a program with a suitable set of process parameters

In general, the Rework Process includes the following steps:

- Desoldering of a component
- Cleaning of the pads
- Preparing pads and component for the soldering process
- Placement of the new component (e.g. with PL 550 A)
- Soldering of the new component

Note: - Solder Fume --
As a lot of flux and solder fume is emerged during the Reflow Process, we recommend the use of IR 550 A together with a solder fume extraction unit.

In order to protect of the employees' health, Ersa recommends the use of EA 110 plus filter system to clean process air.



Solder fume filtration with ERSA EA 110 plus

5 Functional description

For the Functional description of the DIGITAL 2000 A soldering station, please refer to chapter 5 of the DIGITAL 2000 A operating instructions (3BA00044).

5.1 Functional elements of IR 550 A

5.1.1 Infrared radiators

The IR 550 A Rework System is equipped with infrared radiators providing the necessary energy for soldering. The wavelength of the radiators is adapted to the needs of the soldering process. Especially components with hidden solder joints can be soldered in highest quality. The soldering system does not need any component specific nozzles or stencils but can nevertheless be adapted to any soldering application.

The infrared radiation heats the component pins equally and prevents small components from being blown away.

The bottom radiator is a large-surface heating element and ensures an even PCB warm-up. It is either covered with the included glass pane or with an optional stainless steel grid for soldering applications where extreme bottom heating is required. The bottom radiator is operated with a preset energy ranging from 0 to 10 or 11 to 15 for heat intensive applications, depending on the chosen program (Pr1 – Pr4).

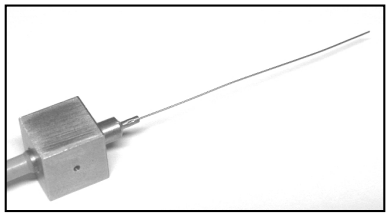
The top radiator is swung into operating position and supplies the main heat. By means of the patented aperture system the heat is directed right into the required working area. The shielded areas are heated with reduced radiation. During soldering and desoldering, both radiators are controlled by the microprocessor according to the set temperature profile.

Note:
Radiation sources are subjected to an aging process. According to load and duration of use, the heating elements must be changed after the end of lifetime.

5.1.2 Temperature sensors

The IR 550 A contains a non-contacting infrared sensor (Se1). An external K-type thermocouple (Se2) can also be connected to the backside of the unit. The non-contacting infrared sensor measures surface temperatures in a certain area. A K-type thermocouple detects temperatures at a measuring point.

Note:
Make always sure the tip of the K-type thermocouple (Se2) has good contact to the surface.



Whether the non-contacting infrared sensor or the K-type thermocouple is used depends on the soldering application.

For most rework applications measurements with the non-contacting infrared sensor are more reliable, as errors due to unequal contact cannot occur.

By calibrating the system to a given melting temperature, temperature differences between the component surface and the solder joint can be compensated (see chapter 5.2.2).

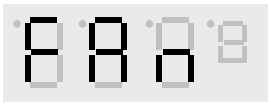
5.1.3 Cooling fan and laser positioning device

The cooling fan and the laser positioning device are mounted on the second swing arm. When the cooling fan arm is swung into working position, the laser positioning device is switched on automatically.

Attention!
The laser positioning device includes a laser product **class II**.
Do not look directly into the laser beam!

The cooling fan is switched on and off via the 

key. It is used to cool down the PCB after soldering and desoldering. As a default setting the cooling fan switches on automatically, when the top heater is swung back after soldering. With *IRSoft* the automatic switch on can be deactivated.
While the fan is operating, the actual temperature and “Fan” are shown alternately.


(Fan is on)

An optional available, additional external cooling fan (0IR5500-13, Ø 120 mm) should be placed beside the unit; it is used for cooling the PCB after the soldering process.

5.1.4 Vacuum pipette and vacuum pump

The IR 550 A is equipped with a vacuum pipette which is integrated into the top radiator. This tool allows an automated desoldering process: First the pipette’s vacuum cup is pressed on the component. As soon as the solder is liquid the spring-loaded pipette lifts off the component automatically. At the same time it is possible set the display to the melting temperature that is reached in this moment (automatic calibration). As default this function is deactivated. As soon as the solder is liquid the component can be picked up very gently with the pipette.

The built-in vacuum pump is switched on automatically when the pipette is pressed down. When a desoldered component is set down on the component tray, the pump switches off again.
By pressing the 

key, the pump can be switched manually.

5.1.5 DIGITAL 2000 A soldering station

The cooling fan and the laser positioning device are mounted on the second swing arm. When the cooling fan arm is swung into working position, the laser positioning device is switched on automatically.

5.1.6 Serial port, documentation software *IRSoft*

The IR 550 A contains a serial port so that it can be connected to a PC. In this way process data can be documented at any time.

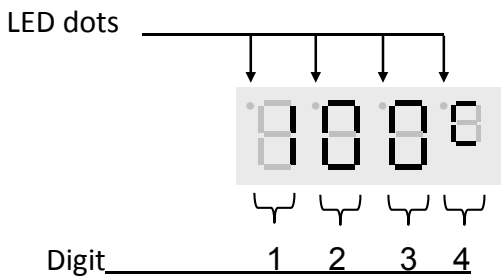
Connect the system with the included USB cable to a PC (USB Port) on which you run the documentation software *IRSoft*. You will find this software on the included CD-Rom. Please also refer to the online manual of the software. *IRSoft* updates are available at Ersa or contact one of Ersa's distributors.

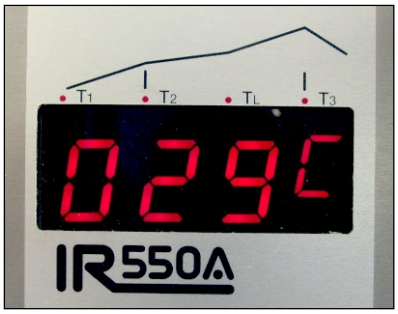
5.2 Operation and program parameters

The IR 550 A Rework System enables repair soldering based on parameters which are set and can be stored by the user. In total, four programs (Pr1 to Pr4) can be saved and modified at any time. (For more storage options use the documentation software *IRSoft*, see 5.1.6).

The active program, all parameters and the actual temperature value are visualized over a four digit LED display.

Display of IR 550 A:





Digits 1 to 3 display actual temperature values and the settings of all parameters

Digit 4 displays the units or symbols for each parameter.

The LED dots are correlated to the parameters *T1, T2, TL* and *T3*. They light up during the setting of the correlated parameter and as soon as the measured value reaches one of these parameters during the process is running.

The unit is operated via an external keypad with six function keys:

Key	Function
Set +	change program; increase parameter value[1)]
Menue	choose program; change parameter, store values[2)]
Set −	change program; decrease parameter value

Key	Function
Cal	Adjust display to melting temperature[3)]
Vac on/off	Switching vacuum pump on/off
Fan on/off	Switching cooling fan on/off

[1)] Special function: Keep pressing at switch-on **shows firmware version.**

[2)] Special function: Keep pressing at switch-on **loads factory settings.**

[3)] Special function: **Reset calibration factor** when top radiator is in neutral position.

5.2.1 Menus and programs

The operation concept of the IR 550 A allows, similar to the integrated DIGITAL 2000 A soldering station, to run the system by using only three keys for parameter settings. The parameters are modified for all four programs in the same manner. By just changing the program, the user has access to four different sets of parameters for different soldering applications.

The menu is operated with the three keys Set +, Set −, Menue.

By pressing the Set + or Set − key the display is switched from the actual temperature to the program display. Now, the desired program (Pr1 – Pr4) can be chosen with the same keys.

With the Menue key the system returns to the actual temperature display, and the parameters of the selected program are activated immediately. Alternatively, the processor returns to the actual temperature automatically after eight seconds without any inputs.

Example: Display during program choice

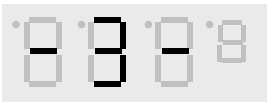
Storage scheme of IR 550 A: () = number of parameters

	P1	P2	P3	P4
C	T_{init} (-1-)	T_{init}	T_{init}	T_{init}
S	t_1 (-2-)	t_1	t_1	t_1
C	T_1 (-3-)	T_1	T_1	T_1
S	t_2 (-4-)	t_2	t_2	t_2
C	T_2 (-5-)	T_2	T_2	T_2
S	t_3 (-6-)	t_3	t_3	t_3
C	T_L (-7-)	T_L	T_L	T_L
C	T_3 (-8-)	T_3	T_3	T_3
S	t_4 (-9-)	t_4	t_4	t_4
E	Energy (-10)	Energy	Energy	Energy
A	Alt. Sensor (-11)	Alt. Sensor	Alt. Sensor	Alt. Sensor
U	Unit (-12)	Unit	Unit	Unit
P	(-13)	Password		

5.2.2 Parameter setting and description

Within the IR 550 A each of the four programs contains one set of twelve parameters. For an overview of all parameters please refer to the appendix at Table 4.
The parameters can be modified and stored separately for every program. Only the parameter Password is the same for all programs and saves the unit from unwanted or unauthorized changes.

Starting from the temperature display, the number of the next parameter in the menu will be shown by pressing the Menue key.



(Parameter number 3, T_1)

The order of parameters can be seen in chapter 5.2.1. The values for each parameter are set with the keys Set and Set.

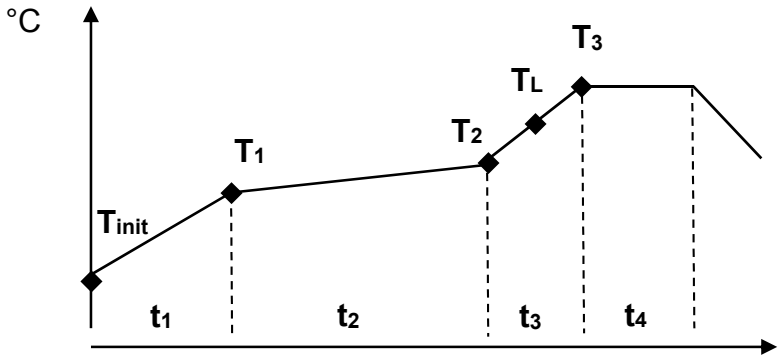
By double-click (pressing the key two times) on the Menue key the display returns from each parameter to the temperature display. Changed values will be stored and activated at once.

While setting a parameter value, the fourth digit flashes. If there are no inputs for 8 seconds, the processor switches back to the temperature display automatically. The value is activated immediately.

Note:
For an easier setting of values the last active parameter can be recalled to the display by using the double-click function (pressing the key two times) of the Menue key. A second double-click switches back to the temperature display.

The parameters T_{init}, t_1, T_1, t_2, T_2, t_3, T_3 and t_4 define the soldering process. They describe the temperature-time profile the system is running during operation.

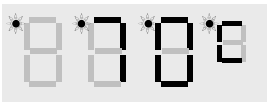
T_{init}	marks the initial stating temperature of the process,
t_1, T_1, t_2, T_2	define the preheating phase,
t_3, T_3, t_4	characterize the peak zone,
T_L	marks the melting temperature of the used solder and ranges in between T_2 and T_3.



T_{init} Start temperature (Initial temperature) (-1-)

The starting temperature T_{init} is the first temperature value reached during the soldering process. T_{init} is the reference starting temperature for repeatable processes. To reach T_{init} the unit operates only the bottom heating element to preheat the board. At T_{init} both heaters are working.

The value for T_{init} is set with the keys Set + and Set -.



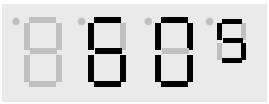
(e.g. LED dots flashing, bottom heat only)

Display until T_{init} is reached.

t_1 Preheating time 1 (-2-)

During the period defined by t_1 the preheating proceeds with a user defined ramp rate up to T_1.

The value for t_1 is set with the keys Set + and Set -.



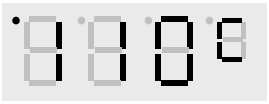
(e.g.)

Display during setting of t_1.

T_1 Preheating temperature 1 (-3-)

The preheating temperature T_1 is the first temperature value reached during the soldering process. The warm-up to T_1 occurs the within the permitted heat up rates defined for electronic components.

The value for T_1 is set with the keys Set + and Set -.



(e.g.)

Display during setting of T_1.

t_2 Preheating time 2 (-4-)

During the period defined by t_2 the preheating proceeds with a slow ramp rate to T_1 or T_2 is kept nearly constant.

The value for t_2 is set with the keys Set + and Set -.

(e.g.)

Display during setting of t_2.

T_2 Preheating temperature 2 (-5-)

At the end of time t_2 the preheating temperature T_2 is reached. Preheating of PCB and component is finished at this time. Fluxes have been activated.

The value for T_2 is set with the keys Set + and Set -.

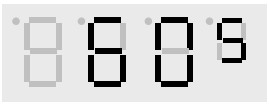
(e.g.)

Display during setting of T_2.

t_3 Preheating time 3 (-6-)

During the period of t_3 the ramp from T_1 to T_2 is defined.

The value for t_3 is set with the keys Set + and Set -.



(e.g.)

Display during setting of t_3.

T_L Liquidus temperature (-7-)

The liquidus temperature T_L defines the temperature when the used solder (-paste) begins to melt and gets liquid. The liquidus temperature is used to calibrate the actual temperature to the temperature at the solder joint and adjust the display to this value (calibration).

There are two possibilities to achieve this:

- Automatic adaptation during desoldering (default: off)
  The adaptation of the display to the stored value of T_L is automatically activated during desoldering, when the spring loaded pipette lifts the component and thereby indicates that the solder has molten at this time.
- Manual adaptation (recommended)

  By viewing the soldering process (i.e. by camera support) the user can press the Cal key as soon as the solder becomes liquid and by this action set the actual display to the stored value of T_L.

The value for T_L is set with the keys Set + and Set -.

(e.g.)

Display during setting of T_L.

See table 3.

T_3 Peak temperature (-8-)

When T_2 is reached, the unit continues to heat up with the maximum permitted heat-up rate towards peak temperature T_3. At peak temperature the soldering process ends (when t_4 = 0 s). Component and PCB can be cooled down using the built-in cooling fan.

The value for T_3 is set with the keys Set+ and Set-.

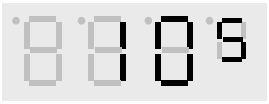
(e.g.)

Display during setting of T_3.

t_4 Time 4, flat peak time (-9-)

During t_4 the peak temperature T_3 is kept constant. Especially in lead free processes on larger components all solder joints will surely come up to the peak temperature when t_4 is set.

The value for t_4 is set with the keys Set+ and Set-.



(z. B.)

Display during setting of t_4.

Energy Bottom heater energy level (-10-)

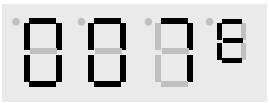
This parameter is used to predefine the power of the bottom radiator for each program. *Energy* defines the heating power of the bottom radiator in levels from 0 to 15.

Note:
Please use **levels 11 to 15** for high energy applications (lead free) only. Remove the glass pane and insert the stainless steel grid in these cases!

When the top radiator is in its rear position, the bottom radiator is powered according to this value and can be used as a heating plate. Swinging the top radiator into the working position, the bottom radiator will be controlled with this predefined energy during the entire soldering process.

The unit will switch to standby level 4 during operational breaks automatically if not deactivated via *IRSoft.*

The value for *Energy* is set with the keys Set+ and Set-.



(e.g. 7)

Display during setting of *Energy.*

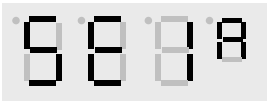
See chart in the appendix for relationship of energy levels and temperature on the glass plate.

Attention!
When the energy level is set to values **11 to 15** the unit will become extremely hot during operation. Please use the included stainless steel grid to cover the bottom heater instead of the glass pane!
Remove any combustible objects or liquids from the working area. Do not touch hot housing parts. Keep any flammable objects away from hot housing parts!

Alt. Sensor (-11-)

In addition to the built-in non-contacting infrared sensor (Se1) the user can connect an external K-type thermocouple (Se2) for temperature measurement. The parameter *Alternative Sensor* is used to select the sensor. The signal of the selected sensor will be displayed and used for process control.

The value for *Alternative Sensor* is set with the keys Set+ and Set-.



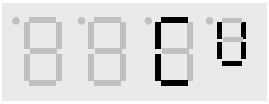
(e.g. „Se1“ for non-contacting sensor)

Display during setting of *Alternative Sensor.*

Unit Temperature unit (-12-)

The parameter Unit is used to change the temperature displayed in °C or °F within one program.

The value for *Unit* is set with the keys Set+ and Set-.



(e.g. „C“ for Celsius)

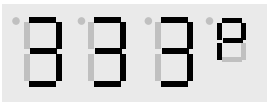
Display during setting of *Unit.*

Password (-13-)

To save the unit from unwanted or unauthorized changes the parameter Password is used. When its value is set to 0 (Display 000) password protection is inactive.

After setting a numeric combination with Set+ and Set- and storage by pressing the Menue- key, three lines (Display - - -) indicate the active password protection of the unit.

All parameters can still be displayed; changes are only possible by input of the correct numeric combination using Set+ and Set- to set the value and the Menue- key to confirm. The programs can be changed when the password protection is active.



(e.g.)

Display during setting of Password.

The parameter Password stays the same for all programs and can be activated or inactivated within each program. The system requests the input of the right password (Display - - -) before any changes are possible. The password can also be activated and be deactivated the *IRSoft* software.

For **reset** of the password please see chapter “5.2.5 Factory settings”.

5.2.3 Operating process “soldering”

The parameters of each program define the temperature profile for the soldering process which is carried out in the following steps:

READY

- The unit is ready for operation, the bottom radiator is preheated, the top radiator is in its rear position over the component tray.
- The PCB is clamped in the holder and positioned over the bottom radiator of the IR 550 A. The component to be soldered should be placed in the center of top and bottom radiator. This position can easily be checked using the laser positioning device.
- The parameters of the last chosen program are active.
- The display shows the actual temperature of the selected sensor.

START

- As soon as the top radiator is swiveled into working position the process starts. The radiators heat up the assembly group. As long as T_{init} is not reached only the bottom heater is active. When T_{init} is reached also the top heater starts to heat the component.
- During the component warm-up the LED-dots in the display indicate when T_1, T_2, T_3 and T_L are reached.
- If the melting of the solder is watched, the user can adjust the display to the preset liquid temperature T_L by pressing the Cal key.
- When T_L is reached it is indicated by a pulsing acoustic signal*.

END

- As soon as T_3 is reached (and the time t_4 is run out) the heating process is finished. The acoustic signal changes to a constant beep*, the radiator’s heating power is reduced.
- When the top radiator is swung back to rear position the cooling fan is switched on automatically.
- By swinging the second arm to working position the assembly will be cooled down. Use the Fan on/off key to manually switch on or off the cooling fan.

* The acoustic signals can be changed in *IRSoft*:

- buzzer on
- buzzer off
- short buzzer signals (default)

5.2.4 Operating process “desoldering”

READY

- The unit is ready for operation, the bottom radiator is preheated, the top radiator is in its rear position over the component tray.
- The PCB is clamped in the holder and has to be positioned over the bottom radiator of the IR 550 A. The component to be soldered should be placed in the center of top and bottom radiator. This position can easily be checked using the laser-positioning device.
- The parameters of the last chosen program are active.
- The display shows the actual temperature of the selected sensor.

START

- As soon as the top radiator is swiveled into working position, the process starts. The radiators heat up the assembly. As long as T_{init} is not reached only the bottom heater is active. When T_{init} is reached also the top heater starts to heat the component.
- As soon as the vacuum pipette is pressed down, the vacuum pump switches on. The radiators heat up component and PCB to peak temperature T_3 with the heating rate defined by t_4. The operator can interrupt the process by pressing the Vac on/off key and start again.

END

- When the solder melts the component is automatically lifted off by the spring-loaded vacuum pipette or taken away manually with the pipette or a pair of tweezers. In the first case, the display can also be adjusted automatically to T_L. The process ends, indicated by an acoustic signal (see page 23), and the radiators’ heating power is reduced.
- When the top radiator is swung back to rear position, the desoldered component on the vacuum pipette can be set onto the component tray by pressing the pipette down again. The vacuum pump is switched off at the same time. The cooling fan is switched on automatically.
- By swinging the second arm to working position the assembly will be cooled down. Use the Fan on/off key to manually switch on or off the cooling fan.

5.2.5 Factory settings

Password	Program	Auto Fan	Auto Cal	Buzzer	Standby
0 (inactive)	1	on	off	short signals	on

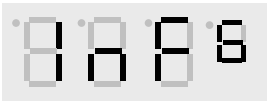
To recall the factory settings you have to switch off the IR 550 A unit at first. Then switch on the unit again and press the Menue key and keep it. All user defined parameters deleted, the factory settings are loaded.

To display the actual firmware version of the unit, press the Set button immediately after switching on the unit. (Example: Display 0180 is version 1.80) The firmware version is also indicated in the *IRSoft* status window.

Table 1 settings in the appendix shows the preset parameters of all four programs. As electronic assemblies are very different, Ersa recommends to adapting the parameters for every single customer application.

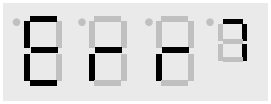
6 Error diagnosis and repair

The unit contains an automatic information management. It detects critical errors as well as information for the operator. Depending on the message the unit might be inoperable.



(e.g. Info 6)

Info display



(e.g. Error 7)

Error display

If an info or error occurs please refer to Table 2 Info and Error description. To confirm an error press the Menue key.

If the error continues to occur, you have to go on with the error analysis. Please contact your supplier or Ersa directly.

Attention!
Repairs should only be carried out by qualified staff. The unit contains alive parts. Inexperienced work is extremely dangerous!

Further errors:

Unit does not operate, display stays dark.

- Is the main cable plugged in correctly?
  ➔ Connect the unit to the power supply.
- Are the main switches of the basic unit and the DIGITAL 2000 A soldering station switched on?
  ➔ Switch on the units.
- Is a fuse blown?
  ➔ Exchange defective fuse. Note that there might be a serious error within the unit causing defective fuses.

Bottom radiator stays cold.

- Is the cooling fan running?
  ➔ The bottom radiator remains switched off if the cooling fan runs (Display FAn). Switch off the cooling fan.
- Is the parameter of *Energy* in the active program set to 0?
  ➔ Set the value of *Energy* > 0.

Component cannot be removed with of the vacuum pipette.

- Is the vacuum pump running and do you have a vacuum at the silicone cup??
  ➔ Switch on the pump.
- Is the silicone cup damaged (Leakage)?
  ➔ Exchange silicone cup.
- Is the filter at the backside of the unit clogged?
  ➔ Exchange the filter.

Laser-positioning device or cooling fan do not operate.

- Is the supply cable from the backside of the unit to the arm plugged in or damaged?
  ➔ Plug in the cable or exchange damaged cable.
- Is the rotor of the cooling fan blocked?
  ➔ Loosen the blockage.
- Is the laser-positioning device aligned properly?
  ➔ Align laser-positioning device.

Unit does not react on external keypad.

- Is the keypad properly connected to the unit?
  ➔ Connect the keypad.
- Is the keypad cable damaged?
  ➔ Exchange keypad with cable.

System overheating:
At an internal temperature of 66 °C the unit switches into the cooling mode. Operation is impossible until the temperature dropped again. If the system indicates the cooling mode “CooL”:

➔ Use the stainless steel grid to cover the bottom radiator.
➔ Make sure the unit is properly ventilated.
➔ Reduce bottom heater energy level, if possible.

(cooling mode)

For appropriate measures regarding errors of the DIGITAL 2000 A soldering station refer to the enclosed DIGITAL 2000 A operating instructions (3BA00044).

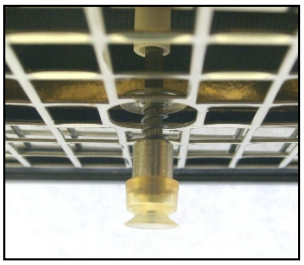
7 Maintenance

Note:
Only use genuine Ersa consumables and spare parts in order to ensure reliable function and to maintain the unit's warranty.

Attention!
Housing parts of the unit can still be hot after switching off the unit. Clean the unit only when it is switched off and has cooled down to room temperature. Please do not use any dangerous or flammable solvents for cleaning.

Cleaning of the unit:

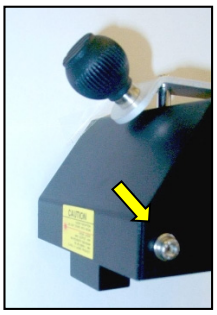
Use a dry or moist towel to clean the unit. The component tray and the glass pate covering the bottom radiator can be cleaned with a hard and dull device and a towel from solder- and flux splashes. The glass plate can also be removed for cleaning. See chap. 8 "spare parts and options"



Exchange of a silicone cup:

To exchange a used silicone cup, switch off the unit and wait until vacuum pipette and top radiator have cooled.

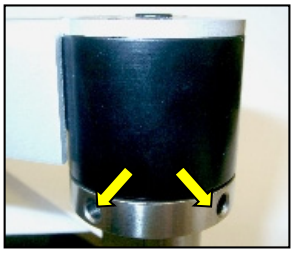
Remove the silicone cup downwards from the pipette and replace it by a new one. Suction cups with Ø 2 mm and Ø 3.5 mm are mounted directly – without adapter – on the vacuum pipe!



Adjustment of the laser positioning device:
The laser positioning device can be readjusted at two points:

1. Adjustment screws at the cooling fan housing: Here the angle of the laser positioning device can be re-adjusted in Y-direction.

2. Adjusting ring at the arm of cooling fan and laser positioning device: Re-adjustment of the laser dot in X-direction.)



When the laser dot is adjusted properly it marks exactly the spot where the pipette contacts the board when pressed down.

8 Spare parts and options

Designation	Order number
IR 550 A microprocessor controlled rework system	0IR550A
Silicone suction cup ∅ 8 mm	0IR4520-01
Silicone suction cup ∅ 5 mm	0IR4520-02
Silicone 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
External keypad	0IR5500-04
USB cable	3ET00241
Controller board	0IR5500-06
Top radiator heating element 230 V (with TC)	0IR5500-31
Top radiator heating element 115 V (with TC)	0IR5500-32
Filter unit complete (for vacuum)	0IR4500-23
X-Y PCB table (option)	0IR5500-01
PCB Holder (option)	0PH100
K-Type Thermocouple with support cube	0IR6500-01
K-Type Thermocouple wire IR (option)	0IR4510-02
K-Type Thermocouple wire DIG (option)	0DIG207
Stainless steel grid	0IR5500-03
ROBAX glass pane	0IR5500-33
External cooling fan for boards Ø 120 mm (option)	0IR5500-13
Reflective tape (25 mm x 1 m)	0IR4500-40
Kapton tape (25 mm x 10 m)	0IR4500-07
Flux-Pen with flux IF 8001	4FMJF8001-PEN
No-Clean flux cream	0FMKANC32-005

You will find further spare parts in a separate spare part list.
For spare parts and order numbers of the DIGITAL 2000 A soldering station, please refer to the Ersa DIGITAL 2000 A operating instructions (3BA00044).

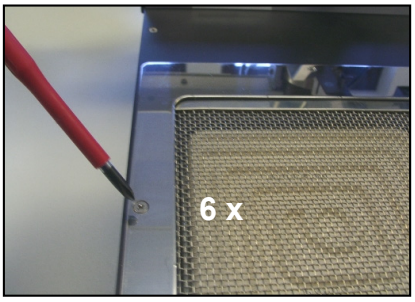
Viton ® is a registered trademark of DuPont Dow Elastomers

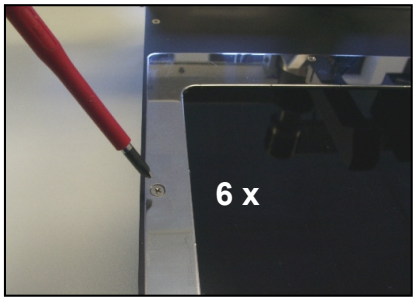
Mounting the glass pane

Glass pane (optional bottom radiator cover):

Usage:
In certain soldering applications the stainless steel grid covering the bottom radiator needs to be replaced with a glass pane.

Mounting:
Switch off the unit and wait until is has cooled. Loosen the six fixing screws of the holding frame and remove it. Lift the stainless steel grid and replace it with the glass pane. Remount the frame and tighten the fixing screws.





Note:
Please use the glass pane only for bottom heat energy levels **< 11** for high energy applications (lead free) only. Remove the stainless steel grid and insert the glass pane.

9 Appendix

IR 550 A external keypad with six functional keys:

Key	Function
	Change program; increase parameter value [1]
	Choose program; change parameter, store values[2]
	Change program; decrease parameter value

Key	Function
	Adjust display to melting temperature [3]
	Switching of vacuum pump
	Switching of cooling fan

[1] Special function: Keep pressing at switch-on shows **firmware version**

[2] Special function: Keep pressing at switch-on **load factory settings**

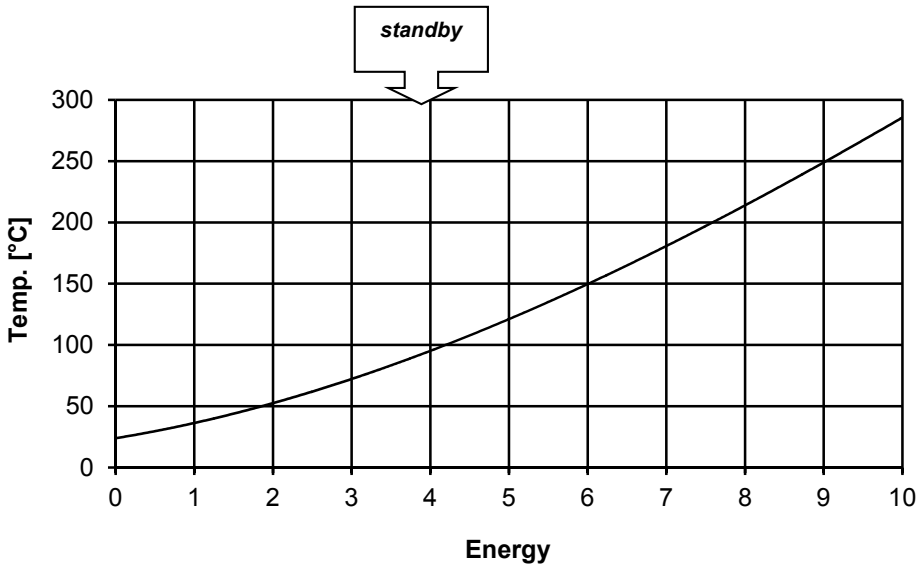
[3] Special function**: Reset calibration** factor when top radiator is in neutral position

Table 1 Factory settings

	Program	Pr1	Pr2	Pr3	Pr4	Unit
No.	Parameter	Desoldering standard	Soldering standard	Desoldering lead free	Soldering lead free	
-1-	T_{init}	30	60	30	80	°C
-2-	t_1	0	60	50	60	s
-3-	T_1	30	140	100	170	°C
-4-	t_2	0	60	70	60	s
-5-	T_2	30	160	200	200	°C
-6-	t_3	170	40	25	35	s
-7-	T_L	183	183	217	217	°C
-8-	T_3	200	200	225	235	°C
-9-	t_4	0	0	0	10	s
-10	Energy	7	7	10	10	-
-11	Alt. Sensor	Se1	Se1	Se1	Se1	-
-12	Unit	C	C	C	C	-
-13	Password	000				-

Note:
The settings serve only as a starting point. The user should suit individually the parameters to his solder task.

Temperatures of the glass plate covering the bottom radiator over bottom radiator energy. During standby the heater is set to **energy level 4**.



Note:
Please use levels **11 to 15** for high energy applications (lead free) only. Remove the glass pane and insert the stainless steel grid in these cases!

Table 2 Info and Error description

Inf/Err	Description	Possible reasons	Steps
Inf 0	Unit too hot	Unit was operated at high temperatures for long time.	Make sure the unit is properly ventilated. Reduce energy level, if possible. Use grid!
Err 3	Error thermocouple top heater	TC connection in top heater is open	Exchange top heater with thermocouple
Inf 6	Sensor reading incorrect	Se1 or Se2 have not read any temperature increase though the heating is on	Ensure Se1 or Se2 are working and are set to the object to measure.
Err 7	Error external thermocouple	cracked TC wire or no thermocouple connected	Connect a working thermocouple
Err 9	parameter in EEPROM damaged	Error in program memory	Keep the Menue key pressed when switching the unit so that the factory settings will be loaded. If error returns frequently: exchange the control board.

Table 3 Melting temperatures of solder alloys

Alloy	T_L	Note
Bi58 / Sn42	138 °C	Lead-free, eutectic *
Sn62 / Pb36 / Ag2	179 °C	Silver protection solder, eutectic *
Sn63 / Pb37	183 °C	Eutectic *
Sn60 / Pb40	183 - 188 °C	
Sn60 / Pb38 / Cu2	183 - 190 °C	Copper protection solder
Sn89 / Zn8 / Bi3	191 - 198 °C	Lead-free
Sn95,5 / Ag3,8 / Cu0,7	217 °C	Lead-free, IDEALS standard, eutectic *
Sn96,5 / Ag3 / Cu0,5 („SAC305“)	217 - 219 °C	Lead-free, JEITA standard
Sn96,5 / Ag3,5	221 °C	Lead-free, eutectic *
Sn99 / Cu0,7 / Ag0,3 („SAC0307“)	217 - 228 °C	
Sn99,3 / Cu0,7 („Sn100Ni+“ etc.)	227 °C	Lead-free, eutectic *
Pb98 / Ag2	304 °C	High temperature solder, eutectic *

* Only eutectic solder alloys have a melting point. All other alloy have a melting range between Solidus and Liquidus temperature. Within the melting range the solder behaves like a pulp.

Table 4 Parameter overview

No	Parameter	Description	Display in 4. digit	Range *
-1-	T_{init}	initial temperature	C/F	20 – 150 °C
-2-	t_1	preheating time 1	S	0 – 300 s
-3-	T_1	preheating temperature 1	C/F, dot T_1	20 – 260 °C
-4-	t_2	preheating time 2	S	0 – 300 s
-5-	T_2	preheating temperature 2	C/F, dot T_2	20 – 260 °C
-6-	t_3	time 3	S	0 – 300 s
-7-	T_L	Liquidus temperature	C/F, dot T_L	100 – 300 °C
-8-	T_3	peak temperature	C/F, dot T_3	100 – 300 °C
-9-	t_4	time 4, flat peak time	S	0 – 60 s
-10	Energy	bottom heater energy level	E	0 – 15
-11	Alt. Sensor	sensor selection	A	Se1 or Se2
-12	Unit	temperature unit	U	°C or F
-13	Password	Password	P	00 - 999

* The range from the aforementioned values can differ by using different firmware versions. (Version 2.22)

10 Warranty

Ersa has produced these Operating Instructions with the utmost care. Nevertheless, we cannot provide any guarantee regarding the content, completeness or quality of the information in these Instructions. The content is regularly updated and adapted to current conditions.

We have gathered all data published in these Operating Instructions, as well as data on products and procedures, to the best of our knowledge, by means of state-of-the-art technical aids. These data are provided without obligation, and do not relieve the user of the responsibility for inspecting the equipment before its use. We assume no responsibility for violations of the protective rights of third parties, or for applications and procedures without our prior express and written confirmation.

Technical information is subject to change without notice in the interest of improving the product. Within the bounds of legal possibility, liability for direct damage, consequential damage and third party damage resulting from the acquisition of this product are precluded.

EC Declaration of Conformity

Issuer's name and address:

ERSA GmbH
Leonhard-Karl-Str. 24
97877 Wertheim

Product: *Soldering / Desoldering station*

Type designation: *IR 550 A*

The designated product is in conformity with the European Directive:

2006/42/EC
Including amendments

"Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on the approximation of the laws of the Member States relating to machinery".

The technical documentation and full compliance with the standards listed below proves the conformity of the product with the requirements of the above-mentioned EC Directive:

DIN EN 60335-1 (VDE 0700-1):2010-11; EN 60335-1:2002+A11+A1+A12+A2+A13+A14:2010
DIN EN 60335-1/A15 (VDE 0700-1/A15):2012-03; EN 60335-1/A15:2011
DIN EN 60335-2-45 (VDE 0700- 45):2012-08; EN 60335-2-45:2002+A1+A2:2012
DIN EN 62233 (VDE 0700-366):2008-11; EN 62233:2008
DIN EN 62233 Ber.1 (VDE 0700-366 Ber.1):2009-04; EN 62233 Ber.1:2008

The VDE Testing and Certification Institute (EU Identification No. 0366), Merianstr. 28, 63069 Offenbach (Germany), has tested and certified the product.

Certificate No. 136309
File Reference 265000-2350-0052 / 200203 / AS7 / HM

Wertheim, 15.09.2014
(Place, Date)

(Dipl. -Ing. Rainer Kurtz, Managing Director)

EC Declaration of Conformity

Issuer´s name and address:

ERSA GmbH
Leonhard-Karl-Str. 24
97877 Wertheim

Product: Soldering- / desoldering station

Type designation: IR 550 A

The designated product is in conformity with the European Directive:

2004/108/EC

„DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15. December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC".

Full compliance with the standards listed below proves the conformity of the designated product with the essential protection requirements of the above-mentioned EC-Directive:

DIN EN 61000-3-2 (VDE 0838-2):2010-03; EN 61000-3-2:2006 + A1:2009 + A2:2009
DIN EN 61000-3-3 (VDE 0838-3):2009-06; EN 61000-3-3:2008
DIN EN 55014-1 (VDE 0875-14-1):2012-05; EN 55014-1:2006 + A1:2009 + A2:2011
DIN EN 55014-2 (VDE 0875-14-2):2009-06; EN 55014-2:1997 + A1:2001 + A2:2008
Anforderungen der Kategorie IV / Requirements of category IV

The VDE Testing and Certification Institute GmbH (EU Identification No. 0366), Merianstr. 28, D-63069Offenbach, has tested and certified the product granting the VDE Approval for the mark(s) as displayed.

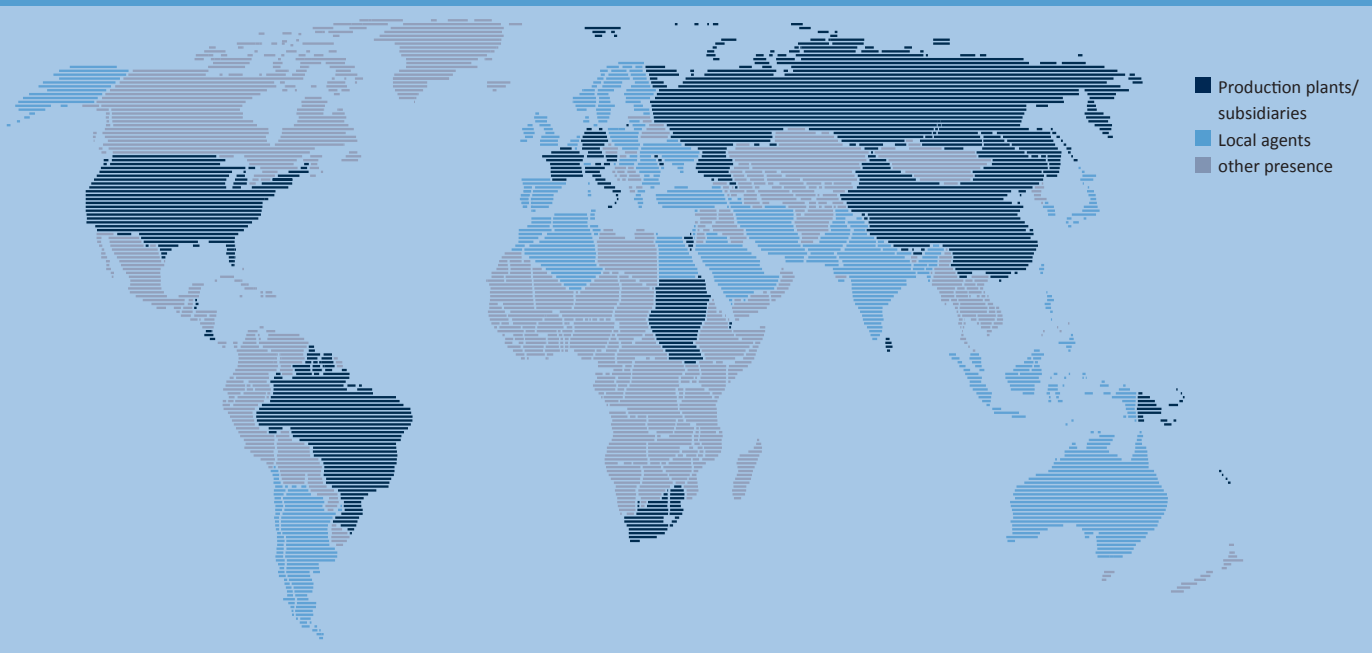
VDE EMC

Certificate No. 40038370
File Reference 265000-2350-0052 / 173396 / EC1 / SHL

Wertheim, den 24.10.2013
(Ort, Datum)

(Dipl. -Ing. Rainer Kurtz, Geschäftsführer)

ELECTRONICS PRODUCTION EQUIPMENT



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