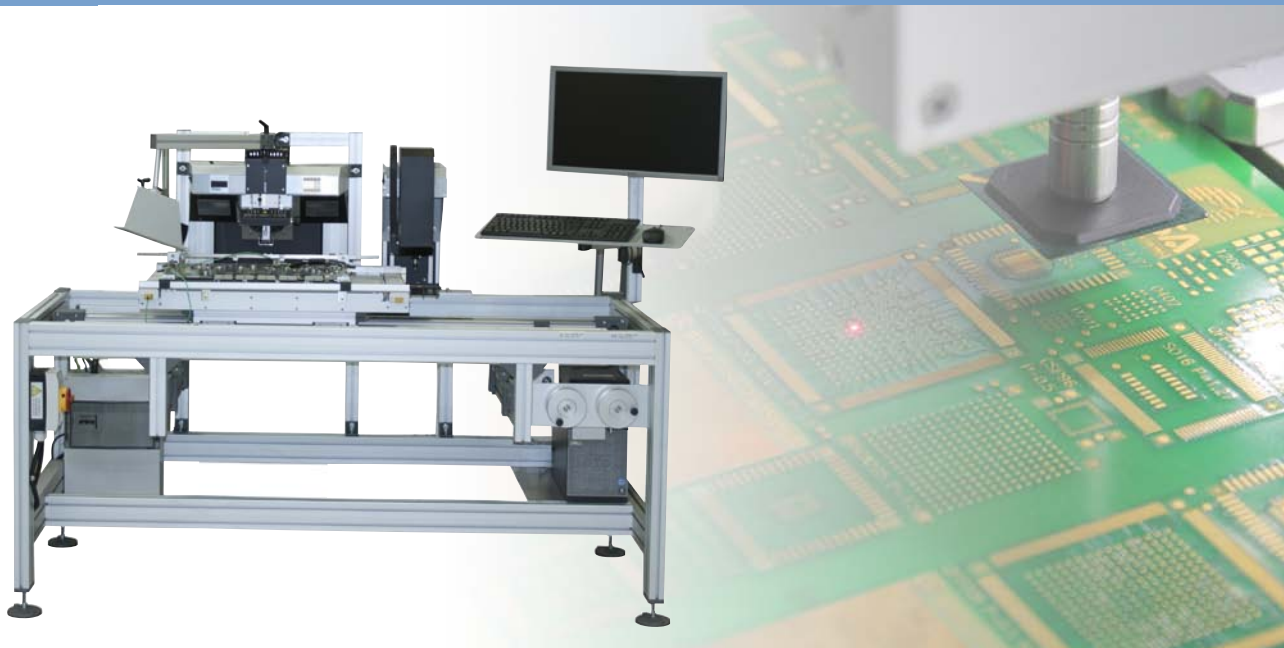


Ersa IR/PL 650 XL

Semi-Automatic SMD/BGA Rework System
for very large board operation



Operating Instructions

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1. Introduction

1.1 General product information

The Ersa IR/PL 650 XL Rework System has been especially developed for extremely large and high-mass printed circuit boards.

The dynamic heating technology of the IR 650, based on Ersa IR technology, offers extensive possibilities, even for repairing complex components and printed circuit boards. Individual profile design, as well as high repetitive precision through automatic process control, extending to component cooling, intelligent measurement technology, and multiple closed loop technology enable ideal process results, even for lead-free applications. The integrated reflow process camera rounds out the process reliability aspects of the IR/PL 650 XL. The system includes a PL 650 placement module. With the PL 650 secure placement of even the smallest, multi-position components succeeds in no time. Here as well, state-of-the-art cameras and drive technology support the user and ensure optimal component placement.

Through the flexible, and for the most part automatic operation of the IR/PL 650 XL, cycle times can be significantly reduced in comparison to cycle times achieved with traditional rework systems.

1.2 General information about the operating instructions

The Operating Instructions are designed to provide the owner of the rework system with complete information concerning the product, its set-up and commissioning, basic machine functions, malfunctions and malfunction resolution, maintenance, as well as spare parts and wearing parts.

Before placing the machine in service, you must carefully read and have understood the section on safety. Our service department is available to respond to any questions and problems you might have with this product.

1.2.1 Explanation of symbols



This symbol warns of electric shock hazard. Touching electrically conducting parts can result in serious bodily injuries which can be fatal.



This symbol warns of hazards of any type that can result in bodily injuries that can be fatal.



This symbol indicates a hazard of burn injuries caused by touching hot objects or machine parts.

ATTENTION!

Attention indicates instructions, which if not complied with, result in damage to the soldering machine or other material damages!

1.3 Proper use

The Ersa IR/PL 650 XL rework system has been built in accordance with the state of the art and standard health and safety regulations. Residual hazards can exist with the system, particularly if it is operated improperly by untrained personnel, or if it is used for purposes for which it is not intended (proper use).

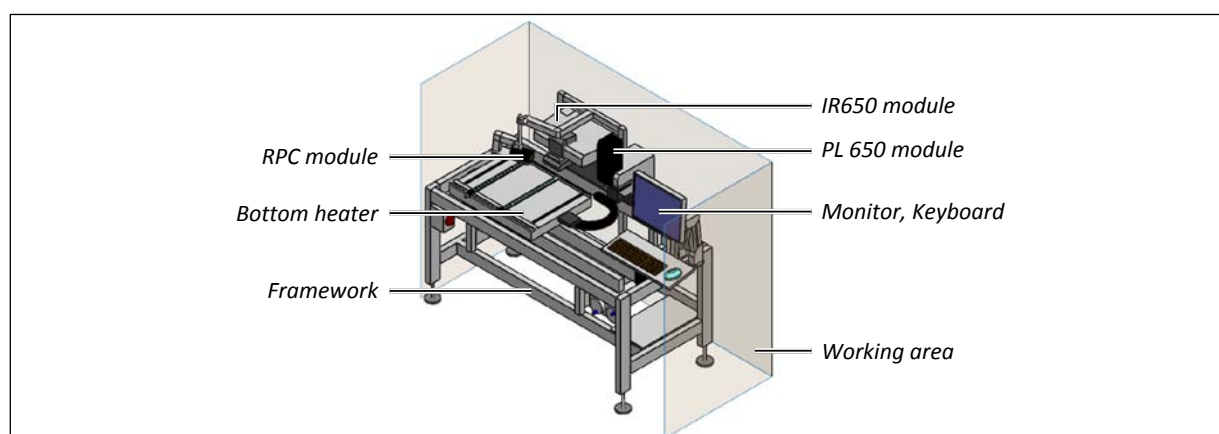
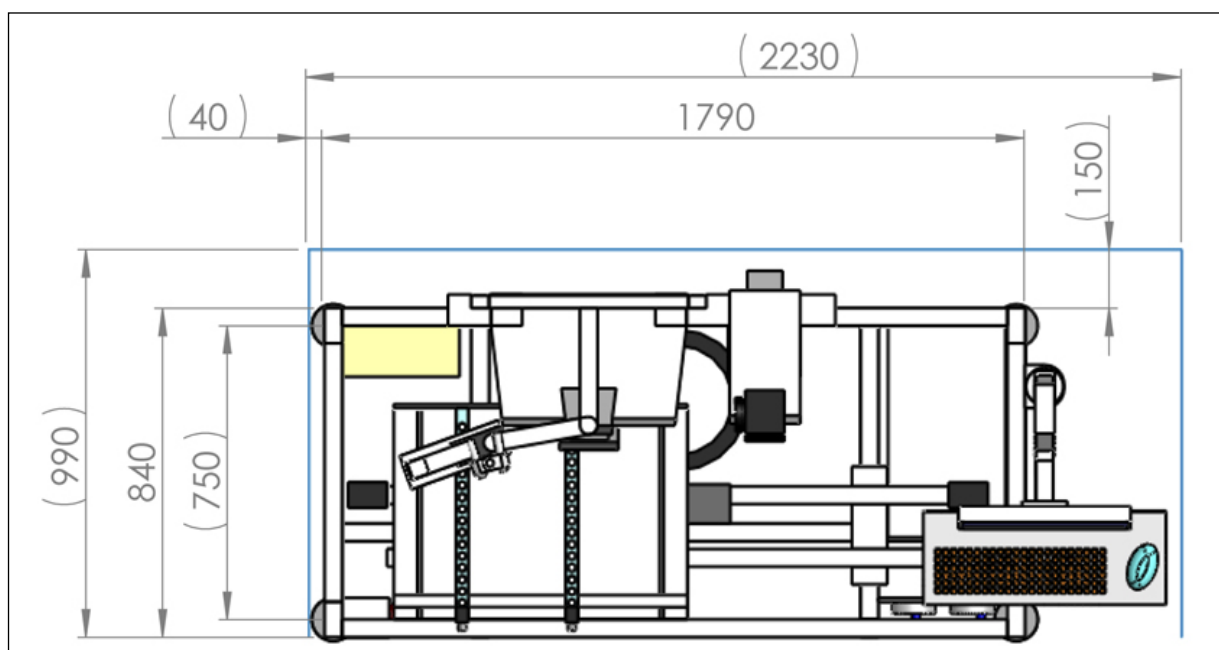
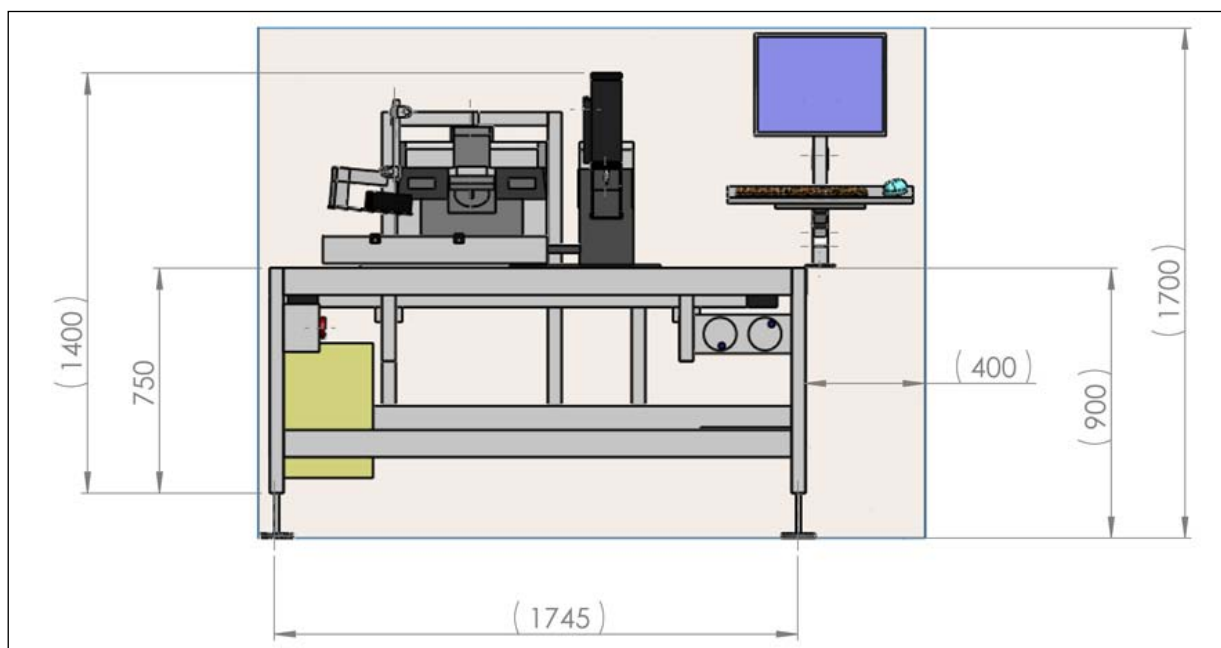
The Ersa Rework System has been designed exclusively for the placement of electronic components and subsequent soft soldering (selective reflow soldering) of electronic assemblies that are suitable for this process. Any other use, or use exceeding this specification, is considered to be improper. The manufacturer/supplier assumes no liability for damages resulting from improper use.

Proper use also includes compliance with the Operating Instructions, including all of the safety instructions. Unauthorized reconstructions and/or modifications that influence the safety of the Ersa Rework System are prohibited, and the manufacturer/supplier is not liable for any damages resulting from such additions or modifications.

The system is designed exclusively for commercial use. Private use is excluded.

2. Technical data

2.1 IR/PL 650-XL main dimensions



2.2

IR 650 XL module

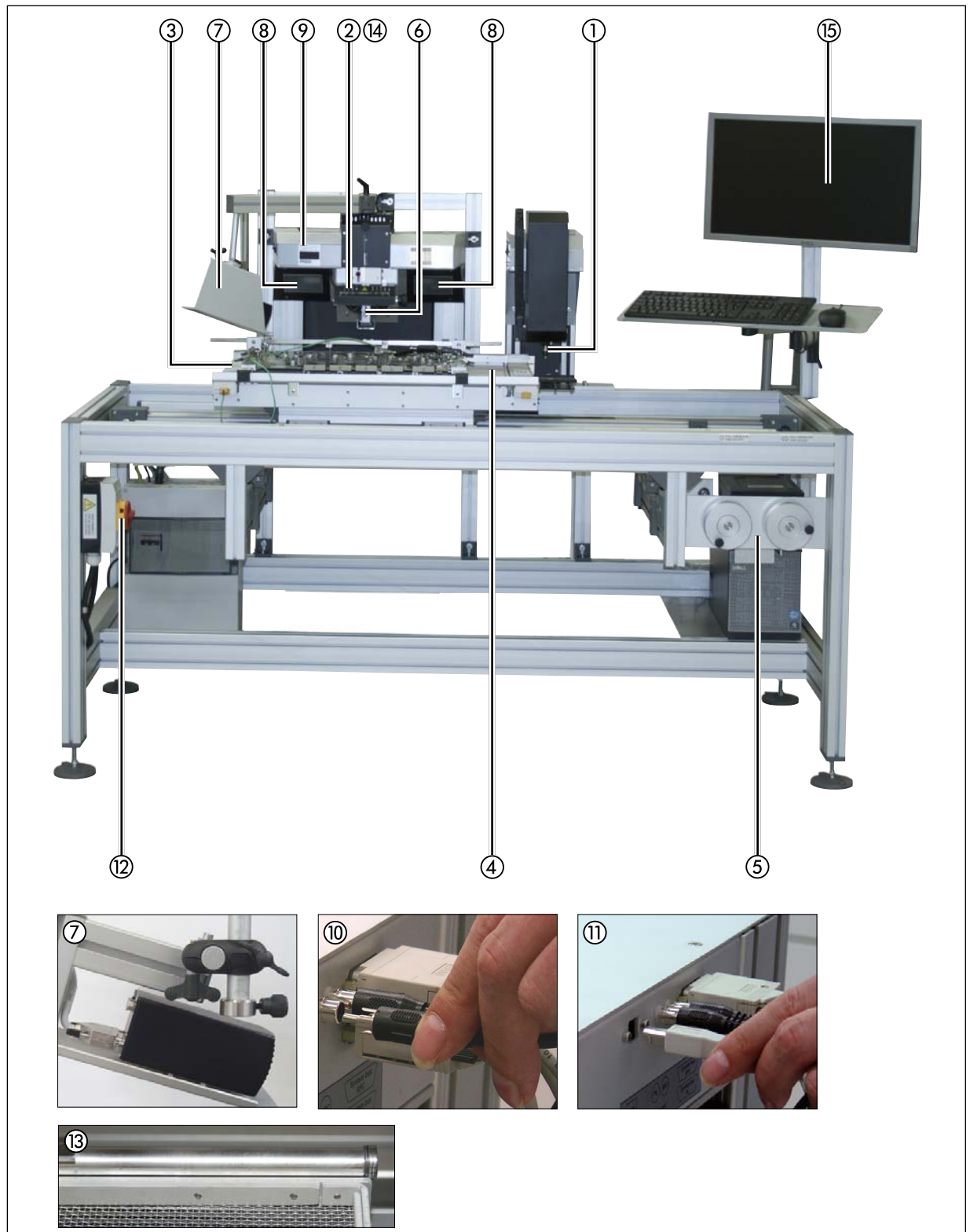
Technical Data IR 650 XL module	
Device dimensions	
Length	1790 mm
Width	840 mm
Height	approx. 1490 mm
Weight	approx. 185 kg
Electrical data	
Voltage	3 x 230 V/N/PE, CEE 16A
Voltage tolerance	+6 %/-10 %
Frequency	50/60 Hz
Rated power	9200 W without PC
Protection	Class I
Upper heating element	
IR upper heating element output	4 x 300 W
4 separately switched heating zones	
Maximum heating element surface	120 x 60 mm
Upper heating element with motorized positioning	
Maximum stroke head	70 mm
Lower heating element	
Lower heating element output	20 x 400 W
5 separately switched heating zones	
Maximum heating element surface	500 x 625 mm
IR heating element wavelength	2 – 5 μ m
Control	
Controlled via PC (Windows® 2000 or XP required)	
Universal Serial Bus (USB) interface	
Integrated 4-character LED display	
Temperature measurement	
1 x IR sensor	
4 x thermocouple channel (K-type, potential-free)	
Additional data	
Component size	1 x 1 mm to 60 x 60 mm
Maximum PCB size	500 x 625 mm
Environmental specifications	
Operating temperature:	20 – 40 °C
Relative humidity:	0 – 80 %
Temperature increase in the process to 2.5 K/sec.	
Working distance	
PCB to upper heating element	60 mm
PCB to lower heating element	30 mm
Volume flow int. cooling elements	
Upper fan	182 m³/h
Lower cooling	compressed air 6 – 10bar
Vacuum nozzle switching point	Up to 15 mm above the upper edge of the PCB.

PL 650 module and RPC module	
Electrical data	
Via external power supply	1 x 100 – 230 VAC
Supply voltage	24VDC / 50 W
Frequency	50 / 60 Hz
Vision box	
Component size	1x1 mm to 60 x 60 mm
Split optics optional for QFP processing	
Component placement force	approx. 2 N for Auto Pick & Place, or position controlled.
Illumination LED row light (each side separately adjustable for component and PCB)	
RPC camera	
Illumination	LED ring light white (adjustable)
Camera	CCD color camera
Focus	25 x optical, 12 x digital
Swivel area	180°
Interface	System bus

3. Safety instructions

3.1 Aggregates and interfaces

The interfaces and aggregates of the IR/PL 650 XL are shown on the following photos.



① Placement head

The placement head positions the respective component on the PCB in conjunction with IRSofT



Attention crushing hazard!

When placing components do not reach between placement head and PCB.

② Upper heating element

The required heat from above for soldering/desoldering electronic components is generated via this aggregate. Temperature selection is specified via the IRSofT control software.



Attention burn hazard!

Upper heating element and surrounding housing parts reach high temperatures during a soldering process.

③ Placement table

Via the placement table the PCB is aligned so that the placement head can place the component precisely on the PCB.

④ Large area bottom heater

The required heat from below for soldering/desoldering electronic components is generated via this aggregate. Temperature selection is specified via the IRSofT control software.



Attention burn hazard!

Lower heating element and surrounding housing parts reach high temperatures during a soldering process.

⑤ X-Y movement and fine adjustment

Use the x-y crankshaft drive with fine adjustment to precisely position the bottom heater with the placement table.

⑥ IR temperature sensor

The sensor detects the surface temperature of the component that will be soldered/desoldered, in a contact-free process.

⑦ Reflow process camera

The reflow process camera provides a live image of the soldering process to the monitor. The RPC camera is mounted to an adjustable arm.

⑧ Illumination

The lighting provides optimal, glare-free illumination of the workstation. It can be switched on or off via the side-mounted switch.

⑨ IR 650 display

The display shows the current actual temperature of the selected temperature sensor.

⑩ Video output:

Two cinch sockets are located on the rear of the IR 650. The video signal from the RPC camera and the PL camera are available on these sockets. This signal is transmitted to the video inputs of the FALCON Frame Grabber card in the PC via two video cables.

⑪ **USB interface, system bus:**

The IR /PL 650 is connected to a PC via a USB cable (type A-B). All control functions, and the process parameter documentation, are available via the IRSoft software.

The control signals to the individual system modules are distributed via the system bus. PL 650 and RPC module are connected on the rear of the IR 650 for this.

The video signals of the two motorized zoom cameras are also transmitted internally via these cables.

⑫ **Main switch with EMERGENCY-STOP function:**

The entire IR/PL 650 XL system is switched on and off via this switch, and in the event of a hazard all phases can be disconnected from the power supply via this switch.

⑬ **Cooling:**

The system provides 2 cooling elements. One fan is cooling the component area from the top (speed adjustable via IR Soft).

On the bottom side a 625 mm long air knife cools the PCB from below. A compressed air supply is required.

⑭ **Safety temperature monitoring:**

The upper heating element of the IR 650 is equipped with a thermal safety switch.

In the event of uncontrolled heating it automatically switches off the energy supply of the heating elements, to prevent damage to the device or to the objects in the vicinity.

The ring core transformer for the upper heating element is likewise equipped with a safety switch.

⑮ **TFT monitor, keyboard and mouse holder:**

Moveable holder to position the PC components ergonomically for individual users.

(PC components are not included in standard delivery)

For proper installation of the customer PC at the monitor arm of the system, following additional specifications have to be fulfilled:

- Minimum 19" TFT monitor with standard VESA® compliant fixture for external monitor holders:
 - Integrated USB-hub with min. two sockets
 - 2 m DVI video cable
 - 2 m power cord
 - 2 m USB uplink cable
- USB slimline keyboard, (connection to TFT USB hub)
- USB optical wheel mouse (connection to TFT USB hub)
- PC case with maximum midi tower size. Case must be able to lay on one side.
- Slimline cases might need the optional half height frame grabber instead of the included full height version

Vacuum supply:

The IR/PL 650 XL has one integrated vacuum pump. The pump supplies the vacuum nozzle of the IR 650 and also of the PL 650.

3.2 Safety instructions



Attention! Fire and explosion hazard!

The upper heating element and the lower heating element become very hot during operation. Flammable objects, liquids and gases, must be removed from the work area of the device!



Attention! Fire and explosion hazard!

Do not use the system to heat any liquids, or containers under pressure. Batteries and electrolyte capacitors can explode if heated excessively.



Attention! Burn hazard!

Hot housing elements should not be brought into contact with the skin or with materials that are sensitive to heat.

The housing parts of the IR system will remain hot for several minutes after a rework process.



Attention! Laser beam!

A class II semi-conductor laser is used as a positioning aid. Do not look directly into the laser beam.



Attention! High voltage!

The device contains electrically conducting parts. There is a risk of fatal injury if unexperienced personnel work on the unit.

Only experienced and qualified electricians may perform repair work.

4. Transport, storage, assembly and disposal

4.1 Scope of supply

Please check the completeness of the packaged contents. The scope of supply consists of:

- IR 650 -selective reflow module mounted to a aluminum frame structure
- Movable bottom radiator with PCB table and fine drive adjustment
- RPC camera module and pre-mounted camera swivel arm and system cable (optional)
- Replacement silicone suction cup Ø 5 mm, replacement silicone suction cup Ø 8 mm (2 x)
- 2 support rails bottom with pins
- 1 support rail top with pins
- Component tray
- External ACCUTC thermocouple K-type (2 x)
- 1 flexpoint TC holder
- USB cable for connecting to a PC
- FALCON Frame Grabber card to install in a PC
- Video connecting cable (cinch - cinch) (2x)
- Operating Instructions and IRSOFT software IR/PL 650 XL on CD-ROM
- PL 650 placement unit with system cable mounted to aluminum frame structure.
- Power supply for placement unit
- Connecting cable for placement unit
- Vacuum nozzles (10mm and 4mm)
- Hex socket wrench
- Calibrating plate and needle

Please contact your supplier if the listed components are damaged or incomplete.

4.2 Transport and storage

The IR/PL 650 XL is delivered on a pallet in a stable box enclosure.

Only use the original packaging for transport and interim storage of the systems.

Strictly avoid jerky movements, jolts, or dropping the system!

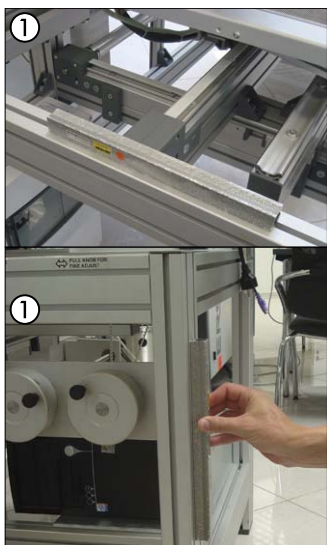
The systems must be protected from weather influences such as rain, fog, sea air, etc.

If the units will be stored for a longer period of time under humid conditions, the system must be packed air-tight with desiccating agents in the enclosure.

Damages due to improper transport and storage are not covered by the guarantee.

4.3 Assembly

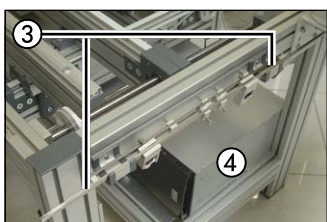
4.3.1 Setting up the system



- Prepare the site where the system will be set-up:
- Unload the transportation box and carefully unpack the system.
- Setup the system on the right place.
- Check with a precision water level ①



- Adjust heating cassette if necessary.
There are four adjustment screws ② located underneath the heating cassette.



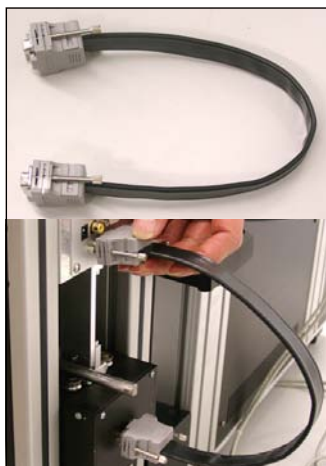
- On the right side of the aluminium framework you will find a holder to store the support rails ③, when not in use.
- Place the PC ④ into the rack.

4.3.2 Electrical connections

ATTENTION! Ensure that the master switch on the IR 650 is switched off, before connecting the electrical systems!



- Connect the vacuum feed line of the PL 650 to the IR 650.



- Connect the vision box on the PL 650 to the device control unit (on the upper rear of the device).



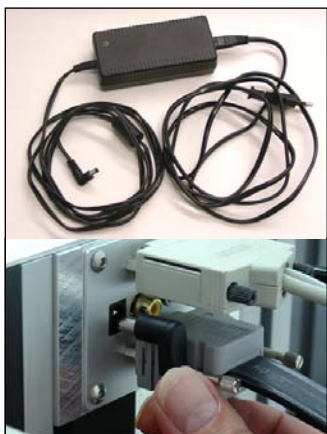
- Now connect the PL 650 control unit to the rear of the IR 650 with the system cable.



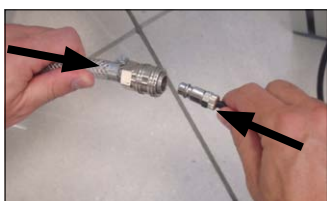
- Connect the RPC camera module to the IR 650 via the appropriate system cable.



- Connect the two video sockets on the rear of the IR 650 to the FALCON Frame Grabber that you have previously installed in your PC.



- Plug the external power supply of the PL 650 into the 230 V connection of the IR 650 (outlet on the rear of the device).



- Connect the compressed air connection to your local air supply



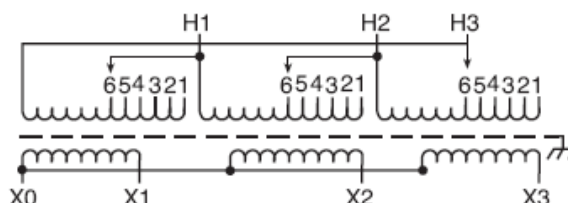
- Connect the power cable of the IR/PL 650 XL to your power supply in accordance to the technical data.

4.3.3 Electrical connections for installation in the USA

ERSA IR650 Transformer Wiring Diagram for 3 Phase Systems.

75

PRIMARY: 190/200/210/220/
230/240 Volts Delta
SECONDARY: 400Y/231 Volts



Primary Volts	Connect Primary Lines To	Inter-Connect	Connect Secondary Lines To
240	H1, H2, H3	1	
230	H1, H2, H3	2	
220	H1, H2, H3	3	
210	H1, H2, H3	4	
200	H1, H2, H3	5	
190	H1, H2, H3	6	
Secondary Volts			
400			X1, X2, X3
231 1 phase			X1 to X0 X2 to X0 X3 to X0

Primary Connection: Connect primary wires from facility power according to measured voltage and diagram above.

Secondary Connection:

Power Cable from IR650	Secondary Leads of Transformer
Phase 1	X1
Phase 2	X2
Phase 3	X3
Neutral	X0 and Bonded to Ground
Ground	Chassis ground

4.4 Disposal

After its service life the IR/PL 650 XL system must be disposed of according to the applicable regulations of the respective country where the device was used.
Please contact your local provider of disposal services in this regard.

5. Commissioning

5.1 IRSoft installation

Your PC must satisfy the following minimum prerequisites before installing IRSoft:
Please install IRSoft to your PC prior to switching on the rework system.

PC system requirements:

CPU	Minimum: Intel Pentium 4, 3 GHz or higher (recommended: Core 2 Duo or higher) Minimum: AMD Athlon XP 64, 3000+ or higher (recommended: Athlon X2 or higher)
RAM	Minimum: 1 GB or higher (Windows Vista™ or Windows® 7: 2 GB or higher)
Interfaces	USB 2.0 or higher One free PCI slot (for video frame grabber – required for IR650, PL550 with IRSoft or non-USB ERSASCOPE)
Graphics Card	ATI Radeon™ series NVIDIA® GeForce® series ⇒ DVI signal output (or other digital signal interface, e.g. display port, HDMI etc.)
Monitor	TFT flat screen monitor, minimum 17" (better 19") or larger ⇒ Min. 1280 x 1024 pixels physical resolution (1440 x 900 pixels <u>for</u> widescreen 16:10, 1600 x <u>900</u> pixels for widescreen 16:9), important is the height of minimum 900 pixels! ⇒ DVI signal input (or other digital signal interface, e.g. HDMI, matching the graphics card digital interface) ⇒ DVI interlink cable
Accessories	High quality optical wheel mouse (Microsoft® Mouse, Logitech® etc.)

Installation:

- Close all applications.
- Insert the CD in the CD-ROM drive and run [IRSoftSetup.exe].
- Setup will start now.
- Follow the instructions.

5.2 Switching on for the first time



- Turn on the main switch. Turn on the IR650 A via system on/off switch. Turn on the PL 650 via system on/off switch. Open IRSoft Software.

6. Function description

6.1 The IRSOFT user interface



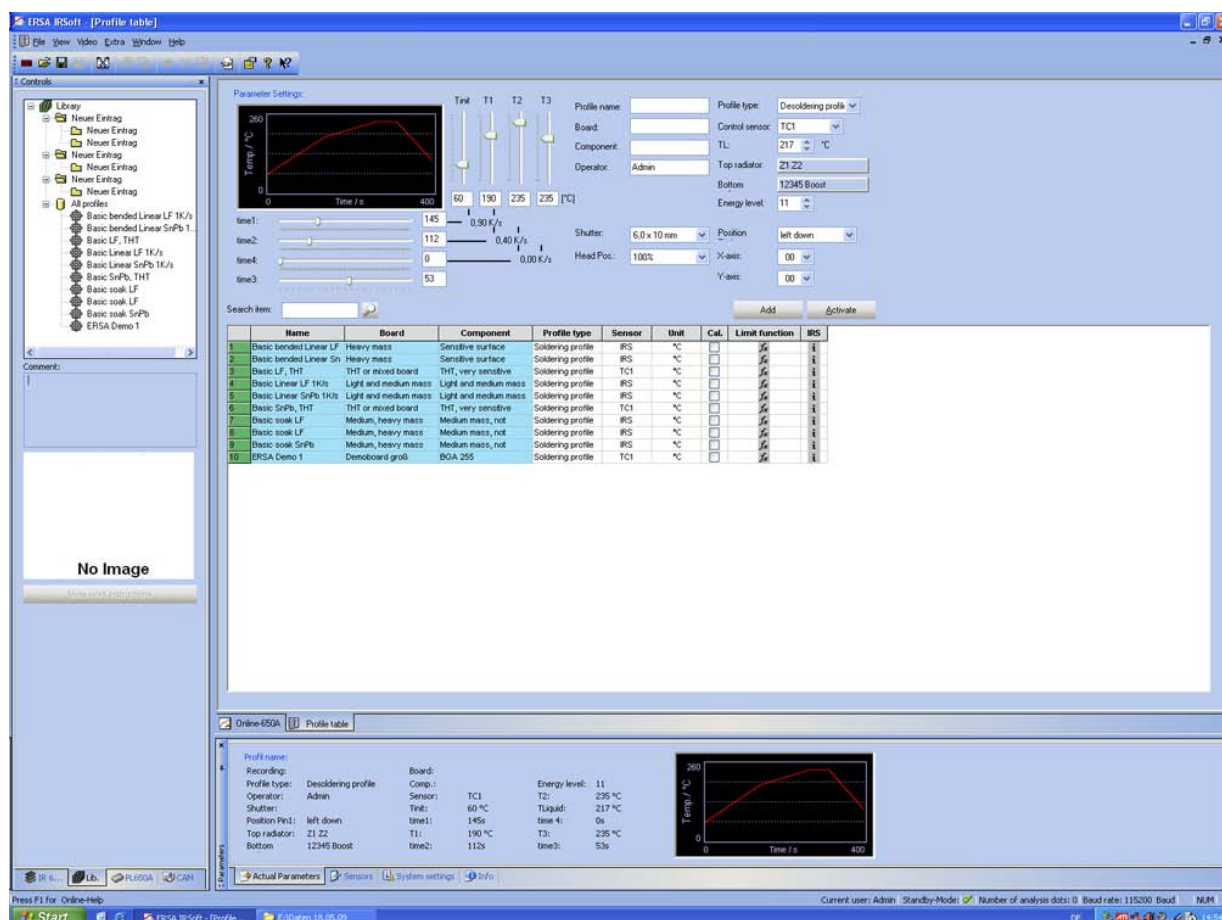
Important note:

This chapter is only an excerpt from the IRSOFT Online Help. Please see the IRSOFT Online Help for details on functions and settings. You can call the Online Help with the F1 key! Details in the software screenshots shown here, may differ from the supplied version. Please also refer to the context sensitive online help.



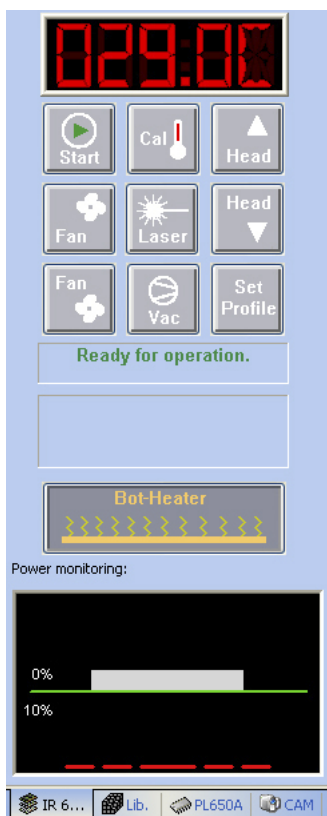
After starting IRSOFT the communication between the computer and the connected IR device is established automatically. The prerequisite for this is that only one interface is activated in the interface configuration. If multiple interfaces are activated, then the user will first get to the [Interface selection] window, in which he can choose the desired interface.

After opening the interface, the individual operating and information elements are displayed in the IRSOFT view. The interface is basically divided into three parts. The [Operator Controls] are on the left side, the [Profile Setting] view is on the right side, the [Parameter] windows are below.



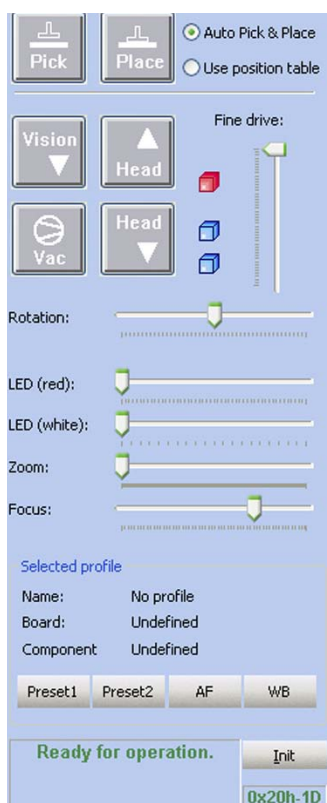
6.2 Device controls

6.2.1 IR 650



The currently measured temperature is displayed in the upper section. Underneath there is the keypad for operating the IR 650. Beneath the keypad there are 2 status windows. In the upper status window the current system status is displayed. The field below is used for more extensive messages, such as errors, that can occur. The popup window for this control opens via the right mouse key.

6.2.2 PL 650



Use the PL 650 [Operator Control] to operate the fundamental functions of the placement unit PL 650 ([Vision box] - forward/back, [Head] - up/down, [Rotation], [Fine drive] - up/down). The top and bottom vision box lighting is controlled via the [LED (red)] and [LED (white)] sliders. The sliders [Zoom] and [Focus] are for image adjustment. Use the [AF] button to trigger auto focus, use the [WB] button for white balance. Use the [Preset 1] and [Preset 2] keys to call previously saved settings (lighting red & white, zoom and focus) at the touch of a button. These functions are quite useful when recurring camera settings are desired. To save the presets use the right mouse key on either [Preset 1] or [Preset 2] to open the corresponding popup menu [Save Preset]. Left click on [Save Preset] and all settings are saved and can then be called as desired via [Preset 1] or [Preset 2].

In the lower part of the control there is an output window where the messages relative to the placement unit are output in plain text. The head of the placement unit has three clearly-defined settings (Top, Middle = place position, Down = pick position).

These settings are visualized through the graphic to the right of the [Head down] key. Pushing the slider triggers the corresponding actuators in the placement unit, use the mouse wheel to finally adjust the slider for the input focus.

6.2.3 RPC 650



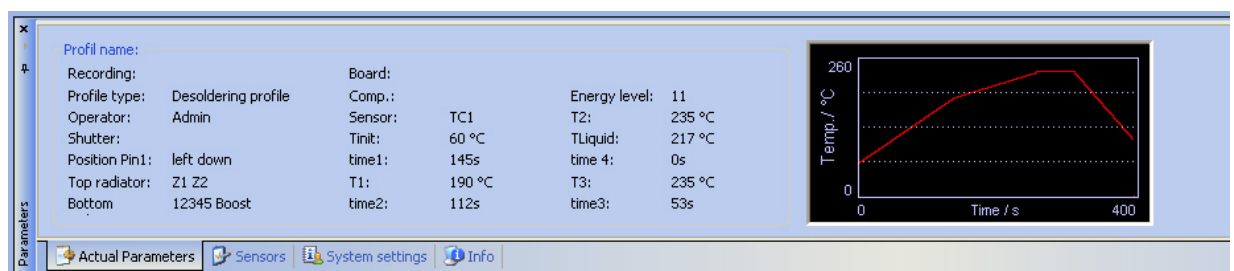
The control for the RPC camera is available twice depending on the equipment. It is located on the control of the placement unit, and here it governs the internal camera of the placement unit, also there is another separate control for an external RPC camera that is connected to the IR 650.

The LED ring light is controlled via the [Lighting] slider. The sliders [Zoom] and [Focus] are for image adjustment. Use the [AF] button to trigger auto focus, use [WB] for white balance. Use the [Preset 1] and [Preset 2] keys to call previously saved settings (Lighting, Zoom and Focus) at the touch of a button. These functions are quite useful when recurring camera settings are desired. To save the presets use the right mouse key on either [Preset 1] or [Preset 2] to open the corresponding popup menu [Save Preset]. Left click on [Save Preset] and all settings are saved and can then be called as desired via [Preset 1] or [Preset 2].

6.3 Parameter window

6.3.1 Current profile parameters

In this view the parameters are displayed that are currently active in the connected IR device. Thus the user can check the parameters individually, and he can check them based on the curve of the target profile.



Record date and time, the name of the user, as well as the other environment variables are saved and displayed on the left side.

With the IR 650 the configuration of the upper and lower heating elements is displayed.

6.3.2 Measured value and threshold value sensors

In the next view, [Measured value and threshold value sensors], the user has a table view of all connected temperature sensors. For the IR 650 there are four external thermocouples in addition to the IR sensor.

Profile-headline:

Sensor	Akt. temp.	Limit /°C	Limit Function	Test position	Test point	Board	Component	Show	Colour	Size
IRS	148,1 °C	200	Deactivated	Top side	Center			☒		1
TC1	24,6 °C	200	Deactivated	Top side	Center			☐		1
TC2	1,2 °C	200	Deactivated	Top side	Center			☐		1
TC3	1,2 °C	200	Deactivated	Top side	Center			☐		1
TC4	1,2 °C	200	Deactivated	Top side	Center			☐		1

☒ Actual Parameters
 ☒ **Sensors**
☐ System settings
 ☐ Status
 ☐ Info

The designation of the sensor is shown in the first column, the actual measured temperature is displayed in the second column. In the other columns, in addition to the profiles board and component data, the test position, as well as the test point of the sensor are also documented. In the last 3 columns the user can specify whether the graph of the corresponding sensor will be displayed in the profile graphs, as well as the color and line thickness of the selected graph.

6.3.3 Specifying threshold value functions

In the [Limit/°C] and [Limit Function] columns different limit temperatures and limit functions can be linked with the individual sensors. In this process the selected sensor is continuously monitored. As soon as the selected sensor nears its limit temperature the selected limit function is executed. The following limit functions can be activated:

- Message (in this case the user gets a plain text message in IRSoft)
- Cancel Profile (in this case the profile is aborted immediately)

Dynamic IR functions:

- Switch-off the lower heating element
- Reduce lower heating element output
- Increase lower heating element output and reduce top side heating element output

6.3.4 System settings

In the [System settings] window, all functions are listed with which the behavior of the system can be specifically changed.



Note:

All options are immediately active and do not need any special transmission or activation in the device.

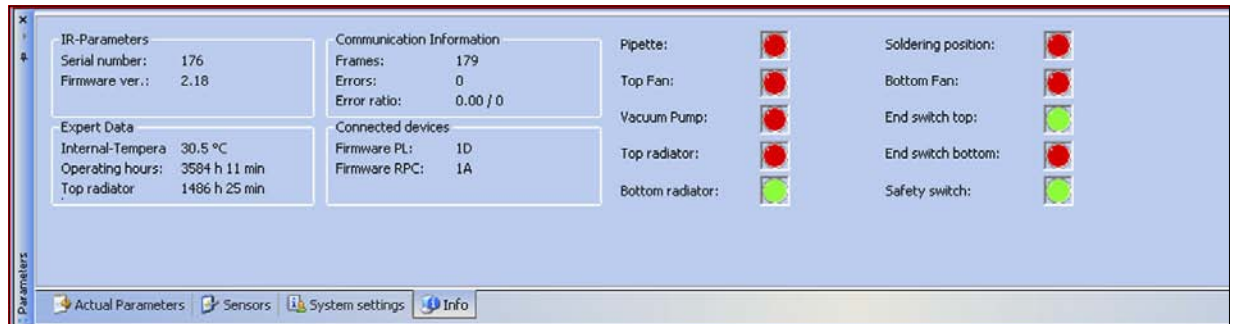
Parameters

Automatic Calibration during Desoldering ☐ When pipette is lifting component ☐ Continuously when TL is reached	Fan automation ☒ Top fan auto on ☒ Bottom fan auto on	Buzzer Mode: Buzzer off
Automatic Process Recording ☒ at Start of process ☐ at T _{init} ☐ No automatic recording	☒ Stop recording after peak zone	Standby mode ☒ activate Standby mode

☒ Actual Parameters
 ☒ **Sensors**
☒ **System settings**
☐ Status
 ☐ Info

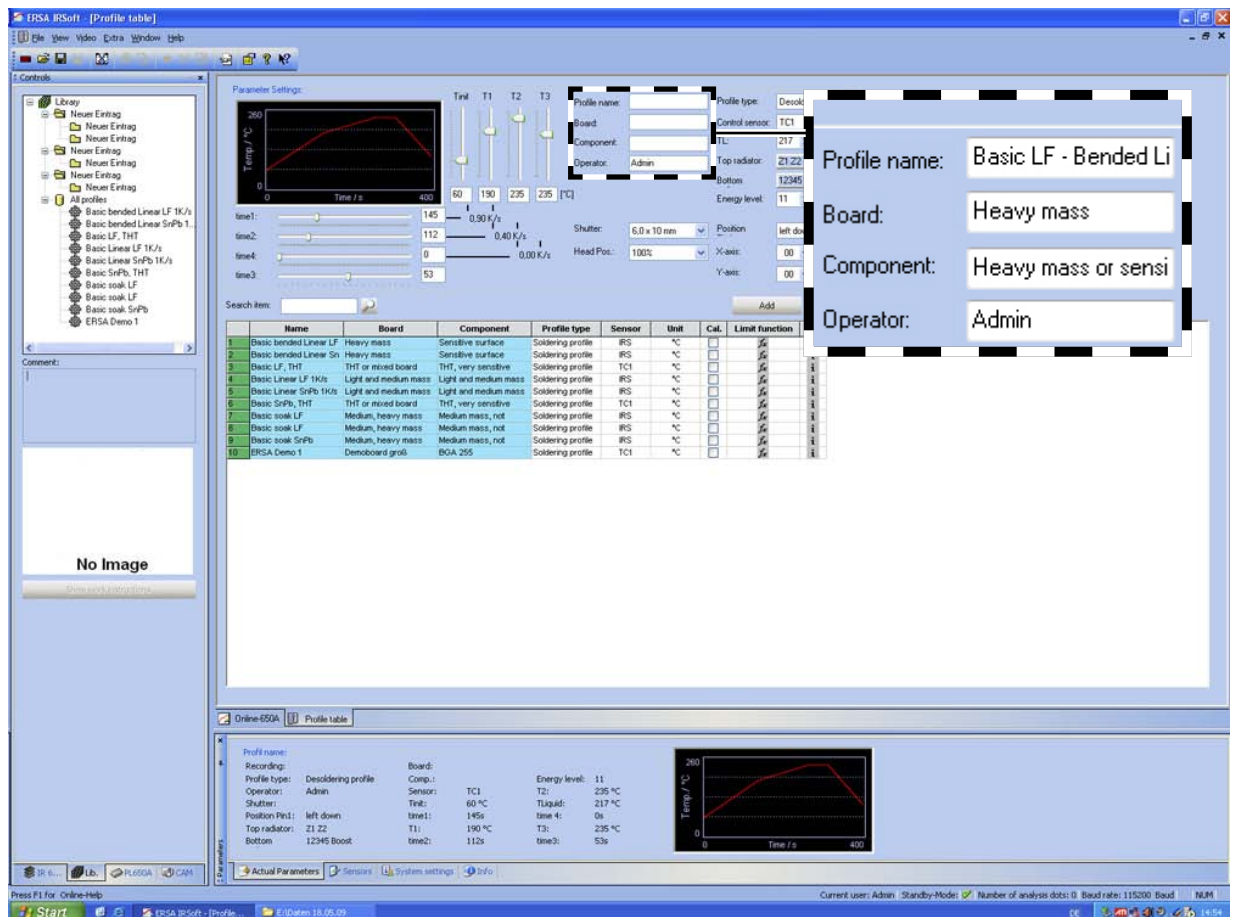
6.3.5 Status display

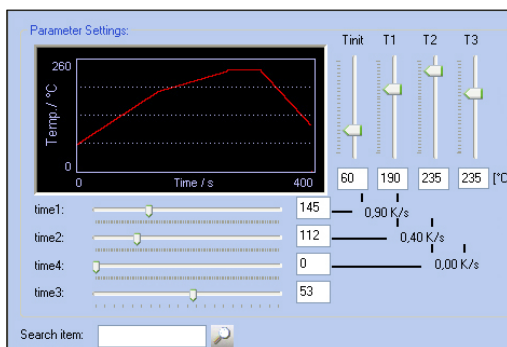
The status display visualizes the actual status of the system. As long as the device is working without problems this data may not be of major interest. However if problems should occur this information can be quite useful in limiting them and resolving them. The status messages should be self-explanatory.



6.4 Profile settings

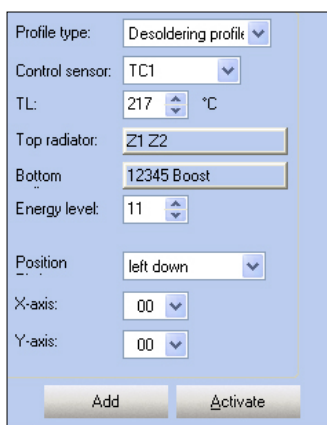
6.4.1 Setting the profile parameters





The individual profile parameters can be conveniently changed via the individual sliders, or they can be changed directly as numeric value in the entry fields. The profile update is transferred when exiting the entry field, and it is updated in the graphic. With the sliders, the graphic is updated “online”.

The system automatically calculates the set gradients in the ranges from [T init] to [T1], [T1] to [T2] and [T2] to [T3]. These are displayed to the user online.

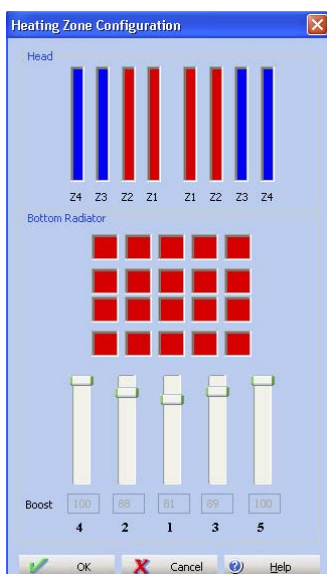


The 'Profile configuration' dialog box includes the following fields: 'Profile type' (set to 'Desoldering profile'), 'Control sensor' (set to 'TC1'), 'TL' (set to '217 °C'), 'Top radiator' (set to 'Z1 Z2'), 'Bottom' (set to '12345 Boost'), 'Energy level' (set to '11'), 'Position' (set to 'left down'), 'X-axis' (set to '00'), and 'Y-axis' (set to '00'). At the bottom, there are 'Add' and 'Activate' buttons.

In the [Profile name], [Board] and [Component] entry fields the user can enter the appropriate PCB data. Later the board and component data are transferred accordingly into the sensors table when activating the profile. The [Profile types] are soldering or desoldering. A soldering profile is typically used for component installation and a desoldering profile is typically used for component removal. During a desoldering profile the vacuum is automatically turned on and a message is displayed reminding the operator to push down the pipette to remove the component. The selected [Control sensor] is the sensor that will control the closed loop heating process of the profile. All five of the systems sensors are listed but only one can be selected to control the process. [TL] is the melting point of the solder alloy that is used.

This temperature serves as the reference value for calibration and the pipette reminder message is displayed during a desoldering profile eight degrees after the [TL] set point. (Top radiator and bottom radiator see section 6.4.2) The values 0 – 15 are permitted as [Energy level]. 0 means OFF, 15 means maximum output. [Position] Pin 1 is indicating to the operator the orientation in which the PCB should be placed into the PCB rails. [X-axis] and [Y-axis] indicate to the operator where the PCB rails should be positioned over the bottom radiator. Thus the complete solder process can be documented and the reproducibility of the soldering results can be increased.

6.4.2 Setting the [Heating Zone Configuration]



For the IR/PL 650 XL the individual zones of the upper heating element and the lower heating element are selectively activated or deactivated. Click on [Upper heating element] or [Lower heating element] for this. The configuration dialog displayed below will open for the heating element.

A simple mouse click on the individual zones activates them (red), or deactivates them (blue). Click on the [OK] button to transfer the settings to the profile.

Each bottom heating zone has a related power control to set the maximum heating rate for the zone individually.

6.4.3 Saving, loading, and managing profiles

Component	Profile type	Sensor	Unit	Cal.	Limit f
native surface	Soldering profile	IRS	°C	☐	☐
ry sensitive surface	Soldering profile	IRS	°C	☐	☐
mass	Soldering profile	IRS	°C	☐	☐
sensitive	Soldering profile	IRS	°C	☐	☐
native surface	Soldering profile	IRS	°C	☐	☐
ry sensitive surface	Soldering profile	IRS	°C	☐	☐
mass	Soldering profile	IRS	°C	☐	☐
sensitive	Soldering profile	IRS	°C	☐	☐
	Soldering profile	IRS	°C	☐	☐

Profiles can be permanently saved, called and reused. For this the required settings are activated for the profile. To identify profiles it is strictly necessary that board, component and a name are entered for the profile.

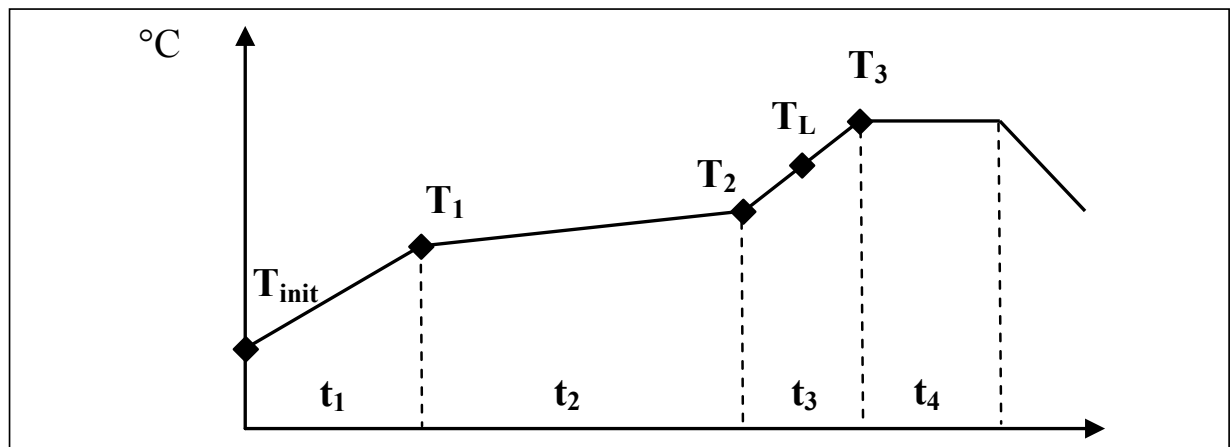
All profiles are stored in the [IRSoftDB.mdb] file in the installation directory.

- The [Delete] button erases profiles from the list.
- Existing profiles can be modified. By using the [Overwrite] button the changes will be saved to the profile table.
- A new profile can be permanently saved in the data via the [Add] button.
- With the [Activate] button, profiles will be transferred to the system.

	Name	Board	Component	Profile type	Sensor	Unit	Cal.	Limit function	IRS
1	Basic bended Linear LF	Heavy mass	Sensitive surface	Soldering profile	IRS	°C	☐	f_x	i
2	Basic bended Linear Sn	Heavy mass	Sensitive surface	Soldering profile	IRS	°C	☐	f_x	i
3	Basic LF, THT	THT or mixed board	THT, very sensitive	Soldering profile	TC1	°C	☐	f_x	i
4	Basic Linear LF 1K/s	Light and medium mass	Light and medium mass	Soldering profile	IRS	°C	☐	f_x	i
5	Basic Linear SnPb 1K/s	Light and medium mass	Light and medium mass	Soldering profile	IRS	°C	☐	f_x	i
6	Basic SnPb, THT	THT or mixed board	THT, very sensitive	Soldering profile	TC1	°C	☐	f_x	i
7	Basic soak LF	Medium, heavy mass	Medium mass, not	Soldering profile	IRS	°C	☐	f_x	i
8	Basic soak LF	Medium, heavy mass	Medium mass, not	Soldering profile	IRS	°C	☐	f_x	i
9	Basic soak SnPb	Medium, heavy mass	Medium mass, not	Soldering profile	IRS	°C	☐	f_x	i
10	ERSA Demo 1	Demoboard groß	BGA 255	Soldering profile	TC1	°C	☐	f_x	i

6.4.4 Parameters of Rework Profiles

The parameters [T init], [t1], [T1], [t2], [T2], [t3], [T3] and [t4] define the soldering process. They



describe the temperature-time profile the system is running during operation.

[T init]: marks the initial stating temperature for the process,

[t1], [T1], [t2], [T2]: define the preheating phase,

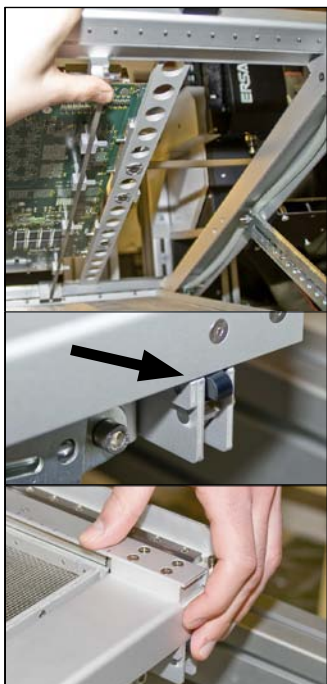
[t3], [T3], [t4]: characterize the peak zone,

[T_L]: marks the melting temperature of the used solder and ranges in between [T2] and [T3].

6.4.5 Desoldering a component



- Place the PCB in the frame of the IR 650 and fix it in place. In many cases it is necessary to use the PCB support, to prevent bending of the PCB.



- The X-Y table can be lifted by releasing it on both sides. The butterfly mechanism allows bottom side access to the PCB. Move the X-Y table to the very front for best access.

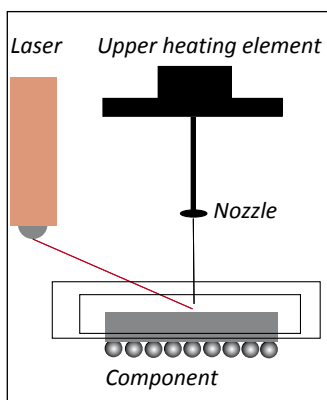


- Cover the surrounding heat-sensitive components and plug connectors with reflecting tape. Switch on the laser via the button  in IRSoft.



Note:

For higher positioned components it is necessary to adjust the laser pointer. Because the laser beam (as shown in the illustration) hits the component from the side, the discharge point of the laser changes for components of different height.



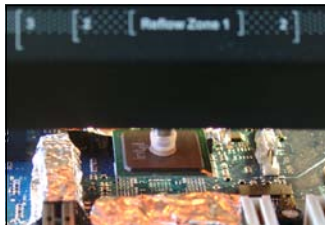


- Select a suitable desoldering profile for the assembly and activate this profile in the [Profile table].

Then push the start button  in the operating controls for the IR/PL 650 XL. The IR 650 now runs the desoldering profile.



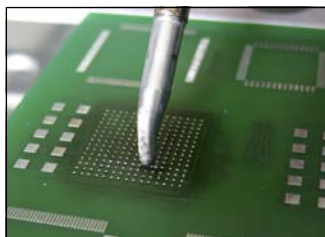
- A short time before reaching the melting point the vacuum pump in the IR 650 starts automatically. When you detect the melting via the RPC camera, place the nozzle on the component as shown in the photo. Additionally IRSoft will open a window reminding the operator to activate the pipette.



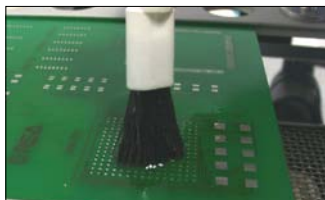
- The extraction head automatically lifts the component from the PCB. The cooling starts automatically and cools down the PCB. The top side cooling fan speed is adjustable via IRSoft.



- The air volume of the bottom side is adjustable by setting the air pressure on the left side of the power cabinet.

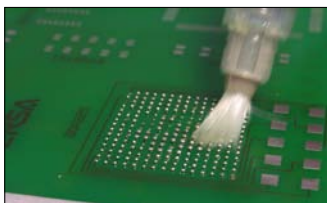


- Remove the residual solder from the PCB. For this operation Ersas supplies different high performance soldering stations like the i-CON family along with various soldering and desoldering tips
Please refer to www.ersa.com

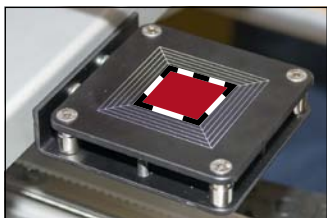


- Loosen the flux residues with flux remover. Remove residues with a fleece cloth.

6.4.6 Placing the component and soldering



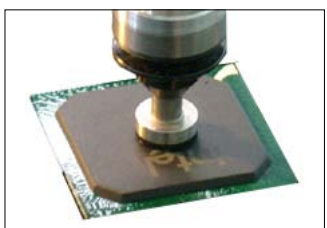
- Apply new flux on the solder joints of the PCB. If required use mini-stencil or dispenser system to apply new solder paste onto the pads.



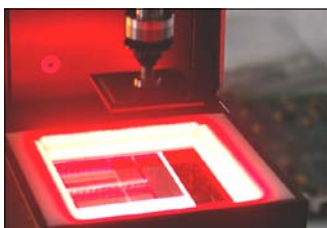
- Place the component in the component pick up tray of the placement unit. Then adjust the guide plates in such a manner that the component is precisely in the middle.

- There are two ways to pick a component. The easiest way is to activate the [Auto Pick & Place] option.

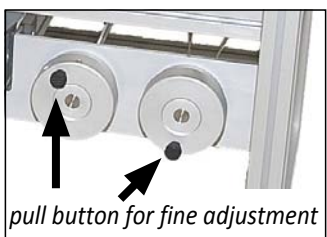
Push the button  in the dialog and the system will automatically grab the component to place. For very sensitive components or special applications picking and placing by use of the position table might be required.



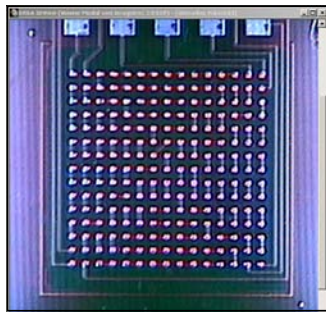
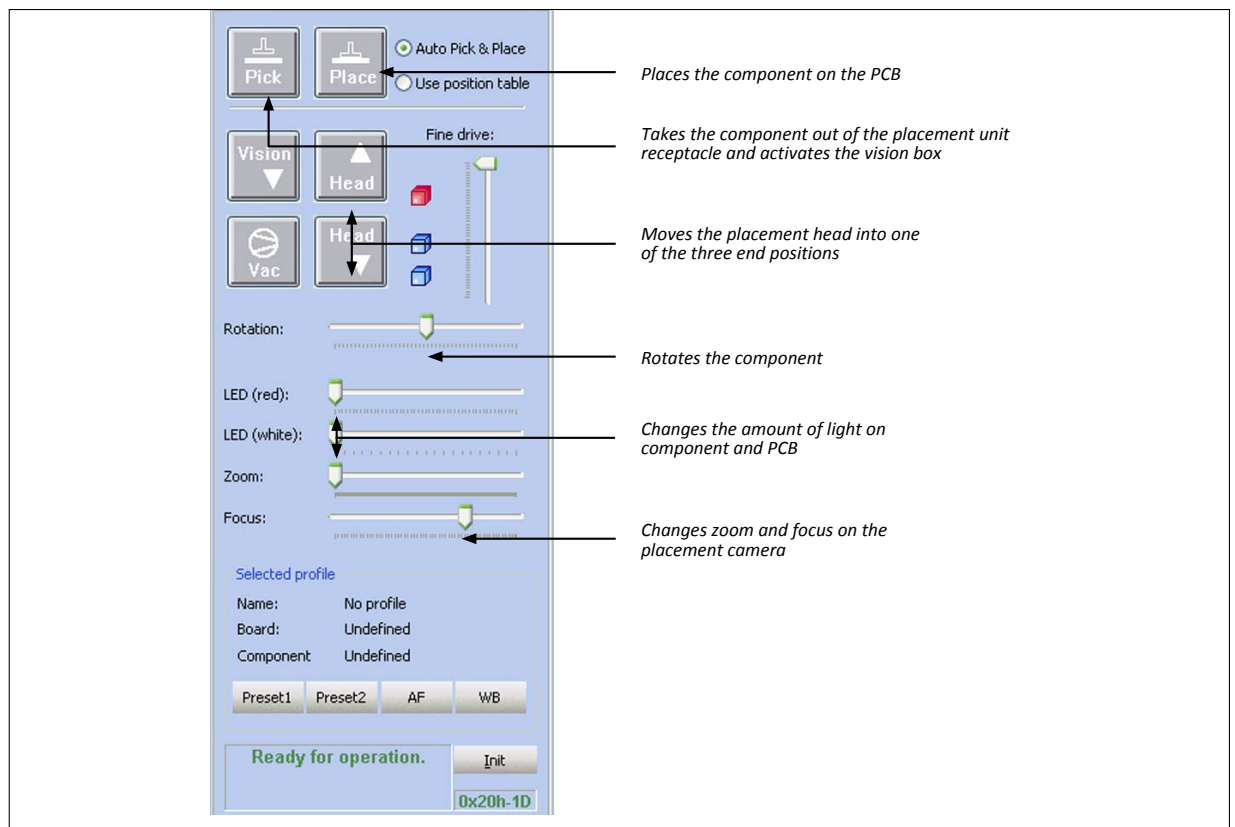
- The placement head picks up the component automatically and moves up.



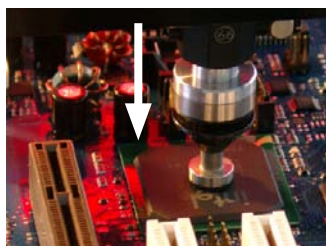
- When the component is picked, the vision box automatically moves forward and shows a view of the landing area of the component and of the PCB on the screen.



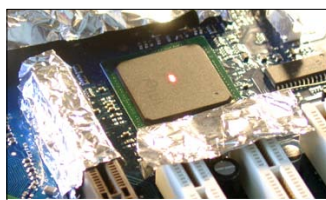
- Adjust the movement table so that the landing area of the component matches the solder contacts on the PCB. Then make the fine adjustment with the fine adjustment screws. To rotate the component you must use the IRSoft operating controls. The functions in this dialog are explained here.



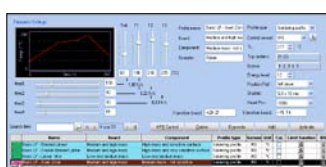
- If the footprint of the component precisely matches the pads on the PCB, press the [Place] button .



- The component will then be placed automatically on the PCB.



- To run the soldering process, move the table to the working position on the IR system. Activate the laser on the IR 650. Position the PCB so that the laser points to the middle of the component.



- In this dialog select a suitable soldering profile for the assembly and activate this profile. Then push the [Start] button  in the operating controls for the IR 650. The IR now runs the soldering profile.

6.4.7 The optimal profile

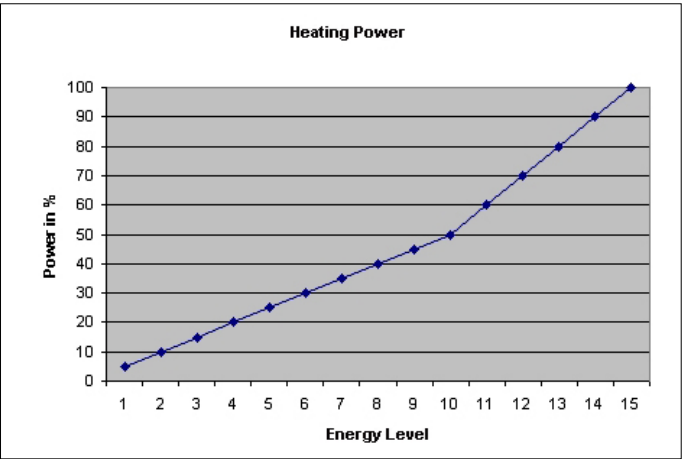
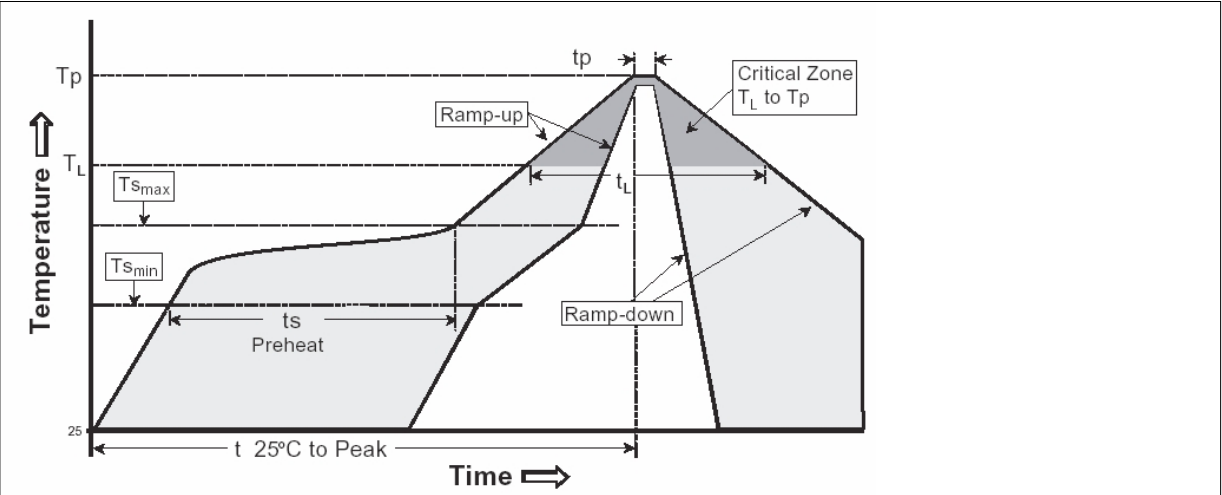
In order to achieve optimal results with the IR 650 Rework System, the following instructions must be complied with.

Solder profile in [Closed Loop Adjustment]

The selected adjustment sensor will generate the selected temperature profile for each assembly, with due consideration of the threshold value sensors. In this process the thermal capacity of the assembly must be taken into account. Basically for rework processes profile data should be set according to [IPC/JEDEC J-STD-020C]. In addition recommendations made by the component manufacturer, and the producers of the solder paste and flux must also be complied with.

Basically the thermal requirements for the solder process increase with an increase in the following parameters.

- Size of the component to be soldered
- Size of the PCB
- Thickness of the PCB (multi-layer)
- Solder melt temperature



Energy level of the lower heating element	Power in %
1	5
2	10
3	15
4	20
5	25
6	30
7	35
8	40
9	45
10	50
11	60
12	70
13	80
14	90
15	100

Heating zones, energy level, final temperature and peak hold time must be adapted to the respective application.

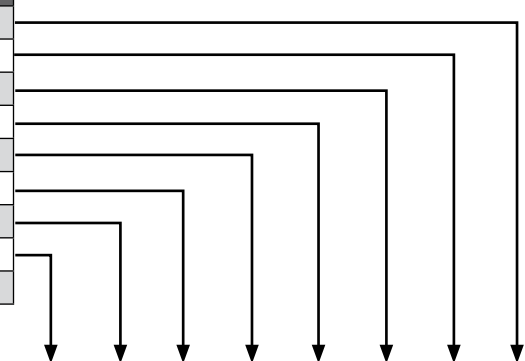
For each heating zone 1-5 an individual boost mode can be set (0-100%) see chap 6.4.2.

Standard profile Ers IR 650

Profile type*	Profile name	Application
Desoldering, linear	Profil 1 SnPb	Large PCB with low mass
Desoldering, saddle	Profil 2 SnPb	Large PCB with high mass
Soldering, linear	Profil 3 SnPb	Large PCB with low mass
Soldering, saddle	Profil 4 SnPb	Large PCB with high mass
Desoldering, linear	Profil 5 LF (SAC)	Large PCB with low mass
Desoldering, saddle	Profil 6 LF (SAC)	Large PCB with high mass
Soldering, linear	Profil 7 LF (SAC)	Large PCB with high mass
Soldering, saddle	Profil 8 LF (SAC)	Large PCB with high mass
* These profiles may differ in different software releases		

These sample profiles are meant as suggestions for the user when creating profiles. The optimal profiles in practical application can significantly deviate from these profiles. In particular the following parameters must be checked individually for each PCB:

- Active heating zones for upper and lower heating elements
- Peak temperature [T3]
- Solder melt temperature [TL]



time 1	70	70	70	45	60	60	60	25
time 2	90	70	90	45	70	60	70	45
time 3	15	15	10	10	10	15	10	10
time 4	0	0	0	0	0	0	0	0
Tinit	70	70	70	70	60	60	60	30
T1	175	140	175	140	150	120	150	80
T2	210	210	210	210	175	180	175	170
T3	230	230	225	225	205	205	200	200
TL	217	217	217	217	183	183	183	183
Energy	12	11	11	10	9	8	8	7

7. Troubleshooting

Problem	Possible cause	Problem solution
The IR system is not functioning:	Power cable is not plugged in. Device fuse defective. EMERGENCY-STOP active.	Connect the power cable to a power outlet. Check / replace the device fuse. Switch EMERGENCY-STOP button to I.
The IR 650 display shows <STOP>	USB cable not plugged in correctly. The device is not detected by the PC. The driver has not been installed. Incorrect interface setting.	Connect the USB cable to the device and PC. Check whether the device appears in the system control. Install the driver as described in the Online Help. Make the interface settings as described in the Online Help.
The IR 650 display shows <Inf0>	The device is too hot.	Ensure adequate device ventilation. Reduce the energy level if possible.
The IR 650 display shows <Inf6>	The regulating sensor does not register any change in temperature although the system is heating.	Ensure that the thermocouples are intact and that they are aligned to the measurement object.
The IR 650 display shows <Err1>	IR head end switch does not supply a signal. IR head is mechanically blocked. Motor is defective.	Remove the obstacle in the movement range of the IR head. Replace motor.
The IR 650 display shows <Err7>	Error external thermocouple 1.	Ensure that an intact thermocouple is connected.
The IR 650 display shows <Err8>	Error external thermocouple 2.	Ensure that an intact thermocouple is connected.
The IR 650 display shows <Err9>	Parameter in the EEPROM is damaged.	Push the [Stop] button. This resets the error message. If it appears again then the control card must be replaced.
An aggregate (compressor, fan, etc.) does not switch on.	A defect of the respective aggregate.	Open the IRSoft status display. Check whether the software activates the aggregate. If yes then the respective aggregate must be replaced.

8. Maintenance

**Note:**

Use only genuine Erska consumable items and spare parts to maintain reliable function and the warranty.

**Attention:**

Device housing parts can still be very hot after the device is switched off. Only perform cleaning work on the device when it is turned off and it has cooled down. Do not use any solvent-containing cleaning agents.

8.1 Cleaning

8.1.1 IR 650 module

A dry or slightly damp cloth is recommended for cleaning the device. The component tray can be cleaned of residual solder and flux splashes with dull hard object and a cloth.

8.1.2 PL 650 module

Make sure that the optical components of the camera module are free of dirt and grease.

Depending on the degree of soiling, perform the following maintenance operations:

- Using a moist cloth and mild household cleaner, remove solder paste and flux residue as well as dust from the system.
- Clean the camera lens and the beam splitter of the vision box using the Optical System Cleaning Kit (OVSLC100).
- Clean the guide rods of the placement head and the guide rails of the PCB holder with a lightly oiled cloth. Recommended oil for the fine drive z-axis: Interflow fin super oil 8019.
- Regularly check the mobility of the rack and pinion drive at the placement head and if necessary re-grease the rack and pinion.
- Replace the vacuum filter of the pump unit if it is visibly soiled or if the vacuum is too weak.

8.1.3 Replacing a silicone suction cup on the IR 650 module

To replace a worn silicone suction cup, switch the device off and wait until the vacuum nozzle and the upper heating element have cooled down. Pull the silicone suction cup down and off of the vacuum pipette and replace it with a new unit.

Suction cups with a diameter of 2 mm and 3.5 mm can be mounted by use of a special adapter (0IR5500-44)!

9. Spare parts and consumable items

Although Ersä IR Rework Systems are manufactured with the utmost care, malfunctions or failures of individual components can occur. This list is provided as an aid for quick identification and replacement of defective parts. Important accessories and wearing parts are also listed.

9.1 Ersä IR/PL 650-XL

Spare parts	Order number
Controller board for IR 650	0IR6500-02
Display board for IR 650	0IR6500-03
Power distribution board	0IR6500-05
IR Top radiator 1400 W/48 V AC	0IR6500-09
IR Bottom radiator 400 W/230 V	0IR6500XL-02
Geared motor for IR650A	0IR6500-06
Vacuum pump	0IR5500-10
IRS Module complete with Laser	0IR6500-07
Laser diode	0IR5500-22
IRS Sensor module with micro plug	0IR6500-24
Gear wheel for motor IR650A	0IR6500-08
Nozzle, complete	0IR6500-12
Shutter blade set complete for IR650A	0IR6500-13
Component tray	0IR6500-18
Rework Process Camera RPC650A	0VSRPC650A
ACCUTC sheath thermocouple (class 1 "recommended")	0IR6500-01
ACCUTC sensor w10 fixture	0IR6500-37
Cable USB A-B	3ET00241
Frame Grabber FALCON	3VSFG100-02
Cinch video cable	3ET00250
Connection current limiter	0IR6500-19
Control transformer for IR650A	3ETRAF0048
Power transformer for IR650A	3ETRAF0049
Solid state relay	0IR6500-20
3/2 direction control valve + aluminium block	0IR6500-21
Pneumatic valve 230V-XL (bottom side cooling)	0IR6500XL-03
Support rail XL (lower - without support pins)	0IR6500XL-04
Support rail XL (top - without support pins)	0IR6500XL-05
Support pin XL (lower)	0IR6500XL-06
Support pin XL (top)	0IR6500XL-07
PCB holder XL complete	0IR6500XL-08
Replacement fuse set	0IR6500-22

Accessories and consumable items IR 650	Order number
Filter unit complete	0IR4500-23
Reflective tape 25 mm x 1000 mm	0IR4500-40
Capton tape	0IR4500-07
PTFE tape	0IR6500-46
Thermocouple wire k-type with plug	0IR4510-02
Operating manual IRPL 650A-XL plus CD-version	3BA00144
Operating manual IRPL 650A-XL DE/EN	3BA00187
Silicone suction cups, 8 mm	0IR4520-01
Silicone suction cups, 5 mm	0IR4520-02
Silicone suction cups, 2 mm	0IR4520-03
Viton® suction cups, 8 mm	0IR4520-04
Viton® suction cups, 5 mm	0IR4520-05
Viton® suction cups, 2 mm	0IR4520-06
Suction cup adapter	0IR5500-44
<i>Viton® is a registered trademark of DuPont Dow Elastomers</i>	

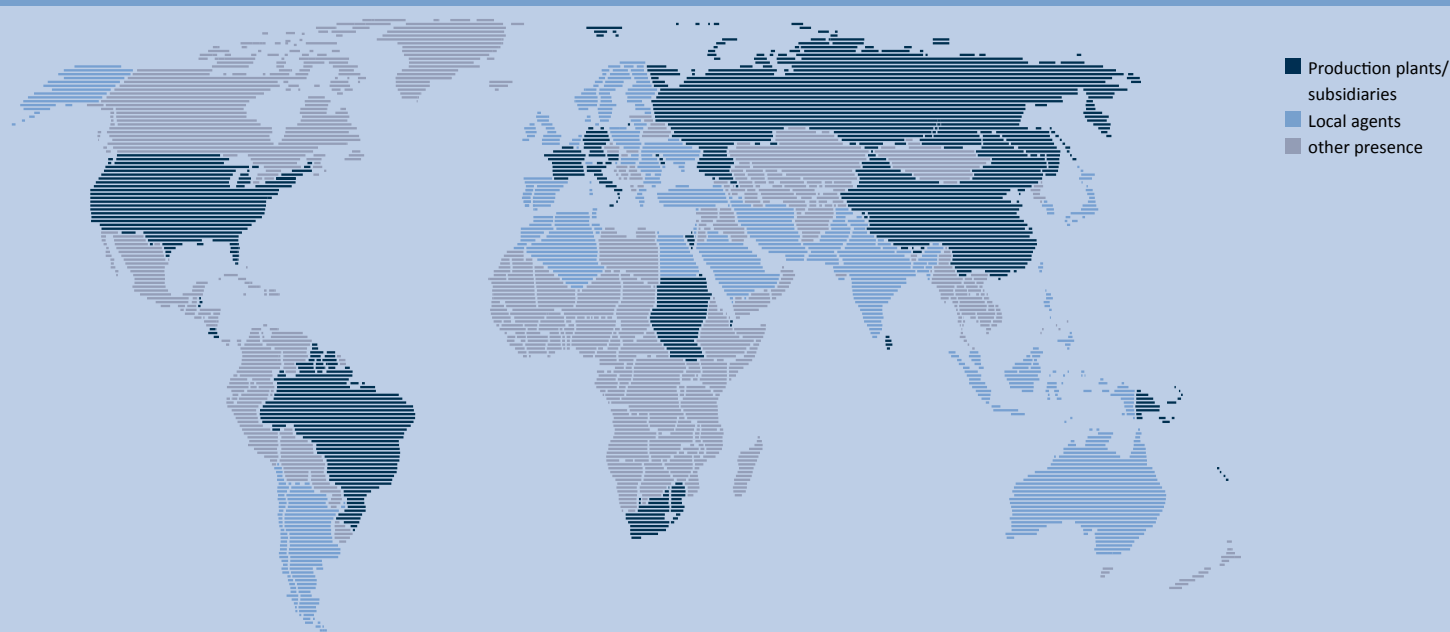
9.2

Ersa PL 650

Spare parts	Order number
Control card for PL650A	0PL6500-02
LED vacuum display for PL650A	0PL6500-03
Vacuum valve for PL650A	0PL6500-04
Rotation motor for PL650A	0PL6500-05
Z-Motor fine adjusted gear for PL650A	0PL6500-06
Z-Motor insertion head for PL650A	0PL6500-07
Vision box complete for PL650A	0PL6500-08
Motor vision box complete for PL650A	0PL6500-09
Sensor for vision box for PL650A	0PL6500-10

Accessories and consumable items PL 650	Order number
Split optic for PL650A	0PL6500-11
Nozzle Ø 0.8 mm	0PL6500-13
Nozzle Ø 1,2 mm	0PL6500-14
Nozzle Ø 3 mm	0PL6500-15
Nozzle Ø 4 mm	0PL6500-16
Nozzle Ø 10 mm	0PL6500-17
Nozzle Ø 10 mm, rubber lined	0PL6500-18
Optical System Cleaning Kit	0VSLC100

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