

# HR 500

# Rework-System



Translation of the original operating manual: 3BA00246-01 | Serial  
No.: .....

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## 1 Introduction

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## 1.1 Product information

### 1.1.1 General information about the product

This operating manual is universally valid for Ersa Hybride-Rework-System of the HR 500 series.

### 1.1.2 Intended use

The machine was built according to the current state of the art and the recognised safety rules. However, the machine may pose some residual risks, in particular if it is improperly operated by untrained staff or not used as intended. The Rework System HR 500 is intended for industrial indoor use. The machine is intended exclusively for soldering and desoldering electronic components on PCBs. Any other or additional use shall be considered improper. The manufacturer / supplier shall not be liable for any resulting damage. Proper use also includes compliance with the operating instructions including those concerning safety.

### 1.1.3 Retrofitting, changes

Unauthorised conversions, changes to hardware and software and additional software installations are not permitted and exclude any liability or warranty on the manufacturer's / supplier's part for any resulting damage. The machine is designed exclusively for industrial use only. In principle, no private use is allowed.

### 1.1.4 Warranty

The warranty period shall be compliant with ERSA GmbH applicable terms of sale, delivery and payment. ERSA GmbH may only grant a warranty if the unit is returned in its original packaging.

Any inappropriate use and improper operation on the unit shall void all warranty and liability claims of the buyer against the manufacturer.

To the extent permitted by law, liability for direct, consequential and indirect damage resulting from the purchase of this product is ruled out.





## 1.2 Information about this manual

### For your safety

ERSA products are developed, manufactured and tested in compliance with the basic safety requirements.

### Nevertheless, residual risks still exist!

For this reason, please read these operating instructions before operating the machine for the first time. The instructions manual helps you master all the functions and use them optimally.

### **DANGER**

#### Hazards caused by the improper operation of the machine!

✓ Observe the operating instructions!

- a) Any person involved in the installation, commissioning, operation and/or maintenance of the machine must have read and understood the contents of chapter "Safety instructions", as well as the chapters which are relevant for the specific activity!
- b) The operator is advised to have this confirmed in writing!
- c) In addition, for the machine operation, local safety and accident prevention regulations must also be complied with!
- d) Always keep these instructions near the machine, in a place accessible to all users at any time!





### 1.2.1 Pictogram and symbol explanations

Pictograms are used to identify dangers, both in this instruction manual and on the machine.

Specific information or requirements and prohibitions for the prevention of personal injury or property damage are shown in the manual with a pictogram, and are complemented in the text by **hierarchically graded, signal words in bold print**:



#### **⚠ DANGER**

**It describes an *immediately* threatening danger**

If not avoided, death, serious injury or material damage can result.

- a) Measures are described in the following text to avert the danger.



#### **⚠ WARNING**

**It indicates a *potentially* threatening danger**

If not avoided, death, serious injury or material damage can result.

- a) Measures are described in the following text to avert the danger.



#### **⚠ CAUTION**

**It indicates a *potentially* threatening danger**

If not avoided, death, serious injury or material damage can result.

- a) Measures are described in the following text to avert a danger.



#### **NOTE**

**The hereinafter highlighted text passages contain explanations, further information or tips.**



### 1.2.1.1 Prevailing term definitions in this instruction manual

In addition to the pictograms described above, we use the following symbols and notations:

#### Safety instructions

- ✓ This symbol means: **Prerequisite** to avert a danger.
- a) This symbol means: **Measures** to avert a danger.

An example:



#### NOTE

##### Machine malfunctions caused by improper maintenance!

- ✓ Shorten service intervals, if necessary!
- a) Service intervals in this manual refer to single shift operation! They are to be shortened accordingly for multi-shift operation!

#### Operating instructions

the operating instructions contain:

- references to the measures to be adopted

or

- instructions to be followed by all means.

#### The operating instructions are structured as follows:

- ✓ this symbol means: **prerequisite** for the implementation of a measure **or**
- ✓ **aim** of a measure.
  - a) This symbol means: **description** of a measure.
    - ⇒ This symbol means: **intermediate result**.
  - ⇒ This symbol means: **result**.

#### An example: pressure adjustment

- ✓ Remove the cover panel.
  - a) Adjust the (A) regulator air pressure to 2.5 bar.
    - ⇒ The symbol on the screen turns green.
  - b) Reinstall the cover panel.
    - ⇒ The air pressure has been properly set.



### 1.2.1.2 Warnings

We use the following pictograms for warnings:



**⚠ WARNING**

Dangerous electrical voltage! Danger of electrocution!



**⚠ WARNING**

Hot surfaces, hot gases! Burn hazard!



**⚠ WARNING**

Laser beam! Risk of retinal burns!



**⚠ WARNING**

Risk of injury! Hand injury risk!



### 1.2.1.3 Rule notices



#### NOTE

Read the operating instructions!



#### NOTE

Wear protective goggles!



#### NOTE

Disconnect power!



#### NOTE

ESD-hazardous components!



#### 1.2.1.4 Prohibition notices

We use the following pictograms for prohibition notices:





### 1.2.2 Target readers group

These instructions are intended for people who use, adjust, operate or service the machine.



#### **DANGER**

##### **Personal injury or material damage due to inadequate maintenance and improper operation of the machine!**

- ✓ Use only qualified personnel!
- a) The machine transport, assembly, connection, commissioning, operation or maintenance by people who are not sufficiently qualified and informed can cause severe damage to the machine or damage to people.
- b) Such work may therefore only be performed by properly trained personnel! This personnel must be able to recognize the hazards that can be caused by the system mechanical, electrical or electronic equipment.
- c) The people who carry out such work must know and have understood the contents of these instructions.
- d) Any person involved in the installation, commissioning, operation and/or maintenance of the machine must have read and understood the contents of the "Safety instructions" chapter, as well as the chapters which are relevant for the specific activity!

### 1.2.3 Copyright, liability

Ersa has written these operating instructions with great care. However, no guarantee can be given as to the content, completeness and quality of the information provided in this manual. The content is continually updated and adapted to current conditions.

All the data published in these operating instructions, including the information provided about products and procedures, was identified by us to the best of our knowledge and ability, and using the most modern technical aids. These specifications are non-binding and for information only; they do not relieve users from the responsibility to carry out their own checks before operating the equipment. We accept no liability for any infringement of third party rights for applications and procedures without prior express written confirmation. We reserve the right to make technical changes with the intention of improving the product.

To the extent permitted by law, liability for direct, consequential and indirect damage resulting from the purchase of this product is ruled out. All rights reserved.

These operating instructions, or any parts thereof, may not be reproduced, modified, transferred or translated into another language without the written permission of ERSA GmbH!



#### **NOTE**

##### **The original operating instructions were drawn up in the [German] language**

The original operating instructions in German are contained in the [\\ERSA\product\_data\049\] folder on the drive of your machine PC. All other available languages are translations of the original operating instructions. Should any discrepancies occur in the translated text, consult the original operating instructions (German) for clarification or contact the machine manufacturer.







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## 2.1 General data

Description	
Width (mm)	650
Depth (mm)	660
Height (mm)	693
Weight (kg)	approx. 55

## 2.2 Electrical connection

Designation	
Mains voltage, 3-wire network L/N/PE (VAC)	230
Voltage tolerance (%)	± 10
Mains frequency (Hz)	50 - 60
Fuse (A)	10
Power consumption (kW)	2,6
Connection	Connector

## 2.3 Heating system

### Bottom radiator

Designation	
Heating type	Keramic heating elements, medium wave, infrared, reactive
Radiator cassette dimensions (width x depth, mm)	270 x 270
Number of heating zones	2
Rated output (kW) at 230 V	1.6 (4 x 0.4)

### Top radiator

Designation	
Heating type	Hybrid radiator, IR radiator in ceramic seat, medium wave, with blower
Component handling	Built-in pipette, motorised
Dimensions (width x depth, mm)	80 x 80
Rated output (kW) at 230 V	0.9, infrared
Baffle insert (mm)	30 x 30, 45 x 45 (always available as optional equipment)

### Temperature sensors

Designation	
Sensor type	AccuTC sheath thermocouple, type K
Additional inputs for K-type thermocouples	1



## 2.4 Axis system

Designation	
Type	Precision rail guide with step motors
Axles	Z pipette
Repeat accuracy (µm)	± 25
Nozzle diameter (mm)	5 and 10, optional 3.3, 2 and 1

## 2.5 Cameras

### Visionbox pick-and-place camera

Designation	
Type	Colour camera
Resolution (Mpixel)	5
Interface	GigE
Lighting	White diffuse circuit board lighting Red diffuse component lighting
Laser pointer	Laser Class 2

## 2.6 Printed circuit boards and components

Description	
PCB cooling from below	Blower
Max. PCB size (width x depth, mm)	300 x 373 (11.8" x 14.7")
Min. PCB size (width x depth, mm)	10 x 10 (0.4" x 0.4")
Max. PCB thickness (mm)	6 (0.24")
Max. PCB mass (kg)	2
Min. component dimensions (mm)	1 x 1 (0.39" x 0.39")
Max. component dimensions (mm)	50 x 50 (2.0" x 2.0")
Typ. operating distance above (mm)	40 (1.6") to upper heating 45 (1.8") to Visionbox 35 (1.4") to lower heating

## 2.7 PC system requirements

For the PC configuration required for your Rework System, refer to the PDF document

[3BA00212\_PC-Setup-Recommendation\_Ersa-IRSoft-HRSoft-ImageDoc.pdf].

This document can be found on the Ersa Rework USB stick (3BA000149).

## 2.8 Ambient conditions

Designation	
Ambient temperature (°C)	20...25, constant
air humidity (% , non condensing)	40...60





## 2.9 Options

The following items are available as options (not included in the scope of delivery):

	Description	Item number
	Nozzle Ø 1 mm, metallic *	OHR5520-05010
	Nozzle Ø 2 mm, metallic *	OHR5520-10020
	Nozzle Ø 3.3 mm with silicone cup Ø 2 mm **	OHR5520-20033
	RPC camera	OHR510
	Dip & Print station	OPR100
	Dip stencil 40 x 40, 0.3 mm	OPR100-D001
	Dip stencil 40 x 40, 0.1 mm	OPR100-D004
	Thermocouple mount V2	OHR641
	Air deflector 30 x 30	330692
	Air deflector 45 x 45	330694
	Component tray	OIR6500-18
	Support rail with two pins	OHR504-01





	Description	Item number
	AccuTC 2.0 thermocouple	OHR645
	K-type thermocouple wire with plug	OIR4510-02

\* Metal, long service life, several months to years. Cleaning with isopropanol. Treat carefully.

\*\* Metal nozzle, long service life. Replace silicone suction cups after 10-30 desoldering processes.

The following devices can be connected to the HR 500 unit. They can be controlled via the HR 500 unit:

	Description	Item number
	Fume extraction Ersas EASY ARM 1 (Through flow volume 110 m <sup>3</sup> /h)	OCA10-001
	Fume extraction Ersas EASY ARM 2 (Through flow volume 2 x 110 m <sup>3</sup> /h)	OCA-10-002
	Modular cable, 2 x RJ12, 2 m	317096





## 3 For your safety

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### 3.1 General safety instructions

#### 3.1.1 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.

#### 3.1.2 Fire protection

- a) The machine is to be assessed for fire protection requirements at the installation site.
- b) Locally applicable fire protection regulations must be observed.

### 3.2 Subject-related safety instructions

#### 3.2.1 Dealing with electrical equipment



#### **⚠ 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) Before opening any housing parts, remove plug from mains!
  - b) Use only original fuses with the specified current rating.
  - c) Use only insulated tools.
  - d) In case of faults in the power supply, switch off the system immediately.

#### 3.2.2 Dealing with process materials and substances



#### **⚠ 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!

### **3.3 Safety instructions for certain operating phases**



### **⚠ 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!

### **3.4 Safety instructions for maintenance, service, specific work, troubleshooting**



### **⚠ 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!



### **NOTE**

#### **Disposal**

- a) Provide safe and environmentally friendly disposal of packaging materials!



### 3.5 Safety instructions for certain machine and system parts

#### 3.5.1 Hot device



#### CAUTION

**Risk of burns from hot surfaces!**

- a) Touching the device surfaces may cause burns!

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts become strongly heated during the soldering process!

#### 3.5.2 Laser equipment



#### DANGER

**Laser beam! Risk of injury due to retinal burns**

- a) Do not stare into the laser beam!
- b) Do not point the laser beam at other people! Reflecting surfaces under the laser generate reflections!
- c) Class 2 laser according to DIN EN 60825-1:2008-5,  $P < 1 \text{ mW}$ ,  $\lambda = 650 \text{ nm}$

#### 3.5.3 Using a solder fume extractor, plug available



#### NOTE

**Use the soldering fume extraction system!**

Solder fumes are hazardous to health. For this reason, a soldering fume extraction system should always be used. As regards the type of soldering fume extraction system, we recommend using the Ersas "Easy Arm" with prefilter, HEPA, particle filter and activated carbon filter. The device is equipped with a suitable connection for the soldering fume extraction system. The soldering fume extraction system prevents the device from accumulating dirt quickly.

#### 3.6 Retrofitting and changes

Any unauthorised alterations and/or changes that may affect the machine safety are prohibited and relieve the manufacturer / supplier of any liability for any resulting damages.



#### WARNING

**Personal injury or property damage and environmental damage caused by the machine defective condition!**

- ✓ So, please always make sure that retrofitting or modifying the machine does not pose any problem:
- a) Prior to making any changes to the machine, or altering its parameters, contact the machine manufacturer!



## 4 Transport, installation, storage, disposal

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#### 4.1 Information concerning machine transport and storage

##### CAUTION

###### Material damage is possible!



- ✓ The machine is supplied in a sturdy carton on a pallet. Damage caused by improper storage or improper transportation is not covered by warranty!
- a) Always transport or store the machine in a box on a pallet!
- b) During the machine transport, avoid any jerky movement, abrupt setting-down or bumping!
- c) During storage, protect the machine from weather conditions (moisture, humidity, sea air, fog)! If required, provide the machine with dehumidifying agent and air tight packaging!

#### 4.2 Information on how to unpack the machine

##### CAUTION

###### Risk of injury!



- a) To unpack always use proper tools!
- b) Use suitable protective clothing!

##### NOTE

###### Disposal



- a) Provide safe and environmentally friendly disposal of packaging materials!

##### NOTE

###### Find out and ascertain any transport damage



- a) Inspect the machine for any transport damage immediately after unpacking it.
- b) Immediately notify the forwarder any transport damage.

#### 4.3 Packaging with TIP n TELL indicator



- ✓ To check a package equipped with TIP n TELL tilt indicator:
  - a) check all the TIP n TELL stickers available.
  - b) If the indicator is not coloured, this means that: the machine was properly transported.
  - c) If the indicator has turned blue, this means that: during transport the machine was excessively tilted.
  - d) If the indicator has turned blue, this must be specified in the consignment note!

Fig. 1: Indicator not coloured



#### 4.4 Scope of delivery



### NOTE

#### Is delivery not complete or are there any damaged parts?

Check the delivery for completeness. If any items are missing or damaged, contact the supplier!

Number	Description	Item number
1	HR 500 rework system	3HR500
1	Thermocouple mount V2	0HR641
1	AccuTC thermocouple without fixture *	0IR6500-37
1	RJ45 patch cable, 2.0 m	315664
1	Nozzle $\varnothing$ 10 mm with silicone cup $\varnothing$ 8 mm **	0HR5520-80100
1	Nozzle $\varnothing$ 5 mm with silicone cup $\varnothing$ 3.5 mm **	0HR5520-35050
1	USB flash drive Rework	3BA00149
1	Calibration target 12 x 0,5 mm, blank	344244
1	HR 500 instruction manual	3BA00246

\* Long service life metallic thermocouple. Cleaning with isopropanol. Do not bend. Months-to-years service life.

\*\* Metal nozzle, long service life. Replace silicone suction cups after 10-30 soldering processes.



## 4.5 Unpacking, setting up and connecting the Rework System

### 4.5.1 Unpacking

- ✓ Two people are required for lifting the Rework System:
  - a) Carry the Rework System in its carton box, on a pallet, to the place of installation.
  - b) Open the fastening tapes of the carton with a scissor and remove the upper part of the carton box.
  - c) Remove the top foam packaging.
  - d) Remove the accessories from the packaging.

We recommend storing the packaging material for later use. The Rework System can be safely packed, stored and transported only with this packaging material.

### 4.5.2 Set up



#### **⚠ WARNING**

##### **Fire hazard, hazard due to heat accumulation!**

Personal or material damage is possible!

- a) Above, behind and next to the machine there must be no furniture (shelves, cabinets) or flammable products!
- b) The distance to the walls must be at least 10 cm.



#### **⚠ CAUTION**

##### **Danger of material damages**

The bottom heating is mounted on a soft support, therefore the Rework System cannot be lifted at the bottom heating.

- a) The Rework System cannot be lifted at the bottom heating or the components connected to it.



Fig. 2: Do not lift the Rework System at the bottom heating

- a) The Rework System should be grasped by two people at the authorized lifting points and lifted out of the carton box. The Rework System weighs about 55 kg.



b) Place the Rework System to the left of the table. The PC monitor, keyboard and mouse as well as their operational range will follow. The work table must meet the following requirements:

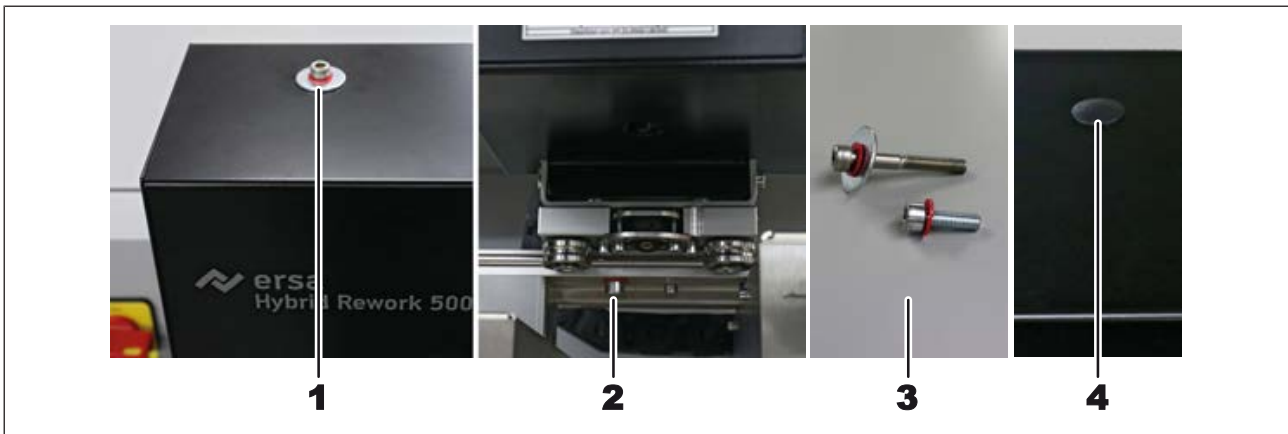
- ⇒ The table top must have a minimum width of 600 mm with a depth of 700 mm. The bottom heating protrudes area: forward and to the right every 150 mm, to the left 350 mm.
- ⇒ The table must be stable, levelled and designed for a load of at least 80 kg. The installation of the Rework System in a vibration-free location improves the work results.
- ⇒ Ensure that the floor area is level and a uniform load on the machine feet!

c) Please note the following points:

- ⇒ If the unit is transported to an environment with high temperature variations, it must be adjusted to room temperature for several hours before commissioning.
- ⇒ The unit must not be exposed to rapid temperature variations.
- ⇒ Keep the place of installation draught-free! Do not install the unit near ventilation ducts or air conditioning units.
- ⇒ A too bright lighting of the workplace (e.g. sun radiation or ceiling spot lights) may affect the functions of the camera.

### 4.5.3 Remove the transport lock

Remove the transport lock before commissioning:



- a) Unscrew the shipping/restraining bolt on the Rework System upper part (1).
- b) Unscrew the shipping/restraining bolt between the heating head and the Vision Box (2).

Keep the shipping/restraining bolts and the shims (3) in a safe place, in order to use them on the next machine transport. The shipping/restraining bolts must be screwed in again before transporting the Rework System.

- a) Close the opening on the machine upper side with the sealing plug included in the accessory package (4).

### 4.5.4 Connecting the machine

✓ Connecting the machine:

- a) remove all accessories from the packaging, unwrap them and lay them out.

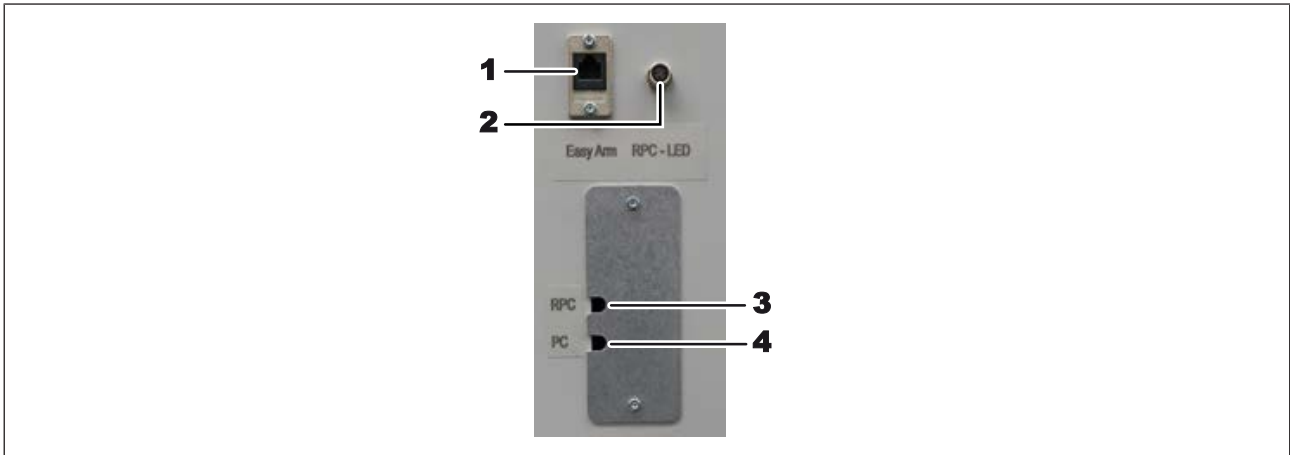


Fig. 3: HR 500 Connections

1	Connection of the optional solder fume extractor controller	3	Ethernet connection for optional RPC camera
2	Connection for optional RPC camera lighting	4	Ethernet connection for the PC network cable

- b) Make sure that the main switch on the front of the machine is in OFF position.
- c) Make sure that the local power supply and the mains frequency match the specifications on the type plate of the machine.
- d) Insert the mains plug into the socket.
- e) To connect the Rework Systems to the PC, insert the Ethernet cable (4) into the PC.

**As regards the pre-assembled AccuTC thermocouple:**

- a) Connect the thermocouple to the TC1 or TC2 socket on the right below the component tray.

**As regards the pre-assembled RPC camera:**

- a) Plug the lighting cable of the camera in port (2). Secure the plug with the coupling nut.
- b) Unscrew the screws of the cable cover plate using a 2.5 mm Allen key.
  - ⇒ The hub with its connections are now visible.
- a) Connect the Ethernet cable for camera connection to the Rework System into the port 4 of the hub. The PC is connected to port 5.
- b) Lead out the cables from the hub through the openings of the cable cover plate and screw the cover plate back on.

**In case of solder fume exhaust system „Ersa Easy Arm“:**

- a) Plug the modular cable (RJ-12, 2 m, order no. 317096) into the socket (1) of the soldering station.
  - ⇒ The fume extractor switches on automatically at working temperatures above 120° C.

For this purpose, please also read Chapter --- FEHLENDER LINK ---.





#### NOTE

##### **Use the soldering fume extraction system!**

Solder fumes are hazardous to health. For this reason, a soldering fume extraction system should always be used. As regards the type of soldering fume extraction system, we recommend using the Ersä "Easy Arm" with prefilter, HEPA, particle filter and activated carbon filter. The device is equipped with a suitable connection for the soldering fume extraction system. The soldering fume extraction system prevents the device from accumulating dirt quickly.



#### 4.5.5 Assembling an RPC camera (optional)

✓ If you purchased the optional [RPC camera]:

a) Perform a completeness check on the parts, see the picture below:

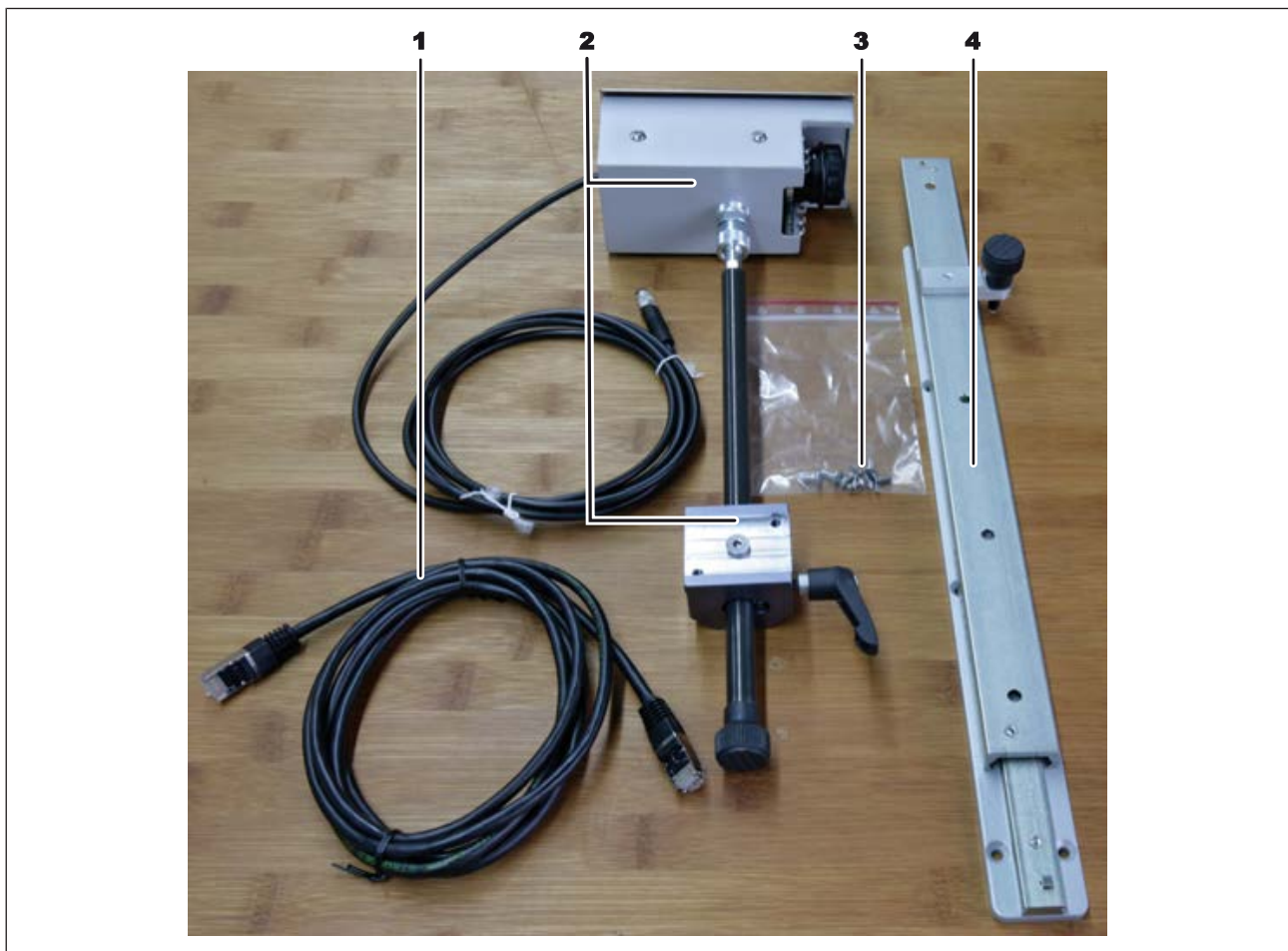


Fig. 4: RPC camera single parts

1	RJ45 patch cable, 2.0 m	3	Counter sunk screw V2A DIN 7991
2	RPC camera with adjustment	4	Telescopic rail with spacer plate

b) Assemble the camera. Fix the screw of the camera mount (6) to the telescopic rail, as shown in the following picture:

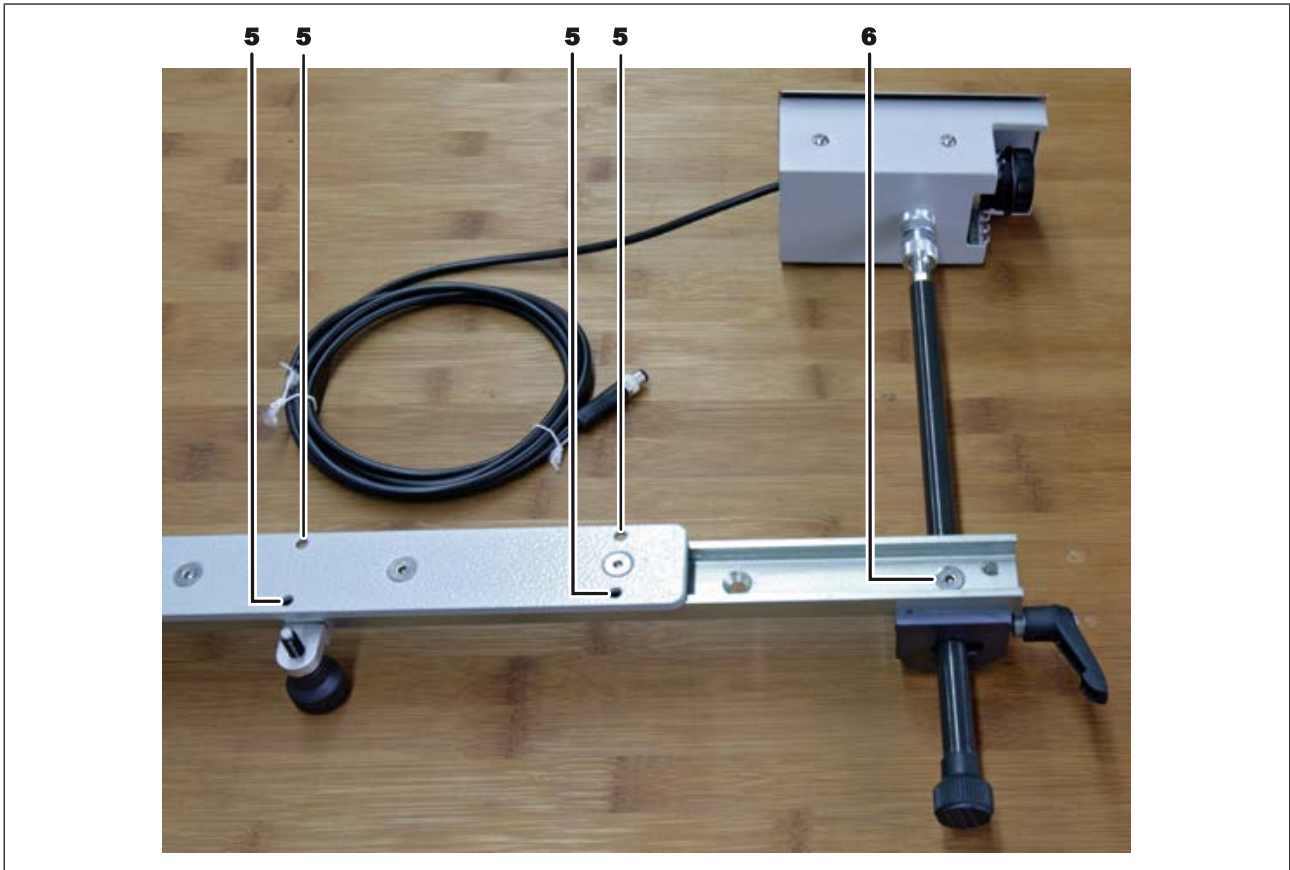


Fig. 5: RPC camera assembled

c) Mount the RPC camera with six screws (3) in the bores (5) at the left side of the Rework System, see the following example picture.



Fig. 6: RPC camera mounted, example picture

d) Connect the Ethernet cable and the LED lighting cable to the Rework System. For this purpose, please read Chapter [Connecting the machine](#) [▶ 31].



#### 4.5.6 Fitting the AccuTC holder and the air baffle

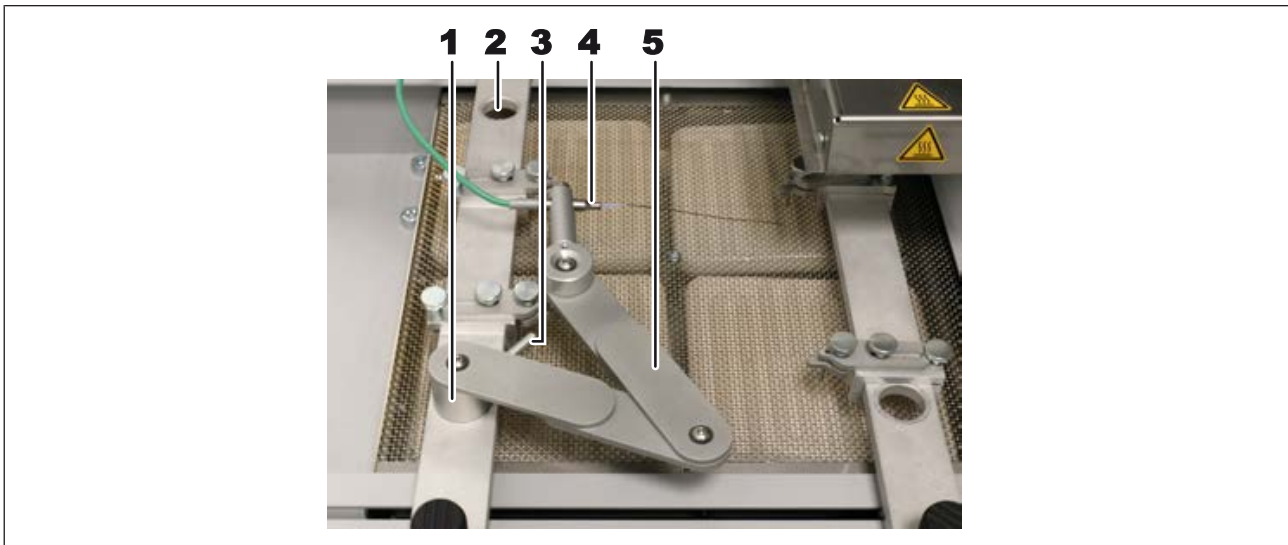


Fig. 7: AccuTC holder, example picture

- ✓ To fit the Accu-TC holder:
  - a) You can fit the holder into any of the four bores (2) of the circuit board holder. For this purpose, insert the cylinder (1) into a bore and lock with the lever (3).
  - b) Connecting the AccuTC thermocouple without fixture (item 01R6500-37) (3) to the socket [TC1].
  - c) Mount the thermocouple (4) as shown.
- ✓ If you work with air deflectors, install one. Reduce the air deflectors according to the opening size of the heated area and reduce the thermal load of the solder point.
  - a) Select an air deflector and let the lower end of the heating head snap in from below.



## 4.6 Transporting the Rework System

Before transporting the Rework System to another location:

- a) In tab [Administration] open dialog [Device settings]. Click button [Move to transport position]  
⇒ The heating head is driven to a safe position to avoid transport damages.
- b) Finish the HRSoft 2 program. If the HRS file was changed, the question will appear as to whether the change should be saved.
- c) Shut down the PC and turn the Rework System off using the main switch.

Screw in the transport fastenings before transportation:

- a) Place both the heating head and the Visionbox in central position.
- b) Lever out the sealing plug on the machine upper side (1) through a sharp-edge tool.



Use the shipping/restraining bolts and the shims (2), which were screwed in, when the Rework System was delivered.

- a) Screw in the shipping/restraining bolt on the Rework System upper part (3).
- b) Screw in the shipping/restraining bolt between the heating head and the Vision-Box (4).
- c) Use the original packing for shipping the Rework System.



## 4.7 Disposal



### ⚠ CAUTION

#### Disposal

- ✓ Solder waste is hazardous waste and must not be disposed of together with domestic waste.
- a) Provide safe and environmentally friendly disposal of packaging materials!
- b) Make sure that all process materials and replacement parts are disposed of in a safe and environmentally friendly way!

In accordance with Directive 2008/98/EC on waste and Directive 2002/96/EC on waste electrical and electronic equipment, we recommend the following procedure:

- ✓ To prepare the machine for disposal:
  - a) Have the machine disconnected from all utility services by a specialised technician:
    - ⇒ Electrical power supply
    - ⇒ Computer network
  - ⇒ Only when all this work has been performed may the disposal of the machine be started.
- ✓ If professional scrapping is not possible in the user's premises:
  - a) Contact a certified waste management company.

#### Waste prevention has priority over waste disposal!

Many parts of the machine can be used again. Only when reuse is not possible, should these parts be recycled.

The machine can contain the following substances or devices:

Electronic and electrical equipment	Computer, electronic controls, relays, monitors, cameras, sensors, meters, motors, preheater modules
Plastics	Cables and caterpillars, hoses, heat insulation, sensors
Metals	Steel, copper, aluminum, brass, gold, lead, tin, silver
Glass, ceramics	Preheater modules, screens

### NOTE

#### Disposal of electrical equipment

Notes on waste disposal acc. to the directive 2012/19/EU of the European Parliament and the Committee from 4th of July 2012 for used electric and electronic appliances:

Products marked with a crossed out waste bin must not be disposed of together with unsorted domestic waste. The municipalities established special collecting points for this type of waste. Please consult your council and ask for available possibilities for the separated collection of old appliances. You thereby contribute to the reuse or other forms of use of old appliances, with the aim of protecting the environment and human health.

Follow the operating/safety instructions for the correct disposal of the packaging, which should be kept until the end of their useful life.





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## 5 Commissioning

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## 5.1 Setting up the PC

- For the PC configuration required for your Rework System, refer to the PDF document 3BA00212 “PC-Konfigurationsempfehlung\_Ersa-IRSOFT-HRSoft-ImageDoc”. This document can be found on the Ersa Rework USB stick (3BA000149).

### You will need also:

- A network card must be installed in the PC. Ersa recommends an Intel® network card.
- Network cable for connecting the rework system to the PC and, if required, to the company network.
- USB stick with the Ersa software and the operating instructions for the rework system (item USB flash drive Rework).

### Installing drivers

- a) Switch on first the Rework System and then the PC. Wait for the operating system to start.
- b) Have a user with administrator rights get logged in.
- c) Insert the USB stick with the operating instructions and software [USB flash drive Rework] (3BA00149) into a USB port of the PC.
- d) Copy the contents of the USB stick to any folder on drive C:.
- e) There, open folder “Driver,” then folder “ImagingSource.”
- f) Start the installation program by double-clicking:
  - GigEcam\_Versions No.\_setup.exe
- a) Answer any queries with Yes. Do not change any settings.

When requested to do so by Ersa-Service, install the two following programs in the following sequence:

- 1. ic\_setup\_Versions-Nr..exe
- 2. setup\_iccapture\_Versions-Nr.\_Versions-Nr.\_.exe

### Entering the IP address

- a) Click on the Windows start button once and enter “Network.”
- b) Click on the “Network status” line in the Windows start menu.
- c) Click on “Change adapter options” in the “Status” dialog.
  - ⇒ The network adapters will be displayed.



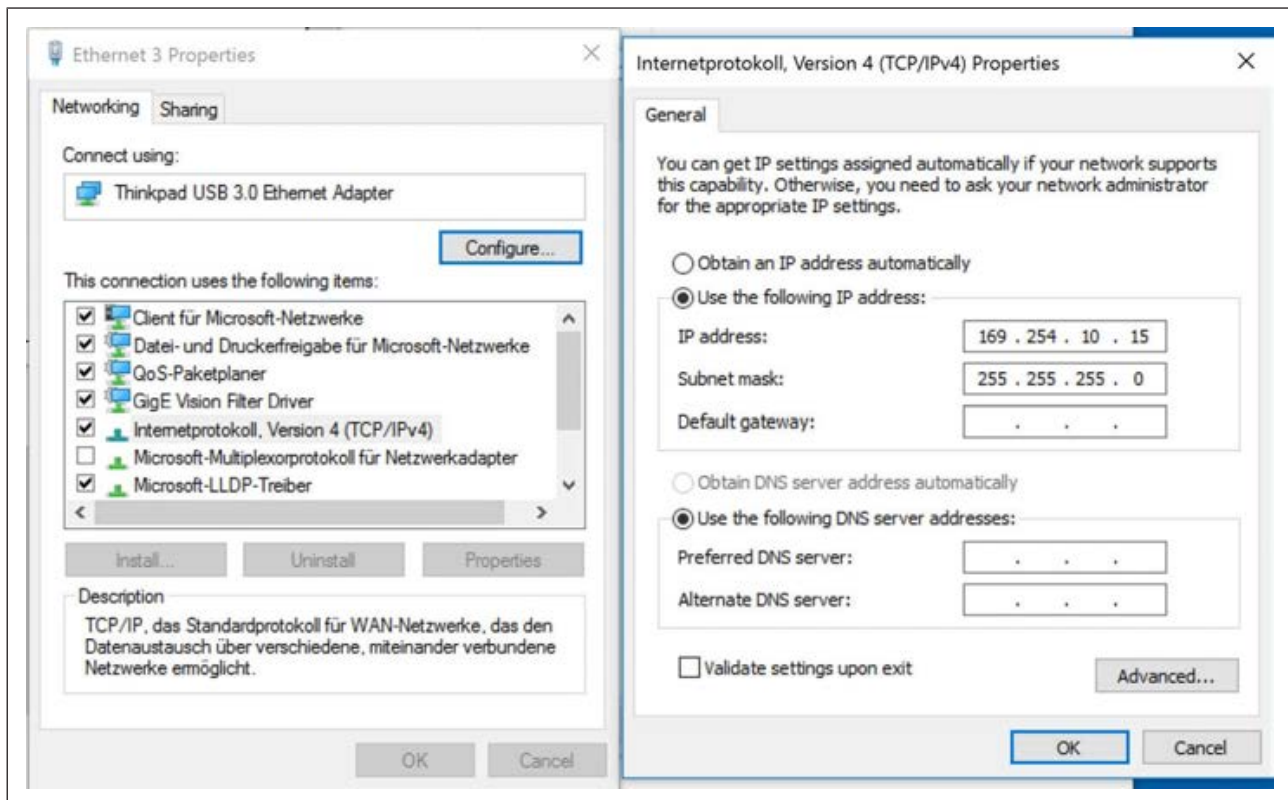


Fig. 8: Entering IP addresses

- d) Right-click on the “Ethernet” network adapter and select “Properties” in the context menu.
- e) Select “Internet protocol version 4 (TCP/IPv4)”.
- f) Click on “Properties.”
- g) Select “Use following IP address.”
- h) In the IP address enter 169.254.10.44
- i) In the “Subnet mask” enter 255.255.255.0
- j) Click on “OK.”
- k) Click on “OK.”

### Configuring the network

- a) Right-click on the “Ethernet” network adapter and select “Properties” in the appearing context menu.
- b) Click on “Configure”.
- c) Select the “Advanced” tab.

If you use an Intel<sup>®</sup> Ethernet card, select the menu item named “Jumbo xxx” in the “Settings” menu. The name may differ slightly depending on the manufacturer of the network adapter.

- a) Select the highest value (9014 Byte) in the “Value” menu.
- b) Close all windows by clicking on “OK”.

### Install the HRSoft 2 program.

- a) In the HRSoft2\_XXX folder search for the installation program “setup.exe” for HRSoft 2. Double click on this file. To do so, follow the instructions and confirm dialogues with OK/Continue.



## 5.2 Calibrate the pipette distances and the optical axle

Perform the following calibrations, after installing the Rework System in the workplace foreseen.

Now calibrate the Rework System by performing function [Start device setup] for calibration of the pipette distances and the optical axis calibration process. Always perform the following functions:

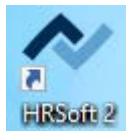
- after reinstalling the Rework system
- after the new installation of HRSoft 2
- after relocating the Rework System.

After the commissioning of the HRSoft 2, you will be logged in as an administrator. This is a prerequisite for performing the [Start device setup] function.

The [Username] and also the [Password] are registered under “Admin,“ please pay attention to capitalization.

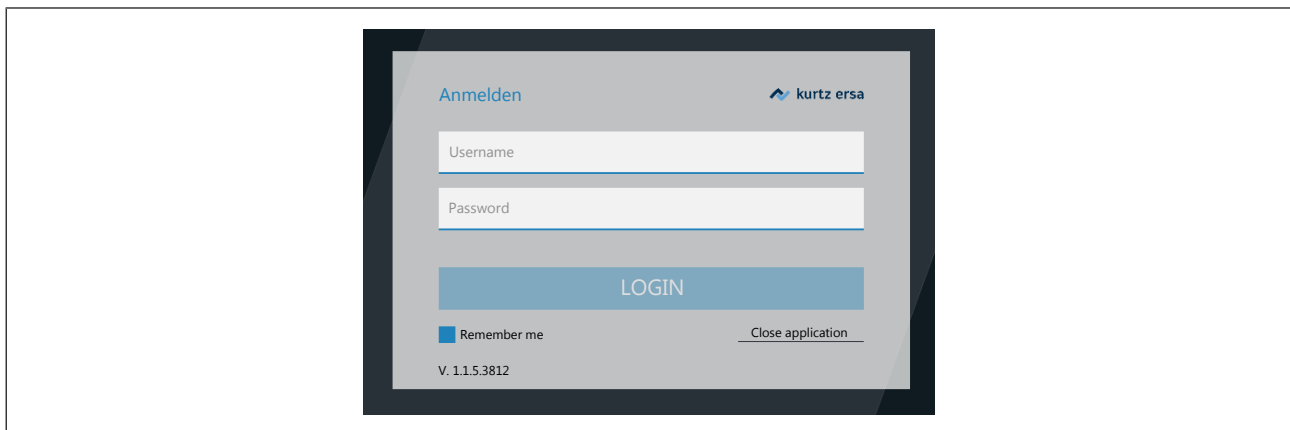
If the Administrator changes the [Password] or creates a new [Username], do not forget the passwords entered, or note them down and keep them in a safe place. As to this, please also read Chapter [The \[user management\] tabulator \[▶ 71\]](#).

a) Double-click the icon of the [HRSoft 2] program on the PC desktop.



b) Enter the Administrator name and password into the [Login] window.

Info: There are two user classes: “Administrator“ and “Standard user.“ Depending on the user name and password entered, you will be assigned to one of these classes. As to this, please also read Chapter [The \[user management\] tabulator \[▶ 71\]](#).



If you highlight checkbox [Remember me], your user name will be already recorded the next time you log in.

a) Acknowledge your entries by pressing the Enter key or by clicking on the [LOGIN] button.

- ⇒ The HRSoft 2 program starts. The Rework System and Rework processes can be controlled via the HRSoft 2 program. HRSoft 2 starts in the administrator mode and shows the tab [Rework].

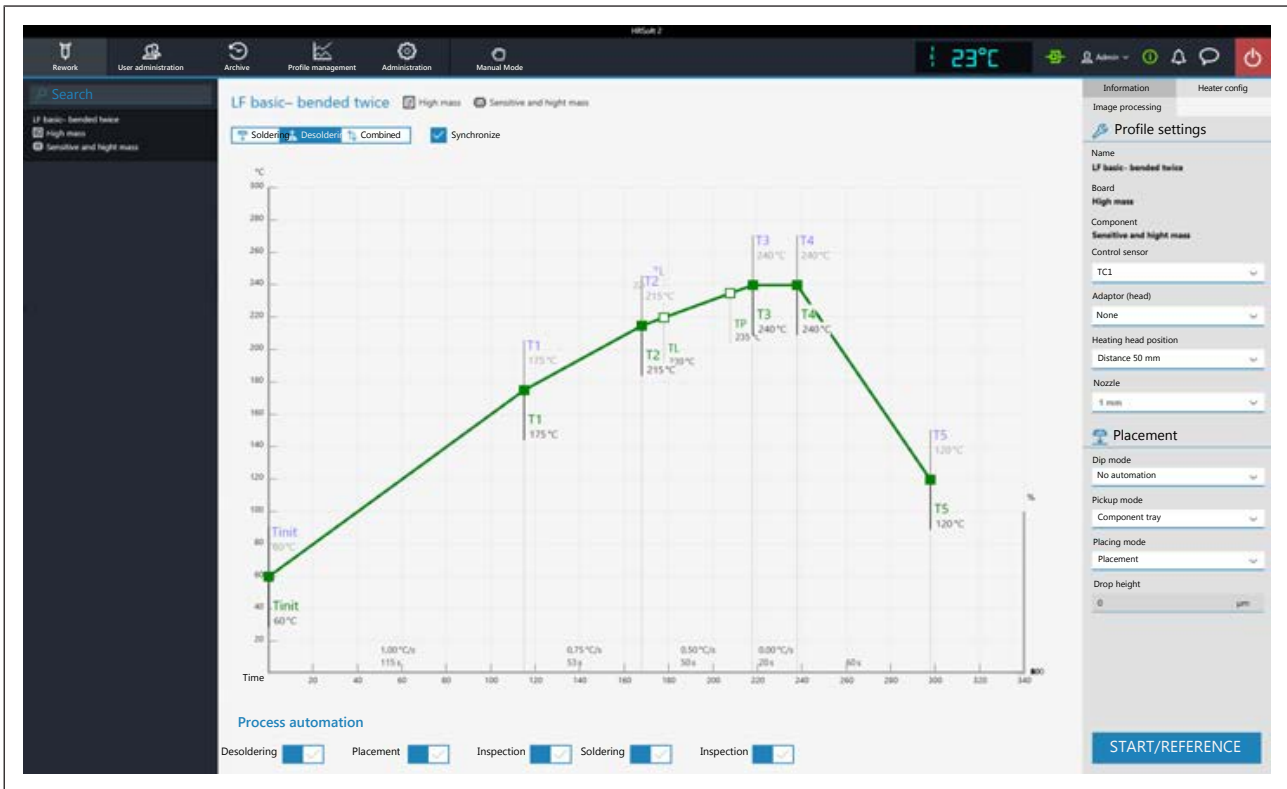


Fig. 9: Tab [Rework ] in the administrator view. Example figure.

- b) If still no suction nozzle is screwed onto the pipette, apply a 5 mm or 10 mm suction nozzle. As to this, please read Chapter Adjust the pipette size to the component.

### Calibration Step 1: Calibrating the pipette distances through function [Start device setup]

- a) In the header, select tab [Administration].
- b) In the left menu bar, select menu item [Device settings].

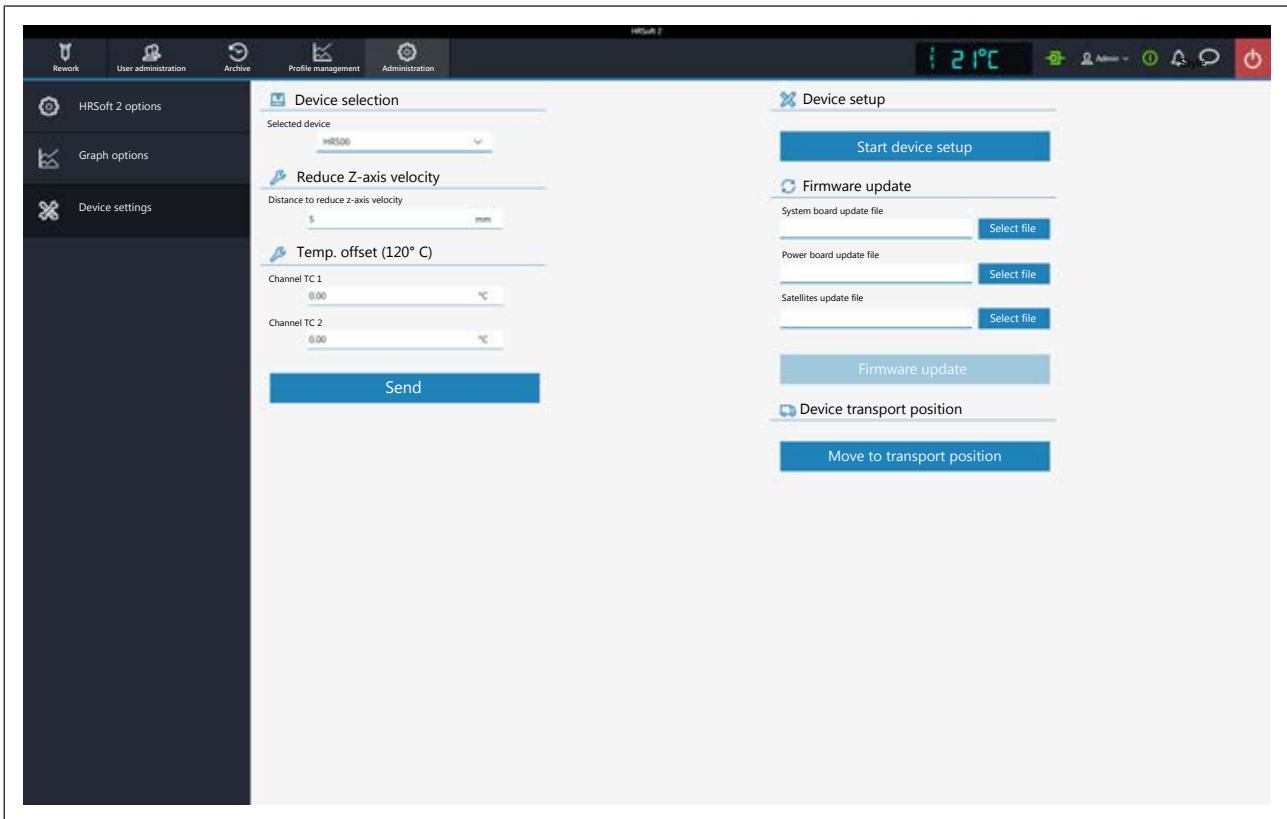
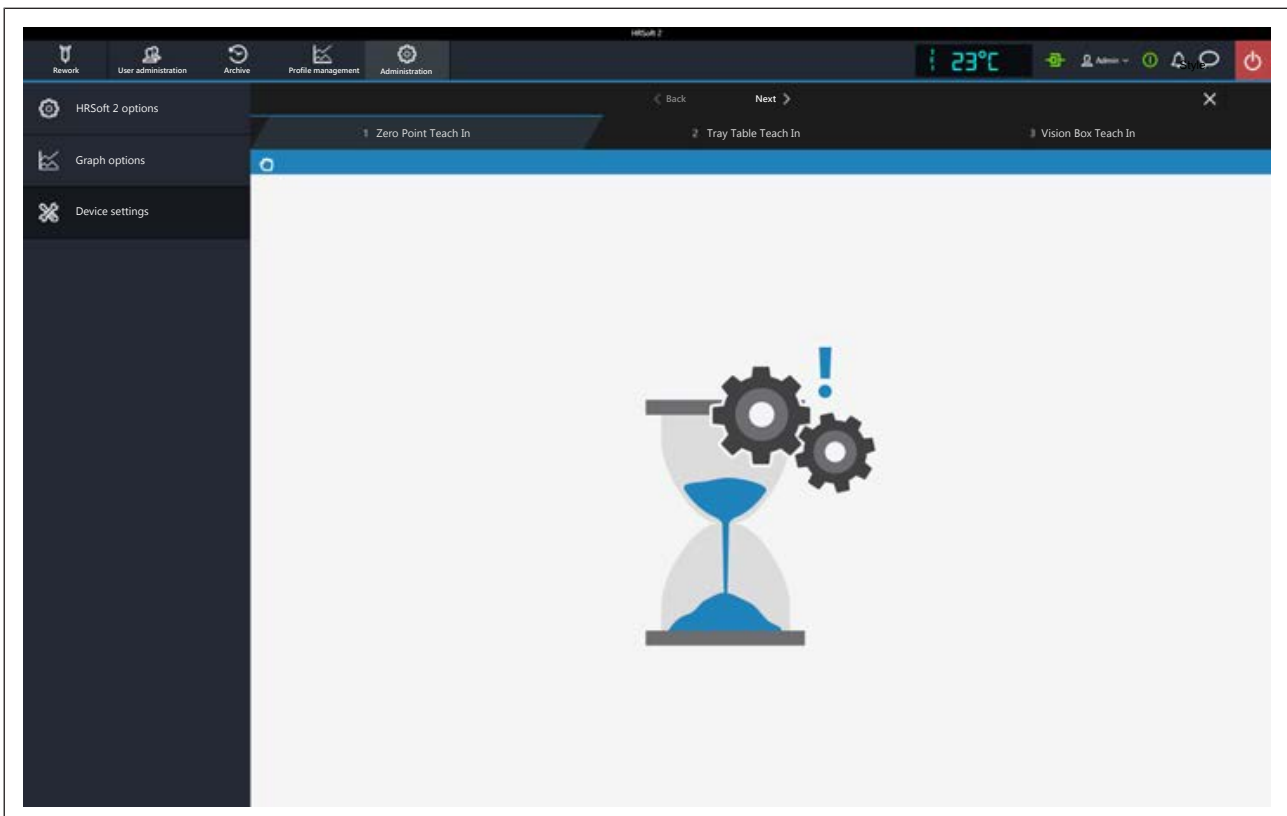


Fig. 10: Dialog [Device settings]

c) Now click and perform function [Start device setup] in the right column.

⇒ The Assistant for the pipette calibration starts. The information line above the diagram describes the work steps to be performed. The pipette performs a reference run.

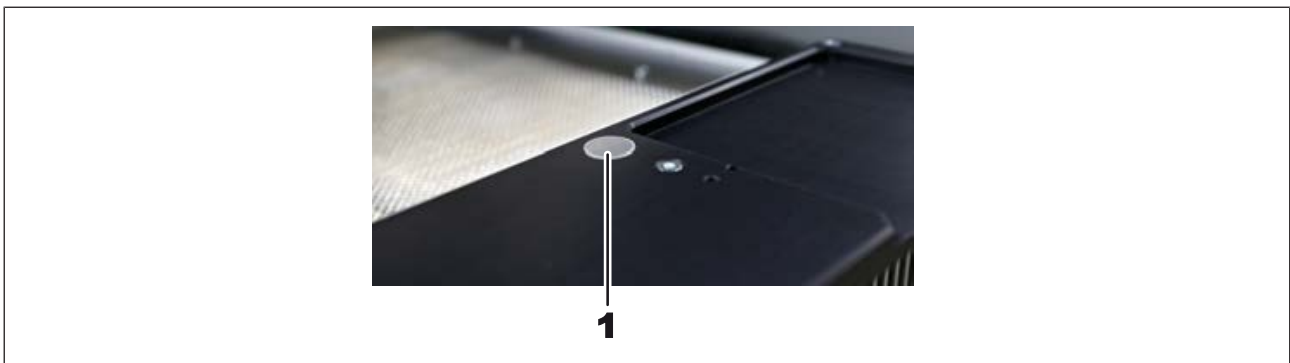




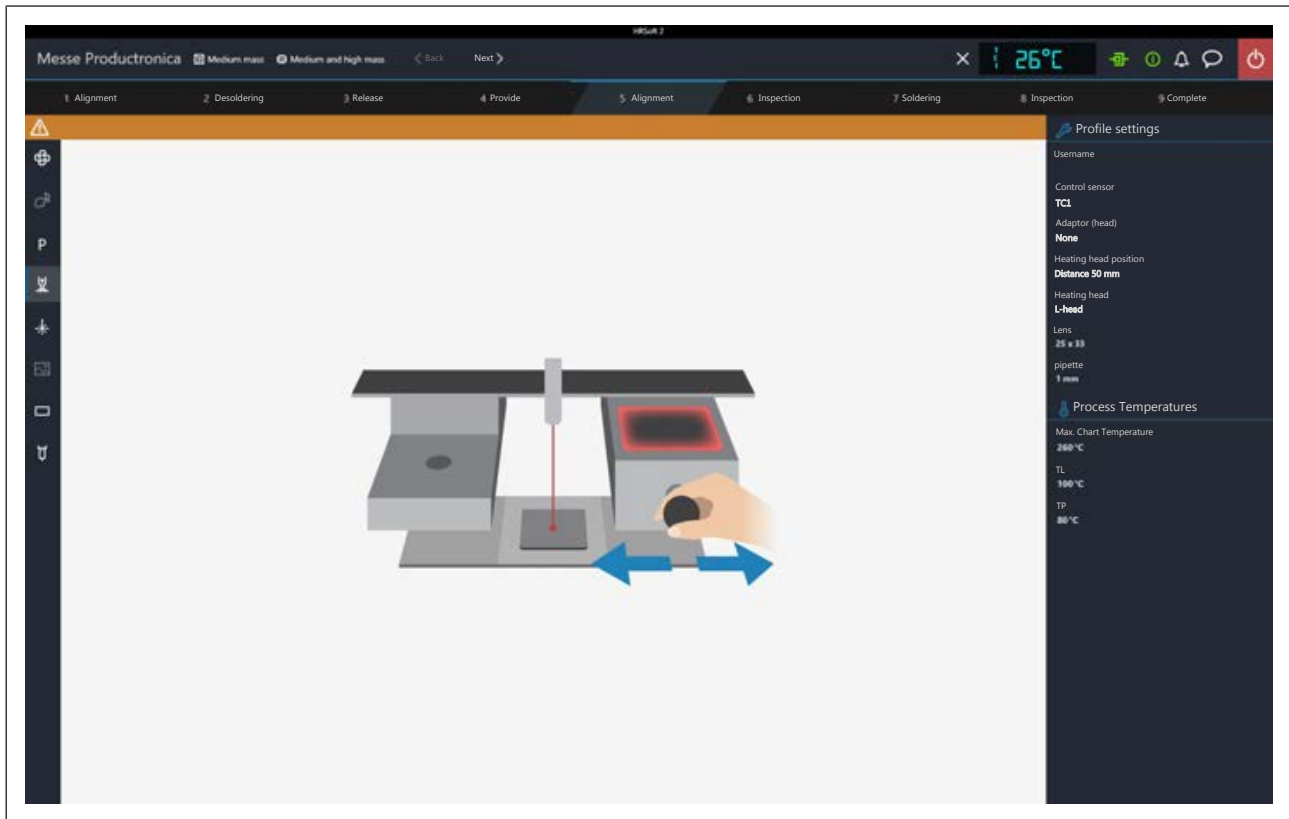
- d) Click on button [Next] or press the button “Next” at the bottom heating to proceed to the next work step.
- e) Place both the heating head and the Visionbox in central position.
- f) Place the black component tray on the right side of the bottom heating below the pipette. Then hold down the button on the front side of the bottom heating and move the bottom heating by the side handles until the flat surface of the component tray lies below the position of the pipettes on the heating head.
- g) Click on button [Next] or press the “Next” button.
  - ⇒ The pipette touches the component tray.
- a) Move the Visionbox to the left position, until the Visionbox is below the pipette.
- b) Click on button [Next] or press the “Next” button.
  - ⇒ The pipette touches the Visionbox.
  - ⇒ The calibration result has been saved after exiting maintenance mode.
- a) Click the X button to close the dialog.

**Calibration Step 2: Calibrate the optical axis with the calibration target.**

- a) Remove the calibration target from the accessories. An open-ended wrench size 13 will be additionally required.
- b) Place the calibration target (1) with the slightly rounded side down in the recess of the component tray. The calibration target must precisely lie in horizontal position in the centre of the recess.



- c) In range [Process automation] deactivate the first work step [Desoldering], the second work step [Placement] must be activated.
- d) Click on button [Start/Reference].
  - ⇒ The Assistant starts at work step 4 [Provide].



- e) Place both the heating head and the Visionbox in central position.  
⇒ The laser beam below the pipette is activated.



**⚠ DANGER**

**Laser beam! Risk of injury due to retinal burns**

- a) Do not stare into the laser beam!
- b) Do not point the laser beam at other people! Reflecting surfaces under the laser generate reflections!
- c) Class 2 laser according to DIN EN 60825-1:2008-5,  $P < 1 \text{ mW}$ ,  $\lambda = 650 \text{ nm}$

The laser beam must lie in the centre on the calibration target. Hold down the button on the front of the bottom heating and move the bottom heating by the side handles. For fine adjustment use both setscrews intended for the fine adjustment of the bottom heating in X and Y direction, forward and to the right of the bottom heating.

- a) Click on button [Next] or press the “Next” button.
- b) In work step 5 [Alignment] you are requested to position a thermocouple. Please skip this work step.
- c) Slide both the heating head and Visionbox to the right.
- d) Click on button [Next] or press the “Next” button.  
⇒ The pipette moves the calibration target high up.
- e) Slide both the heating head and Visionbox to the left.
- f) Use the mouse wheel or the zoom control on the screen to enlarge the calibration target to full screen. Move the camera image with the mouse until the calibration target reaches the screen centre, see the picture below.

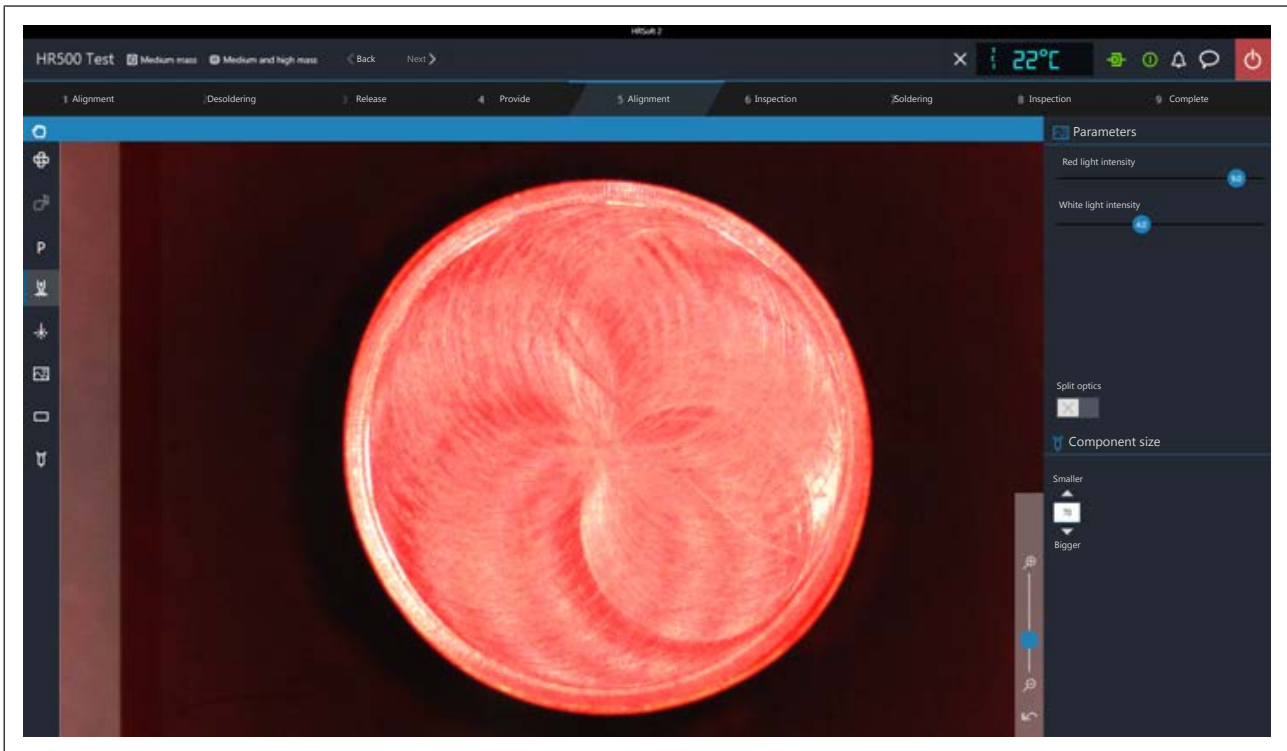


Fig. 11: The calibration target is correctly aligned, if its margins are uniformly displayed.

- g) Through control [White light intensity] set the highest possible colour contrast of the calibration target.
- h) If the calibration target is not displayed congruently on the background and no uniform border is shown, edit the machine base height. To modify it, loosen the upper narrow lock nut on the machine base with a 13 mm open-ended wrench. Use the wrench to screw the lower nut of the base upwards or downwards. Observe the camera image and correct it until the calibration target is displayed congruently on the background showing a uniform border.
- i) Tighten the lock nut again.
- j) If the displayed image is satisfactory, follow the final work steps described below from step q).
- k) If a uniform border of the calibration target cannot be reached with this method, stop this procedure when the desired picture is as close as possible. Perform the following correction. You will need an Allen wrench set:
  - l) With a 2.5 mm Allen wrench slightly loosen the screw in the centre behind the Visionbox (approx.  $\frac{1}{4}$  rotation), see the picture below.
    - ⇒ Now the optical axes can be modified.

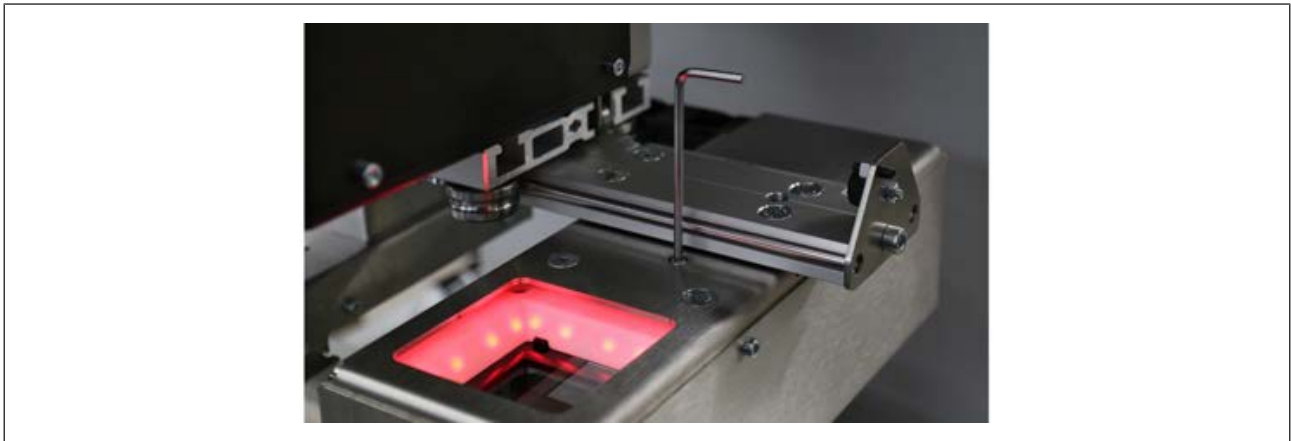


Fig. 12: Use a 2.5 mm Allen wrench and slightly loosen

- m) Rotate the screw at the left behind the Visionbox with a 3 mm Allen wrench, in order to correct the optical axis in X direction, see the picture below. Observe the screen, the margins of the calibration target in Y direction must show a uniform margin.

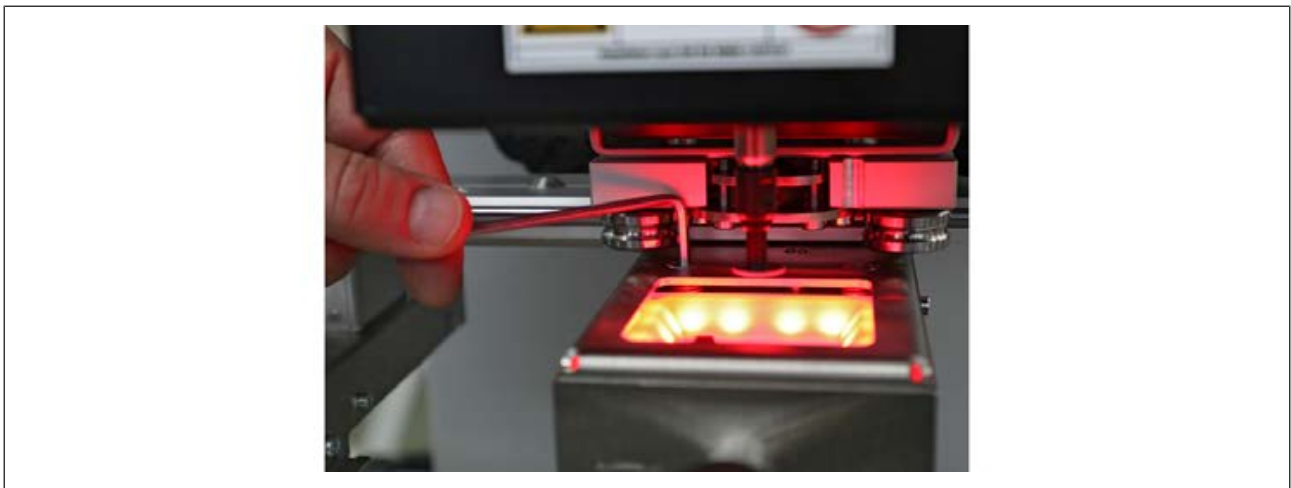


Fig. 13: To correct in X direction, use a 3 mm Allen wrench, while observing the camera image.

- n) Slide both the heating head and the Visionbox to the right.
- o) Rotate the central screw of the rail behind the Visionbox with a 3 mm Allen wrench, in order to correct the optical axis in Y direction, see the picture below. After rotation, slide the Visionbox to the left below the camera and verify the outcome on the screen. Repeat this process until the calibration target is displayed congruently on the background and with a uniform border.





Fig. 14: To correct in Y direction, use a 3 mm Allen wrench. To control the outcome, slide the Visionbox below the camera.

- p) If the picture displayed is satisfactory, slightly re-tighten the 2.5 mm screw behind the Visionbox.
- q) Click on button [Next] or press the “Next” button.
  - ⇒ The calibration target is positioned on the component tray.
- r) To close the Assistant click the X pushbutton top right.
  - ⇒ The Rework System is calibrated.

### 5.3 Mount the pipette

Select the largest possible pipette for the component.

- a) Wait for the heating head to cool down.



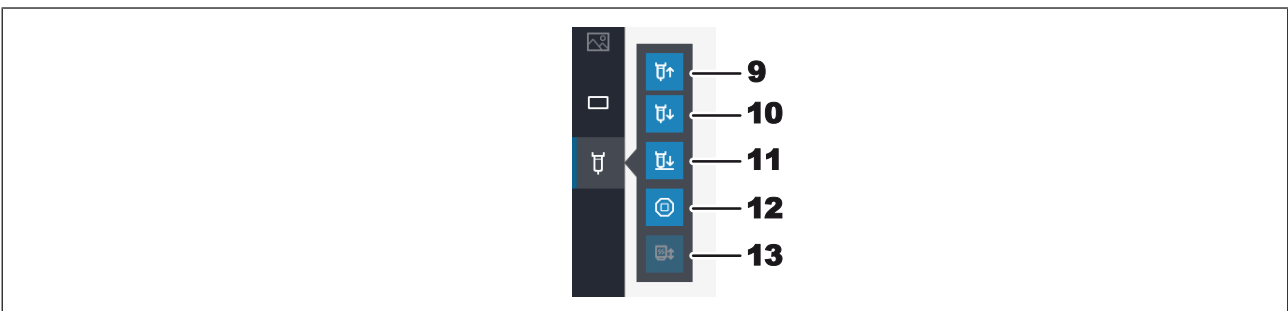
#### **CAUTION**

##### **Risk of burning due to heated machine parts and PCB!**

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

- a) Switch to tab [Rework].
- b) Click tab [Manual Mode] to view the button row for manual operation.
- c) Click the “Pipette” pushbutton



- ⇒ A submenu with further pushbuttons is displayed:
- d) Press the pushbutton (10) until the pipette and its holder have moved far enough downwards.




e) Screw on the pipette and tighten it only slightly.

The pipette is then driven upwards by the Rework System.

For this purpose, please also read Chapter --- FEHLENDER LINK --- where you can find a list of available pipettes.

**Also see**

 Spare parts [[▶ 124](#)]



## 6 Function description

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## 6.1 Read this first!

### 6.1.1 Target readers group

These instructions are intended for people who use, adjust, operate or service the machine.



#### **⚠ DANGER**

**Personal injury or material damage due to inadequate maintenance and improper operation of the machine!**

- ✓ Use only qualified personnel!
- a) The machine transport, assembly, connection, commissioning, operation or maintenance by people who are not sufficiently qualified and informed can cause severe damage to the machine or damage to people.
- b) Such work may therefore only be performed by properly trained personnel! This personnel must be able to recognize the hazards that can be caused by the system mechanical, electrical or electronic equipment.
- c) The people who carry out such work must know and have understood the contents of these instructions.
- d) Any person involved in the installation, commissioning, operation and/or maintenance of the machine must have read and understood the contents of the "Safety instructions" chapter, as well as the chapters which are relevant for the specific activity!

### 6.1.2 Supplementary documents



#### **NOTE**

##### **Additional documents**

Additional documentation or service instructions are available for each module of the machine. These documents are contained in the [\\ERSA\product\_data\] folder on the drive of your machine PC. If you cannot find exhaustive information on a particular topic in this operating manual, check there.

### 6.1.3 ESD-hazardous components



#### **NOTE**

##### **ESD hazardous components!**

Electronic components can be damaged by electrostatic discharge. Please observe the warnings on the packaging or contact the manufacturer or supplier. To protect these components, an ESD (ESD = electrostatic discharge) safe workplace will be suitable. The HR 500 can be easily integrated into such an environment. Through one of the pushbuttons on the front, the user can connect an ESD wrist band. The housing of the HR 500 is connected to the protective conductor of the voltage supply network via the interconnection cable.

All common precautionary measures for ESD-sensitive components must be taken when handling the device.



### 6.2 Overview of the machine parts

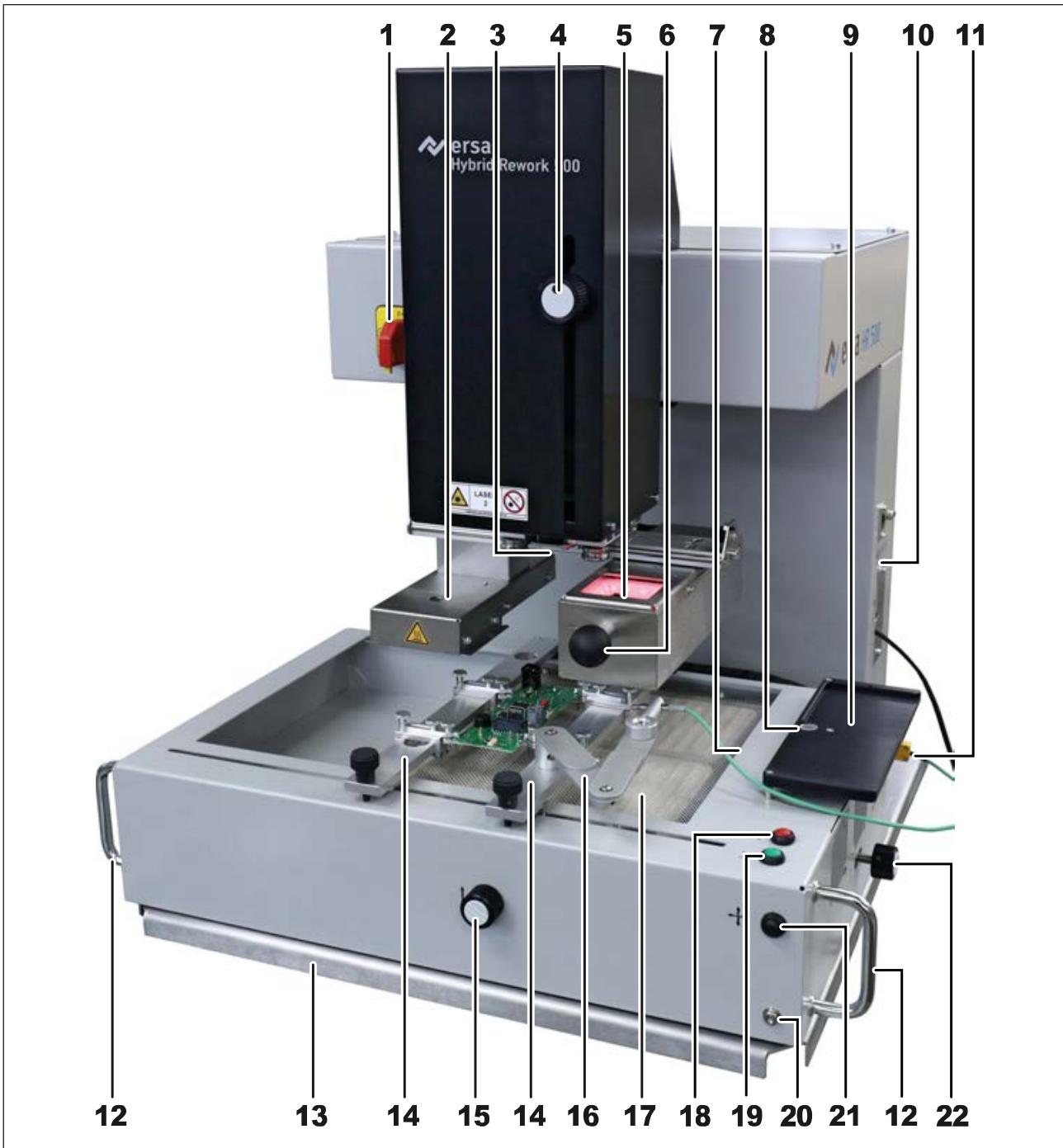


Fig. 15: Overview of the machine parts

#### CAUTION

##### Risk of burning due to heated machine parts and PCB!

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!





**⚠ DANGER**

**Laser beam! Risk of injury due to retinal burns**

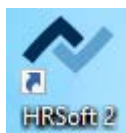
- a) Do not stare into the laser beam!
- b) Do not point the laser beam at other people! Reflecting surfaces under the laser generate reflections!
- c) Class 2 laser according to DIN EN 60825-1:2008-5,  $P < 1 \text{ mW}$ ,  $\lambda = 650 \text{ nm}$

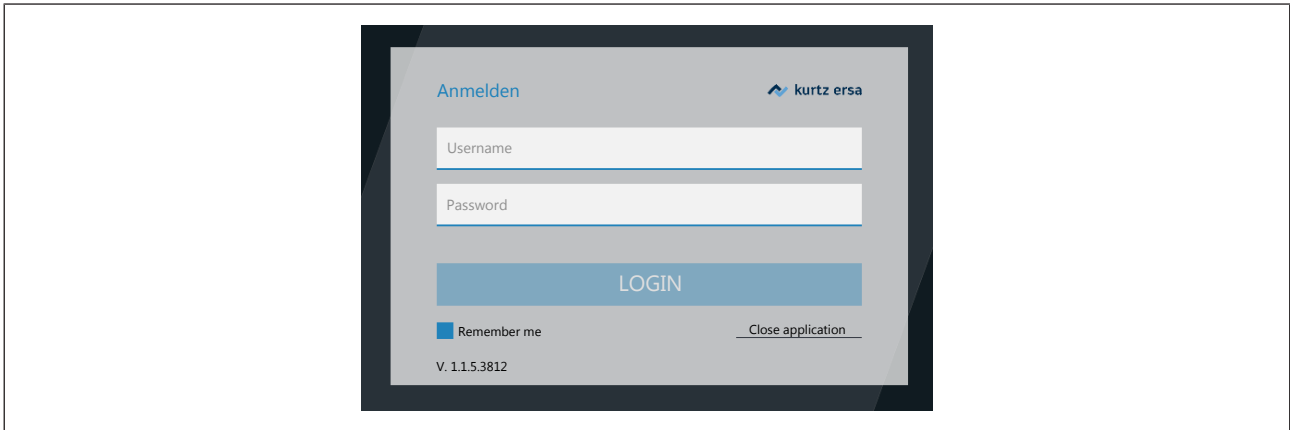
1	Main switch, lockable	12	Handles to move the bottom heating, when the unlock button (21) is pressed
2	Top heating with passage for pipette	13	Equipment baseplate
3	Pipette and laser outlet	14	PCB holding rails
4	Control knob for component rotation	15	Setscrew for fine adjustment of the board in Y direction.
5	Visionbox with camera. Red lighting at the top, white lighting at the bottom	16	Thermocouple holder
6	Handle for Visionbox and heating head displacement	17	Bottom heating, 2 zones
7	Blower outlet for cooling after soldering	18	Red Cancel key to immediately end the current work step.
8	Milling for calibration target (to calibrate the optical axis)	19	Next button. Soldering wizard switched to the next work step
9	Component tray with recess for dip-template and print-template	20	ESD wrist band connection
10	Connectors for PC and further optional equipment	21	Unlock button for releasing the bottom heating
11	Connectors for two thermocouples	22	Setscrew for fine adjustment of the board in X direction

**6.3 Switching on the Rework system and starting HRSoft 2**

✓ To switch on the Rework System proceed as follows:

- a) Switch on the PC.
- b) Use the main switch to turn on the Rework System.
- c) Start the HRSoft 2 program on the PC. Double-click the icon of the [HRSoft 2] link on the computer desktop.
- d) Window [Login] will be displayed on the computer monitor.



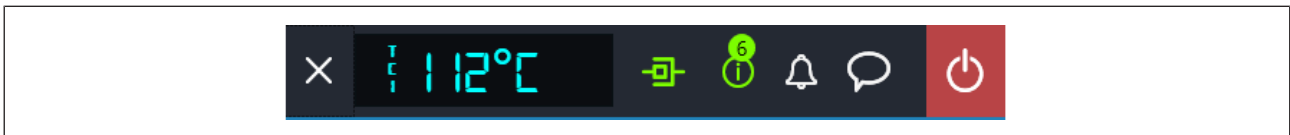


e) Enter the values Username and Password (pay attention to letter capitalization) and press the Enter button.

When button [Remember me] is highlighted, your Username is already saved for the next login.

⇒ The HRSoft 2 program will open in tab [Rework] and depending on the password level, in mode [Administrator] or [Standard user].

⇒ If the network connection icon top right or next to the temperature display turns green, the connection between the Rework System and the PC is established.





## 6.4 The top bar in the HRSoft 2 program

All the functions of the HRSoft 2 program can be accessed via the top bar. The top bar includes tabs to operate the Rework System on the left, and more buttons and displays on the right.



- Use the [Rework] tab to change all parameters of the soldering profile. Almost identical structure to that of the [Profile management] tab, but with all rights to manage soldering profiles; creating, copying, deleting and saving is not possible. Also contains the start button for the rework process. With regard to this, please read Chapter --- FEHLENDER LINK ---.
- Use the [User administration] tab to show, create, edit, delete and save users with their different user rights. With regard to this, please read Chapter --- FEHLENDER LINK ---.
- Use the [Archive] tab to show the rework processes performed so far in all details for an analysis. With regard to this, please read Chapter The [Archive] tabulator.
- Use the [Profile management] tab create, change, copy, delete and save soldering profiles. Almost identical structure to that of the [Rework] tab, but with all rights to manage soldering profiles. If you are logged in as a standard user, the [Profile management] tab will be missing. With regard to this, please read Chapter Overview of the [Profile management] tab.
- Use the [Administration] tab to define HRSoft 2 program parameters (e.g. system language, display colours, etc.), program management (e.g. updates), network management, and start-up functions. This tab contains the following three fields: [HRSoft 2 options] (Chapter The dialog [HRSoft 2 settings]), [Graph options] (Chapter The [Chart settings] dialog) and [Device settings] (Chapter The [device settings] dialog).
- [Manual mode] tab: button for showing/hiding the button bar [Manual mode], which is visible only in the [Rework] tab. With the Rework buttons, you can move the heating head and the pipette at any time, and switch on/off the Rework System functions that can be manually controlled (e.g. motor movements, cooling, etc.). With regard to this, please read Chapter The [Manual Mode].
- Display and button row on the right: Temperature display, network display, user name and system status. With regard to this, please read Chapter --- FEHLENDER LINK ---.

### Also see

- 📖 The [user management] tabulator [▶ 71]
- 📖 Overview of the tab [Rework] [▶ 57]
- 📖 The display and switch row top right [▶ 95]





## 6.5 Temporarily editing the soldering profile in the [Rework] tab

### 6.5.1 Overview of the tab [Rework]

After starting HRSoft 2, the [Rework] tab will be shown. Soldering processes are started and performed in the [Rework] dialog. This dialog is divided into the following ranges:

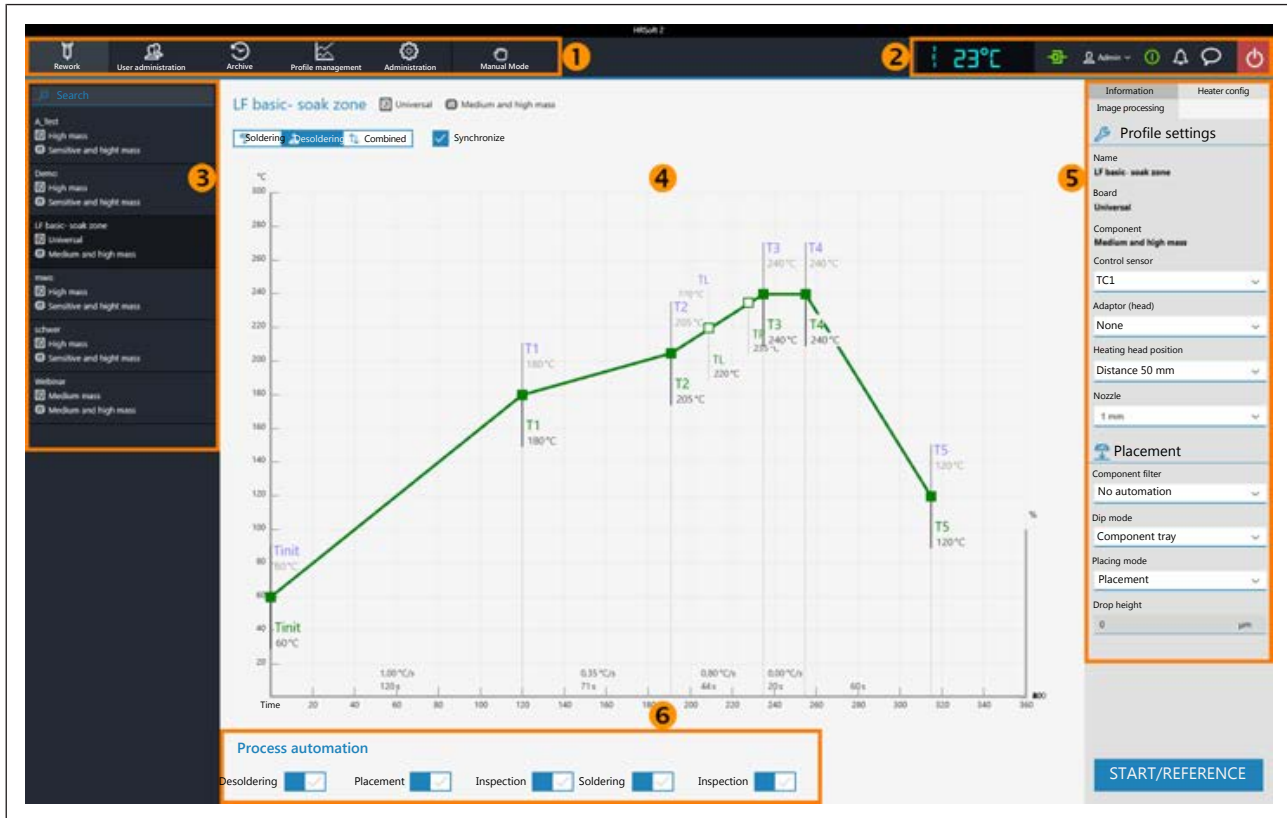


Fig. 16: Ranges in tab Rework

1	Tab bar: to call up tabs and button bar [Manual mode]	2 Displays (e.g. temperature and network connection) and buttons (e.g. to call up status information and dialogs). As to this, please read Chapter The display and button sequence in the right upper corner.
3	To select a soldering profile and search for profile names. Switch to tab [Profile management] to create and save soldering profiles. As to this, please read Chapter Create, copy, delete and save soldering profiles in the [Profile management] tabulator.	4 Chart with soldering curves. To display of the soldering process with curves for soldering and desoldering. Any change that is made here to the soldering process will be accepted but not saved. If you switch from tab [Rework] to another tab, all changes made to the soldering profile will be lost. As to this, please read Chapter The chart in the [Rework] tabulator.



5	Parameter bar with tabs [Information] and [Heater config]. As to this, please read Chapter --- FEHLENDER LINK ---. The machine initialisation and the Rework process can only be started here with the [Start] button.	6	Workflow bar for determining process flow steps (from left to right). Any change that is made here to the process flow will be accepted but not saved. If you switch from tab [Rework] to another tab, all changes made to the soldering profile will be lost. As to this, please read Chapter The [Process automation] buttons under the [Rework] tabulator.
---	---	---	---

The functions of tab [Rework] largely correspond to those of tab [Profile management]. For a description of tab [Profile management] please read Chapter [Editing the soldering profile in the \[Profile management\] tab and changing it permanently](#) [▶ 73].

Only users logged in as “Administrator” may access all functions. If you are logged in as a “standard user,” you may not save changes, and the [Profile management] tab is not visible.

The functions of tab [Rework] are described in detail in the following chapter.



### 6.5.2 Use of the soldering profile in the [Rework] tabulator

A soldering profile (3) is a file in which the complete soldering process with all associated parameter settings is saved. In the [Profile management] tab, you can create, edit, copy, delete and save new soldering profiles.



Soldering profile parameters and other specifications may also be edited in this [Rework] dialog and then applied, but these changes may not be saved here. To permanently create, edit, copy, delete and save a soldering profile, switch to the [Profile management] tab.

Soldering processes are always started in the [Rework] tab.

#### Working with soldering profiles

In the Soldering Profile Selection (3) field, select a soldering profile from the list of saved soldering profiles.

Search for a soldering profile name in the [Search] input field. The search will automatically start after entering the first sign. Any matches found will be highlighted in colour.

The soldering profiles have two lines defining the characteristics of the  PCB and the  component. PCB and component properties, such as PCB thickness, high/low component mass and lead-free/lead solder, can be entered into these lines.

After marking your soldering profile in the soldering profile selection area (3), changes can be made to the time and temperature sequences in Chart fields (4), and to the soldering process steps for this soldering profile in parameter bar (5). With regard to this, please read the Chapters on --- FEHLENDER LINK ---.



### 6.5.3 The tabulators [Information], [Heating setting] and the arrow key [Image processing]

When the [Heater config] tab is called up, the chart (4) with the heating curves is displayed in the middle of the screen, and below the line with the buttons for the [Process automation ] (6).

The heating curves in the middle of the screen can be adjusted for the desired soldering process. With regard to this, please read Chapter The chart in the [Rework] tabulator. You can also change the buttons in the [Process automation] line (6) at the bottom at any time. With regard to this, please also read Chapter The [Process automation] buttons under the [Rework] tabulator. These buttons enable or disable any process steps.

All the changes performed in the [Rework] tab will be accepted but not saved. If you switch from the [Rework] tab to another tab, all changes will be lost.

On the bottom right there is the [START/REFERENCE] button, which starts the rework process. Make sure you have made all settings correctly before starting the rework process. How to perform the soldering process is described by way of example in the --- FEHLENDER LINK ---.

The correct soldering profile settings should be specified in the [Profile management] tab beforehand. Only possible as "Administrator" user. With regard to this, please read Chapter The tabulator with the small arrow key (Image processing) under the [Profile management] tabulator.

#### 6.5.3.1 The three right tabulators

The field (5) on the right contains the two [Information] and [Heater config] tabs as well as a small arrow button to open the [Image processing] tab.

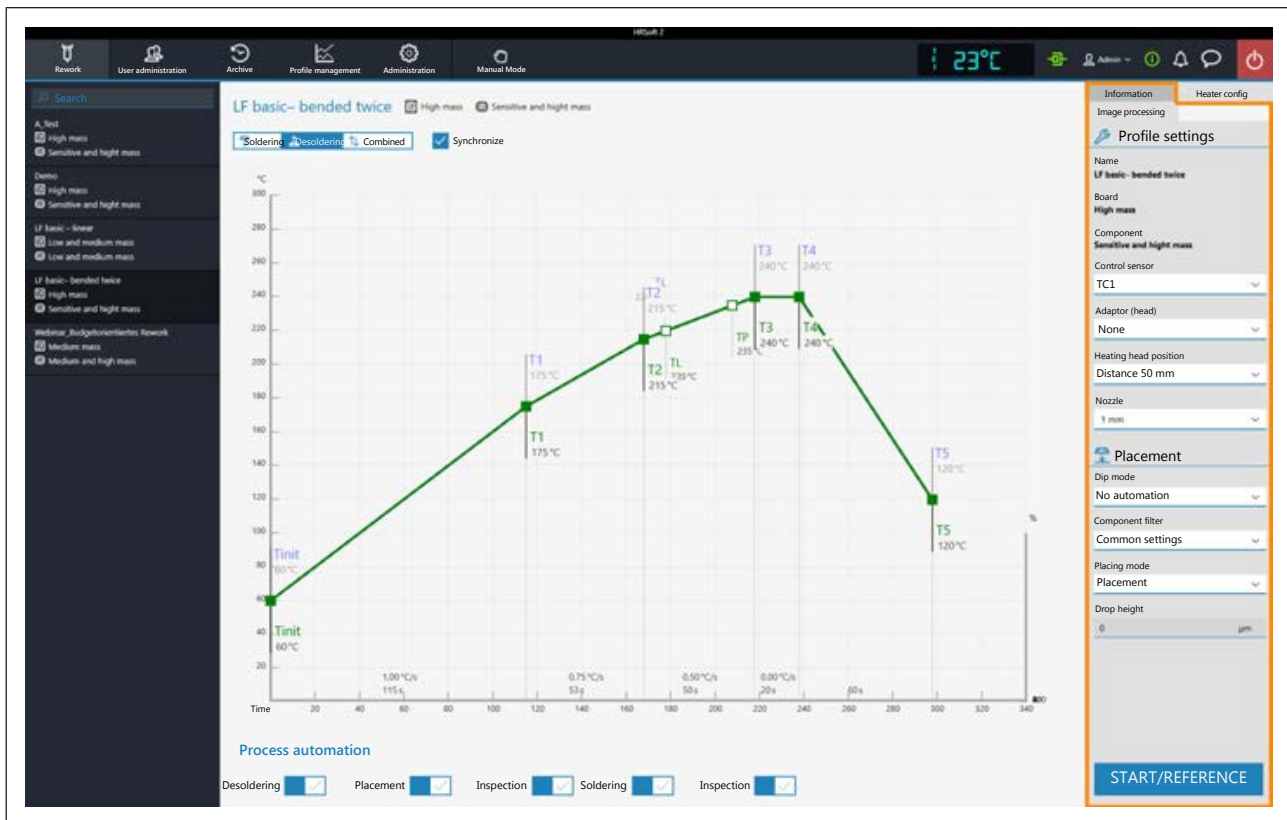
Select the [Information] tab if you want to make changes to the soldering profile parameters. With regard to this, please also read Chapter The [Information] tabulator under the [Rework] tabulator).

Select the [Heater config] tab if you want to make changes to the heaters. With regard to this, please also read Chapter The [Heating setting] tabulator under the [Rework] tabulator.

Click on the small arrow button on the right if you want to make image processing changes. With regard to this, please also read Chapter The tabulator with the small arrow key (Image processing) under the [Rework] tabulator.



### 6.5.3.2 The [Information] tab under the [Rework] tab



#### The parameters in tab [Information]

The soldering profile is selected in this tab and the rework process is started.

The following parameters can be edited here in the [Information] tab:

#### In range [Profile settings]:

The three bolded parameters [Name], [Board] and [Component] are defined in the [Profile management] tab.

The following parameters can be edited here in the [Information] tab:

- [Control sensor]: Selection of the temperature sensor that controls the soldering process through the temperature it measures.  
[TC1] (thermocouple 1) and up to seven further thermocouples.  
[Virtual TC] Can only be used after learning process with thermocouple applied. As to this, please read Chapter Optional extended bottom heating. The currently measured temperature of the selected sensor is displayed as a temperature curve.
- [Adaptor (head)]: used adapter (air baffle).  
No function, only used to save info.
- [Heating head position]: Define the soldering distance to the PCB from 30 mm to 70 mm. No function, only used to save info. For the heating head distance to be kept in case of high components on the PCB, adjust the distance using the buttons in tab [Manual Mode] must be set. As to this, please read Chapter --- FEHLENDER LINK ---.
- [Nozzle]: Selection of the soldering nozzle used.  
No function, only used to save info.
- [Pin 1 orientation ]: position of pin 1 of the component.  
No function, only used to save info.

#### In range [Placement]:



- [Component filter]: The component recognition of the camera is improved for the selected component type. Select the component type before soldering. Possible filters are:
  - [General] = all other component types
  - [BGA] = Ball Grid Array
  - [Small BGA]
  - [Big BGA]
  - Do not use [MFU BGA]!
  - [QFP] = Quad Flat Package
  - [QFN] = Quad Flats No Leads
  - [CBGA] = Ceramic Ball Grid Array, small component [up to 01005 size]
  - [Small component (01005)] = SMD with 0.2 x 0.4 mm
  - [SMD plug]
  - [BGA plug]
- [Dip mode]: You can choose from three soldering methods:
  - [No automation]: Normal soldering without flux material dipping and without using a component that is coated with solder paste. The component is picked up from the component tray, aligned and placed in the soldering position.
  - [Auto. Dip]: The dip stencil prepared with flux material must be placed on the Dip & Print station holder. The component is lifted from the glass plate and immersed into the dip stencil's flux material; then it is aligned and placed in the soldering position.
  - [Auto. Print]: Place the print stencil prepared with the component coated with solder paste on the Dip & Print station holder. The component is picked up from the print stencil, aligned and placed in the soldering position.
- [Placing mode]: during soldering.
  - [Placement]: positioning the component using the contact sensor.
  - [Drop]: dropping the component through the PCB.
- [Drop height]: during soldering. Height above the PCB at which the component is dropped onto the PCB. Only possible if parameter [Drop] is selected.

### Starting the Rework process or performing a reference run

Bottom right you will find button [Start/Reference], with which the Rework process can be started. Make sure all settings have been properly made and the desired work steps selected before starting the Rework process. How to perform a soldering process is exemplified in Chapter --- FEHLENDER LINK --- .

If you only want to perform a reference run of the Rework system, select any work step. Click on [Start/Reference] and cancel the process after performing the reference run.

The correct soldering profile settings should be specified in the [Profile management] tab and saved as a soldering profile. Only possible as "Administrator" user. As to this, please read Chapter --- FEHLENDER LINK ---.

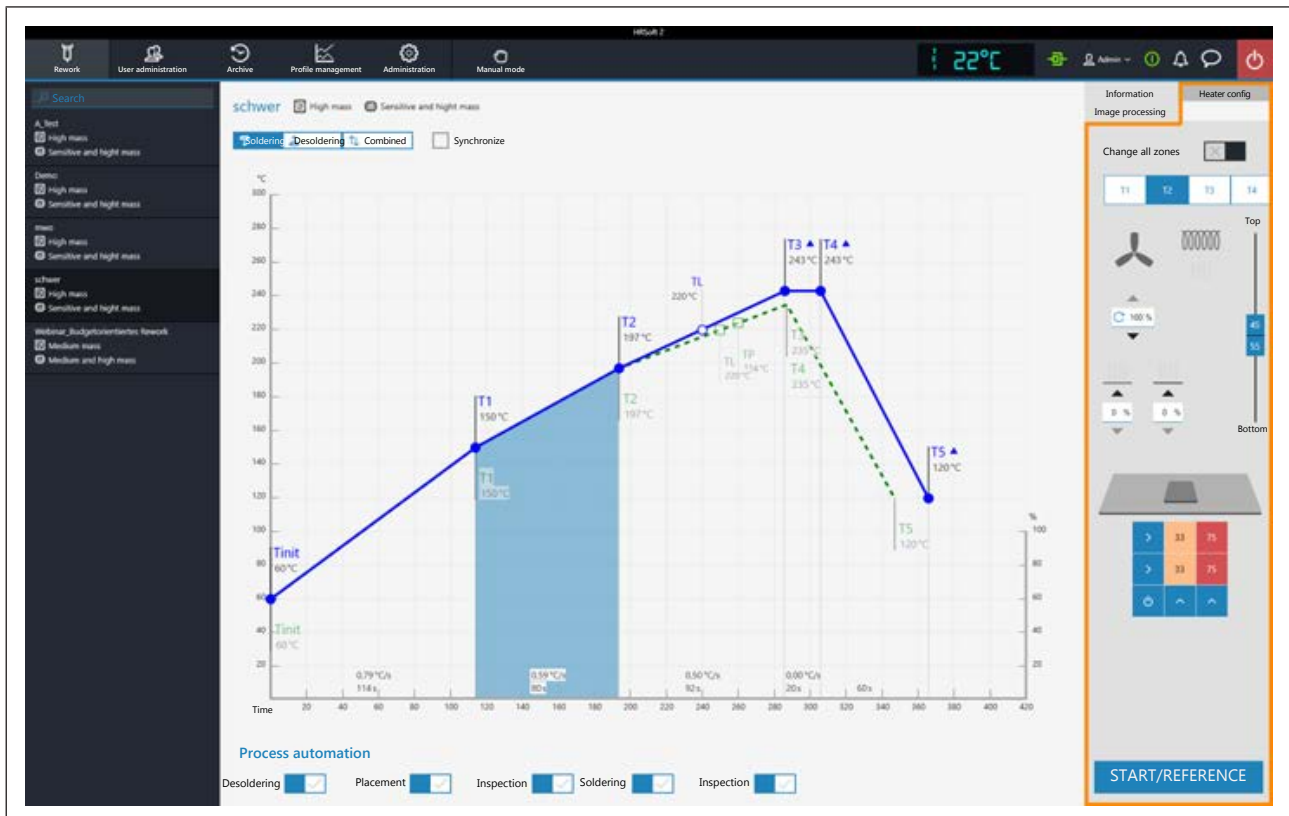


### 6.5.3.3 The [Heating setting] tabulator under the [Rework] tabulator

When calling up tab [Heater config], chart (4) will be displayed in the middle of the screen with the heating curves and, below, the line with the buttons for the [Process automation] (6).

The heating curves in the middle of the screen can be changed. As to this, please read Chapter The chart in the [Rework] tabulator. Also the buttons in line [Process automation] (6) at the bottom can be always changed. As for this, please also read Chapter The [Process automation] buttons under the [Rework] tabulator. Use these buttons to enable or disable process steps.

For all changes that are made in tab [Rework], the following applies: changes are accepted but cannot be saved. If you switch from the [Rework] tab to another tab, all changes will be lost.



If you want to edit the heating settings specified in the soldering profile, deselect the [Combined] button and instead select the [Soldering] or [Desoldering] one. Buttons [Soldering] or [Desoldering] can each have their own heating curve including detailed heating settings or, by selecting button [Synchronize], the heating curve will be identical for both soldering processes. Click on button [Synchronize] to change the desoldering heating curve values to the soldering heating curve ones. The displayed heating settings are valid for the highlighted soldering curve.

#### The parameters in tab [Heater config]

[Change all zones]: if this button is selected, all [Tinit] heating phases up to T4 will be displayed in blue in tab [Heater config] as well as in chart (4). The parameters in tab [Heater config] will now apply to all heating phases. If button [Change all zones] is disabled, different heating parameters can be assigned to each of the four heating phases.

The following parameters can be edited here in the [Heater config] tab:



- Buttons T1 – T4: Selection of the heating phase to define the associated heating parameters. To highlight the corresponding button, you may also click the heating phase in the chart.
- Input field under the blower logo: Hot-air blower speed. Set the blower speed with the small triangle buttons or highlight the blower value and overwrite it. 100 % = maximum blower speed. A high blower value will slightly reduce the hot-air energy.
- Two input fields above the bottom heating matrix field: Control of the heating energy for the two heating zones in the bottom heating matrix field.
- Vertical controller (top - bottom): Top heating/bottom heating percentage power ratio. Adjust the power ratio to the heat requirement of your soldering process.
- Bottom heating matrix field: it is divided into two adjustable zones, Left and Right.  
To edit the heating energy of a heating zone from 0% to 100%: Click on a number in the heating zone and overwrite the value. The darker a field is displayed, the higher the set temperature.  
The individual heating zones are switched on and off via both blue arrow fields below the heating zones.

Note that the components should not be heated too quickly as only slow heating will result in uniform temperature distribution. This will allow for a safe procedure.

Bottom right you will find button [Start ], with which the rework process can be started. Make sure you have made all settings correctly before starting the rework process. How to perform a soldering process is exemplified in Chapter ---  
FEHLENDER LINK --- .

The correct soldering profile settings should be specified in the [Profile management] beforehand. Only possible as "Administrator" user. As to this, please read Chapter [The \[Heating setting\] tabulator under the \[Rework\] tabulator \[▶ 63\]](#).

#### Also see

- 📖 Tutorial – Soldering or unsoldering a component [▶ 99]





#### **6.5.3.4 The tab with the arrow buttons [Image processing] under the tab [Rework]**

Do not use the functions under tab [Image processing].

In the field [Comment:] the user can read the information saved by the Administrator in the soldering profile.



### 6.5.4 The chart in the [Rework] tabulator

When selecting tab [Rework], chart (4) with the heating curves will be displayed in the middle of the screen and, below, the button row for the [Process automation] (6). The heating curves and the button for [Process automation] can be changed here.

For all changes that are made in tab [Rework], the following applies: changes are accepted but cannot be saved. If you switch from tab [Rework] to another tab, all changes will be lost.



The following buttons are available:

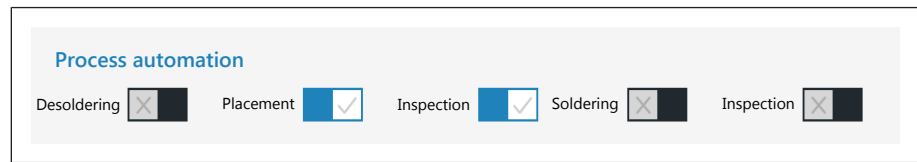
- [Soldering]: The soldering blue heating curve is highlighted in the chart. Then the heating curve for soldering may be changed. Functions can be set in tab [Heater config] for soldering.
- [Desoldering]: The desoldering heating curve is highlighted in green in the chart. Then the heating curve for desoldering may be changed. Functions can be set in tab [Heater config] for desoldering.
- [Combined]: The heating curves of the soldering and desoldering temperature are highlighted in the chart. The complete soldering process is displayed. The heating curves cannot be changed and tab [Heater config] is inaccessible. If you want to edit the heating settings specified in the soldering profile, deselect button [Combined] and, instead, select buttons [Soldering] or [Desoldering].
- [Synchronize]: changes the desoldering heating curve into the soldering one. Both heating curves will be congruent. In this status, any changes to the chart and functions in the [Heater config] tab will affect soldering and desoldering.

For the temperature values of the thermocouples, the left Y-scale of the chart with the temperature values applies. For correcting variables (e.g. TC infrared coil, Outer IR emitter) the right Y scale in the chart indicating maximum values of 100% applies.



### 6.5.5 [Process automation] and its process steps

Under the chart there is the [Process automation] (6) button row.



These buttons enable or disable process steps. The process flow starts with the first process step on the left and continues by performing the selected process steps on the right one after another.

- [Desoldering]: desoldering a component.
- [Placement]: placing a component in the soldering position. To do so, place the component on the component tray.
- [Inspection]: checking the position of the arranged component with the Rework System optical instruments.
- [Soldering]: soldering a positioned component.
- [Inspection]: Final check of the soldering result with the optical instruments of the Rework System.

How to perform a soldering process is exemplified in Chapter --- FEHLENDER LINK --- .

For all changes that are made in tab [Rework], the following applies: changes are accepted but cannot be saved. If you switch from tab [Rework] to another tab, all changes will be lost.

The correct soldering profile settings should be specified in the [Profile management] beforehand. Only possible as “Administrator” user. As to this, please read Chapter The [Process automation] buttons under the [Profile management] tabulator.

#### Also see

- 📖 Tutorial – Soldering or unsoldering a component [▶ 99]



## 6.6 The [Archive] tabulator

All started as well as aborted processes are saved in the archive as graphical charts with all set soldering parameters. These processes are listed in tab [Archive].

The screenshot shows the [Archive] tabulator interface. At the top, there are navigation tabs: Rework, Archive, User administration, Profile management, Administration, and Manual mode. Below the tabs is a search bar and a date range filter (from: 11.12.2018 to: 14.12.2018). The main area contains a table with the following columns: Tracking ID, Date, User, Profile name, Board, and Component. The table lists 20 process records, all performed by 'Admin' on 'Test 4' boards, with 'Low and medium mass' components. At the bottom left, there is a 'Process automation' section with checkboxes for Desoldering, Placement, Inspection, Soldering, and Inspection. On the right side, a sidebar displays technical details for the highlighted process: Profil Init Temp (86), Max Temperature (260), TL (227), TP (180), Lens (Lens25X33), pipette, and Pipette1.

In table [Archive], click on a process record to display the soldering profile details and the corresponding chart. The graphical elements of the chart can be exported as image files. The following functions are available in the [Archive]:

- [Search]: Search for letter sequences within the whole table contents. The search will automatically start after entering the first character.
- Button [View chart]: The highlighted chart will be displayed. For more information, see below in Chapter [View chart]. Charts that have no temperature record cannot be displayed.
- [from:]/[to:]: filtering processes by date.

The greyed-out column on the right shows further details of the highlighted process:

- [Profil Init Temp]: Temperature from which the process record begins.
- [Max Temperature]: Highest measured temperature in the soldering process.
- [TL]: Liquidus temperature entered for the process. No function, freely adjustable in the chart.
- [TP]: Only when desoldering. Pipette temperature at which the pipette moves to the component to lift it.
- [Lens]: Lens used in the process. Without function, can be freely adjusted in the chart.
- [pipette]: Pipette specified in the process. Without function, can be freely adjusted in the chart.

Range [Process automation] under the table shows the process steps adopted.



### 6.6.1 The [Show chart] button

The archived chart of the highlighted soldering process can be called up via the [View chart] button.



Fig. 17: Example for a chart

[Soldering] or [Desoldering]: Indicates whether the chart represents the soldering or desoldering process. If both methods were used in the process, these buttons can be used to change the view.

[CSV export]: Exports the recorded soldering profile data in the data format \*.zip. This ZIP file contains extensive data in three data formats:

- In \*.PDF format. This PDF file is displayed on screen immediately after export.
- In \*.CSV format (comma-separated values), e.g. for further processing in Microsoft Excel™.
- In \*.HRS2 format.

The storage path is: C:\program data\Ersa GmbH\HRSoft2\Temp

- i (Information) button on key: Display/hide the key. The chart lines shown may be selected in the [Heater config] tab.
- Plus button on chart key: To display a vertical measuring line to display values of the chart at any time on the time scale (X direction). The values are displayed at the intersection of the lines. Move the line with the mouse. It is possible to add further measuring lines.  
The values displayed on the left of the line are temperature values. The left Y scale of the chart with temperature values applies to them. The values to the right of the line are variables. The right Y scale of the chart with up to 100% percentages applies to them.
- Trash button on chart key: Delete the selected measuring line.

Tab [Information]: Display of the soldering process parameters.



Tab [Heater config]: Control of the chart display. If activated during the soldering process, the displayed chart lines can be selected in the [Show] column.

If for the soldering process in the [Change all zones] function has been switched off, the single heating phases T1, T2 .... can be clicked on and shown.

- [Device info] tab: Display of basic information about the device and software versions.
- Tab [Image processing]: Display of image processing settings.

The X button to close the chart is located on the top right of the chart.

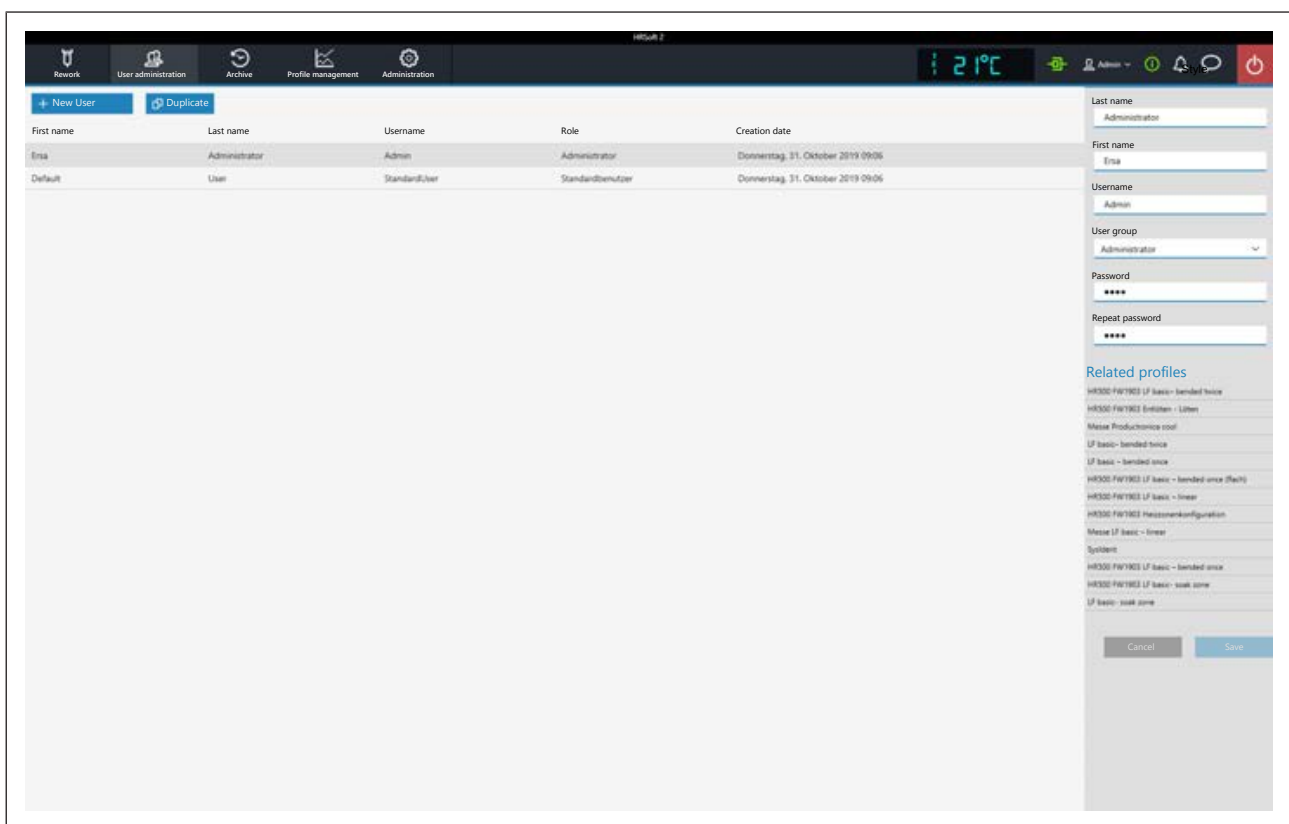


## 6.7 The [user management] tabulator

Two user classes are available in the HRSoft 2 program: “Administrator“ and “Standard user.“ After starting the HRSoft 2 program, the user class will be determined by the user name and password in dialog [Login]. With administrator rights you may access all functions. As a standard user, you may only use the soldering profiles enabled for this user, and not save any changes made.

Note: To assign a user to a soldering profile as an administrator, switch to tab [Profile management]. This tab is only visible to administrators. Here it is possible to assign users to soldering profiles so that these users can see and use the soldering profile in tab [Rework].

The list of users is only an illustration and cannot be edited directly. Click on a user in the list to display all information for this user in the greyed-out column on the right. All the soldering profiles which this user has been assigned to are displayed on the bottom right.



The following functions are available for the administrator under [User administration]:

- Button [New User]: one more line is created for the new user. Then enter all parameters for the new user into the greyed-out column on the right. A red warning triangle is located close to the input fields yet to be filled in. Also assign a user class to the user with selection field [User group]. The [Username and [Password] must be entered into dialog [Login] when starting the HRSoft 2 program. Do not forget the password, or write it down and keep it in a safe place.
- Button [Duplicate]: Creates a copy of a user. Select a user and click on button [Duplicate] to create a copy of this user. Then enter all parameter fields for the new user into the greyed-out column on the right.



- Button [Auto-archiving]: if activated, all soldering processes for this user will be stored in the archive. Started and cancelled processes will be saved in the archive as graphics and in all soldering parameters. With regard to this, please also read Chapter --- FEHLENDER LINK ---.

You can change the user at any time. To do this, click on the button with the current user name in the top right corner and call up function [Logout]. The latter will open dialog [Login] into which you should enter [Name] and [Password] of the new user.

#### **How to delete a user**

- a) Highlight the user to be deleted.
  - ⇒ A button will appear in the user line as a red trash icon.
- b) Click on the trash button.
  - ⇒ The user has been deleted.





## 6.8 Editing the soldering profile in the [Profile management] tab and changing it permanently

### 6.8.1 Overview of the [Profile management] tabulator

In tab [Profile management], you can create, edit, copy, delete and save soldering profiles as an administrator. If you are logged in as a standard user, this tab will not be available. Tab [Profile management] largely corresponds to the content of tab [Rework], where you can also make changes to the soldering profile, but they cannot be saved. In tab [Rework] soldering processes are started and controlled. For a description of tab [Rework], please read Chapter [Temporarily editing the soldering profile in the \[Rework\] tab](#) [▶ 57].

Dialog [Profile management] is divided into the following fields:



Fig. 18: Fields in tab Profile management

1	Tab bar. Viewing tabs and the button bar [Manual mode]	2 Display and buttons to open dialogs, from left to right: <ul style="list-style-type: none"> <li>– Display of the temperature of the assigned temperature sensor</li> <li>– Display Icon green = Network connection established, red = No network connection</li> <li>– Button “User name” to change user</li> <li>– Button to open dialog [System state]</li> </ul> Button to close the HRSoft 2 program For this purpose, please read Chapter <a href="#">The top bar in the HRSoft 2 program</a> [▶ 56].
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<p>3 Selection of a soldering profile. Searching for profile names is possible. From top left to top right, the buttons allow you to:</p> <ul style="list-style-type: none"> <li>– Create a new soldering profile</li> <li>– Copy the highlighted soldering profile</li> <li>– Delete a soldering profile</li> <li>– Save the highlighted soldering profile</li> </ul> <p>For this purpose, please read Chapter <a href="#">Create, copy, delete and save soldering profiles in the [Profile management] tabulator</a> [▶ 74].</p>	<p>4 Chart / soldering curves. Display of the soldering process with curves for soldering and desoldering. Soldering curves can be changed at the points in the curves.</p> <p>For this purpose, please read Chapter <a href="#">The chart in the [Profile management] tabulator</a> [▶ 83].</p>
<p>5 Parameter bar with tabs [Information] and [Heater config] as well as small arrow key to open a dialog [Image processing].</p> <p>For this purpose, please read Chapter Tutorial.</p>	<p>6 Workflow bar for determining the process flow steps (from left to right). For this purpose, please also read Chapter <a href="#">The [Process automation] buttons under the [Profile management] tabulator</a>.</p>

The functions of tab [Profile management ] largely correspond to those of tab [Rework]. For a description of tab [Rework], please read Chapter [Rework] tabulator overview.

You also have access to tabs [Archive], [User administration], [Profile management], [Administration] and button [Manual mode].

The functions of tab [Profile management] are described in detail in the following chapter.

### 6.8.2 Create, copy, delete and save soldering profiles in the [Profile management] tabulator

A soldering profile is a file in which the whole soldering process is defined. With the list of soldering profiles, you may execute the following functions using the four buttons (from the left to the right):





Plus symbol = Create a new soldering profile

Duplicate file = Duplicate a selected soldering profile

Recycle bin = Delete a selected soldering profile

Floppy disk = Save a selected soldering profile

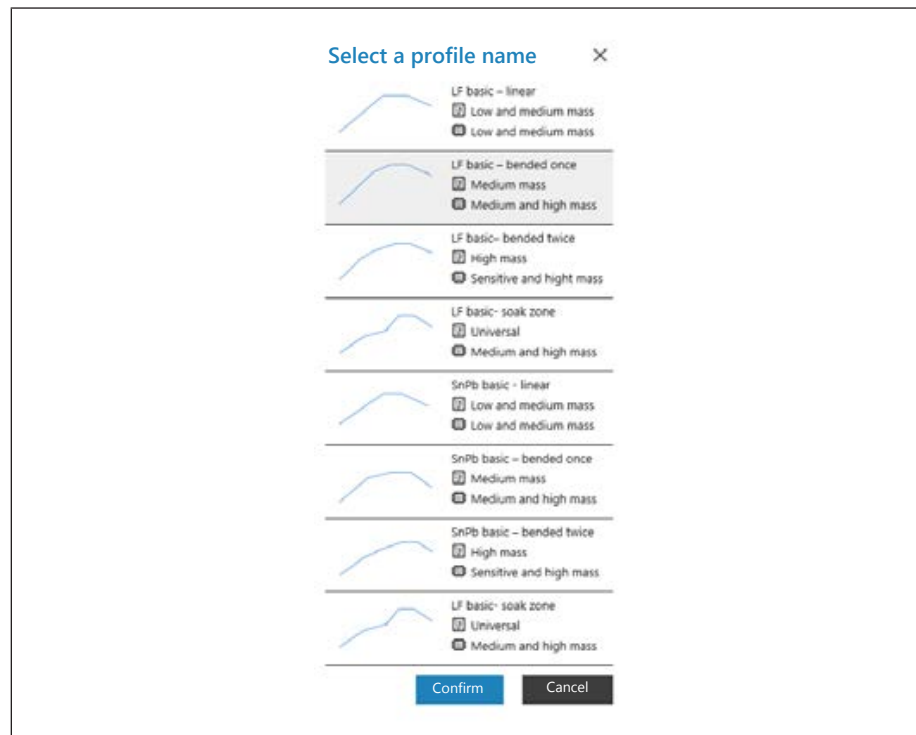
In the [Search] input field you may search the relevant profile names. The search begins automatically as soon as the first characters have been entered. All existing matches are marked in colour.



The soldering profiles have two rows for the definition of the PCB  and of the component . In these rows you may enter the relevant properties, such as board thickness, high/low component mass and unleaded/leaded solder.

#### Create a new soldering profile

a) Click on the “plus symbol” on the soldering profile list.

⇒ The [Select a profile name] window opens.



b) Among the eight templates available, select the profile template that best matches your new soldering profile and click on [Confirm]. The available templates have been defined based on actual applications. They show the temperature profile as a curve, while the two rows after the soldering profile name define the properties of the PCB  and of the component . If necessary, you may then adjust the selected profile template to your specific soldering process. With regard to this, please also read the The [Information] tabulator under the [User management] tabulatorchapter.

⇒ Row 1: Soldering profile names. The soldering templates are always identified as “basic”.

“LF” means “lead free”.


“SnPB” means tin-lead.


“linear” indicates a uniform heating-up phase.

“bended once” indicates a heating-up curve with one bend.

“bended twice” indicates a heating-up curve with two bends.

“soak zone” indicates a heating phase with reduced heat from T1 to T2, for the activation of the flux material.

⇒ Row 2: PCB name . This is defined by default when selecting the profile template. The templates are named “Low and medium mass” for low to medium PCB mass, “Medium mass” for medium PCB mass and “High mass” for high PCB mass, while “Universal” is suitable for all types of PCB. If you want, you may rename the PCBs.

⇒ Row 3: Component name . This is defined by default when selecting the profile template. The templates are named “Low and medium mass” for low to medium component mass, “Medium and high mass” for medium to high component mass and “Sensitive and high mass” in case of high-mass or sensitive components. If you want, you may rename the components.

c) Click on the [Confirm] button.

⇒ The new profile is added at the end of the profile list.

d) Save the profile with the “floppy disk” button on the soldering profile list.



⇒ Change the new profile based on your specific needs. With regard to this, please also read the The [Information] tabulator under the [User management] tabulatorchapter.

### **Copy a soldering profile**

a) In the soldering profile list, click on the soldering profile you wish to copy.

b) Click on the “duplicate file” button on the soldering profile list.

⇒ The copied profile will now appear at the end of the profile list. Change the profile based on your specific needs. With regard to this, please also read the The [Information] tabulator under the [User management] tabulatorchapter.

### **Delete a soldering profile**

a) In the soldering profile list, click on the soldering profile you wish to delete.

b) Click on the “recycle bin” button on the soldering profile list.

⇒ The soldering profile was deleted.

### **Save a soldering profile**

a) In the soldering profile list, click on the soldering profile you wish to save.

b) Click on the “floppy disk” button on the soldering profile list.

⇒ The copied profile was saved.



### 6.8.3 The tabulators [Information], [Heating setting] and the arrow key [Image processing]

When the [Heater config] tab is called up, the chart (4) with the heating curves is displayed in the middle of the screen, and below the line with the buttons for the [Process automation ] (6).

The heating curves in the middle of the screen can be adjusted for the desired soldering process. With regard to this, please read Chapter The chart in the [Rework] tabulator. You can also change the buttons in the [Process automation] line (6) at the bottom at any time. With regard to this, please also read Chapter The [Process automation] buttons under the [Rework] tabulator. These buttons enable or disable any process steps.

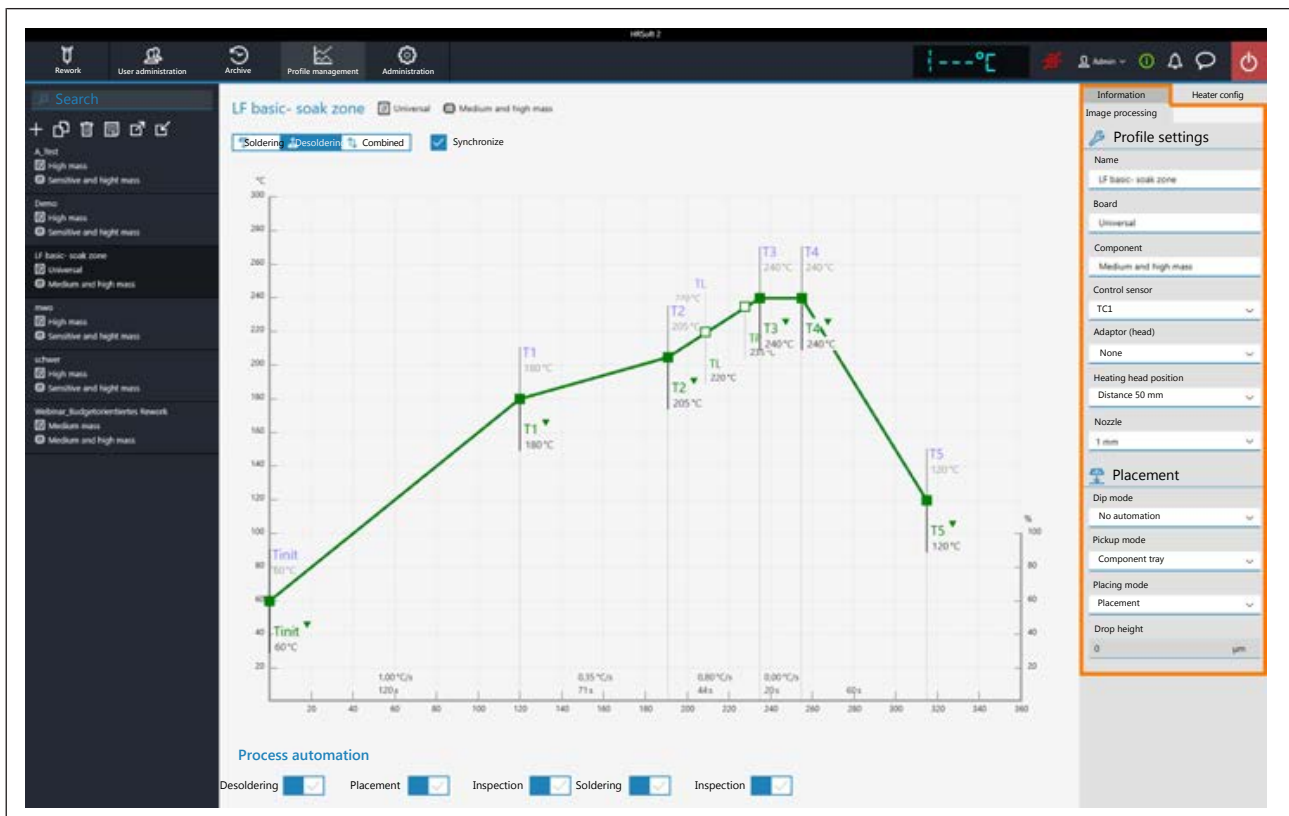
All the changes performed in the [Rework] tab will be accepted but not saved. If you switch from the [Rework] tab to another tab, all changes will be lost.

On the bottom right there is the [START/REFERENCE] button, which starts the rework process. Make sure you have made all settings correctly before starting the rework process. How to perform the soldering process is described by way of example in the --- FEHLENDER LINK ---.

The correct soldering profile settings should be specified in the [Profile management] tab beforehand. Only possible as "Administrator" user. With regard to this, please read Chapter The tabulator with the small arrow key (Image processing) under the [Profile management] tabulator.

#### 6.8.3.1 The [Information] tabulator under the [User management] tabulator

The heating curves in the middle of the screen can be changed. Also the buttons in the [Process automation] line can always be changed. Use these buttons to enable or disable process steps.







### The parameters in tab [Information]

The following parameters can be edited here in tab [Information]:

#### In range [Profile settings]:

- [Name]: is specified by the profile template selection. Assign a different name if desired. As to this, please also read Chapter [Create, copy, delete and save soldering profiles in the \[Profile management\] tabulator \[ 74\]](#).  
The profile templates are always referred to as “basic.”  
“LF” stands for lead free.  
“SnPB” stands for tin lead.  
“Linear” stands for a uniform heating phase.  
“Bent once” stands for a heating curve with a single bend.  
“Bent twice” stands for a heating curve with two bends.  
“Soak zone” stands for heat-reduced heating phase from T1 to T2 to activate the flux material.
- [Board]: It is defined by the profile template selection (  ). The templates are called “Low and medium mass” for low to medium PCB mass, “Medium mass” for medium PCB mass, “High mass” for high PCB mass, and “Universal,” suitable for each PCB type. Assign a different PCB name if desired.
- [Component]: It is defined by the profile template selection (  ). The templates are called “Low and medium mass” for low to medium component mass, “Medium mass” for medium to high component mass, “Sensitive and high mass” for sensitive and high mass components. Assign a different component name if desired.
- [Control sensor]: Selection of the temperature sensor that controls the soldering process through the temperature it measures. [TC1] (thermocouple 1) or [TC2]. The currently measured temperature of the selected sensor is displayed in range (2).
- [Adaptor (head)]: used adaptor (air baffle). No function, only used to save info.
- [Heating head position]: Solder distance from PCB 50 mm.
- [Nozzle]: Used pipette. No function, only used to save info.

#### In range [Placement]:

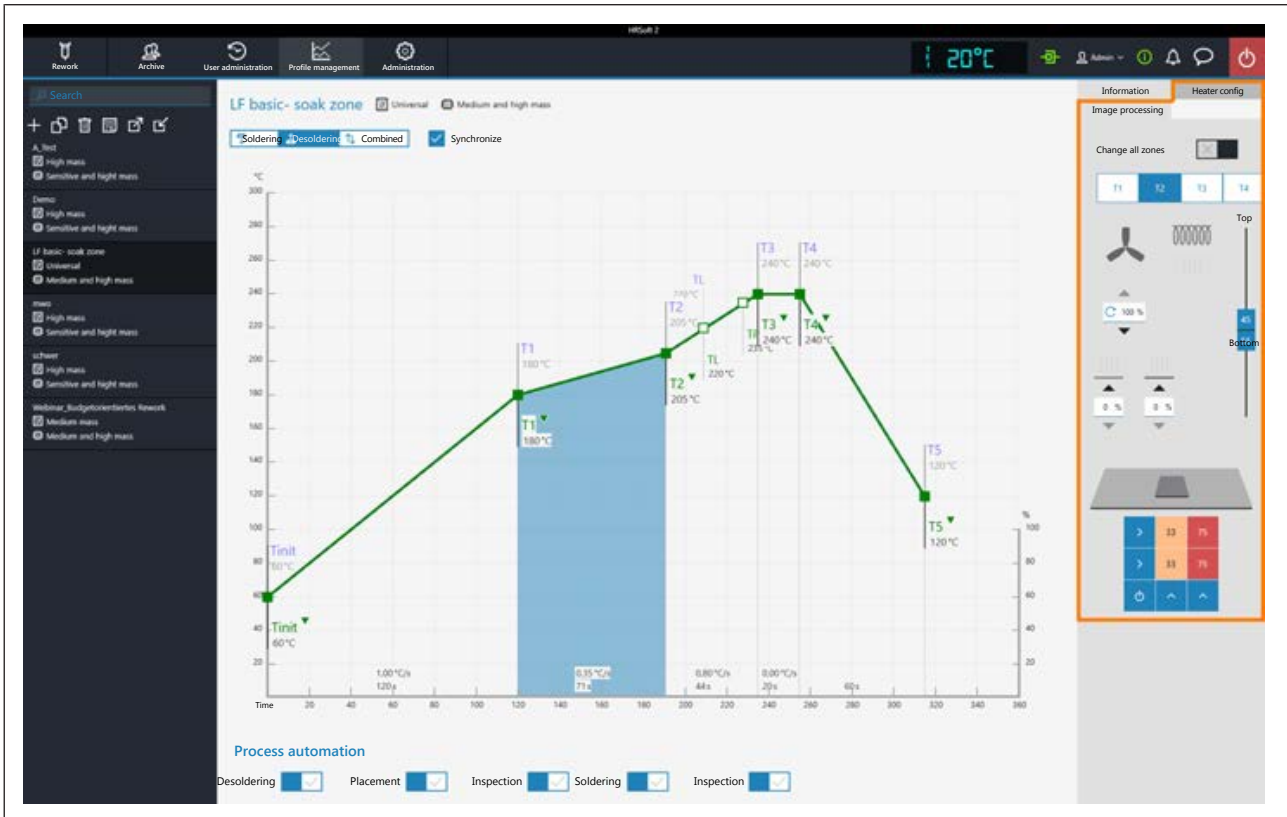
- [Dip mode]: Two positioning methods are available for selection:
  - [No automation]: For ordinary positioning and for the positioning of components, which are coated with soldering paste. The component is picked up from the component tray, aligned and placed in the soldering position.
  - [Auto. Dip]: To position the components that are previously immersed in the dip-template with flux material.
- [Placing mode]: during [Placement]: Positioning of the component using the contact sensor, or [Drop]: dropping the component through the PCB.
- [Drop height]: during soldering: Height above the PCB at which the component is dropped onto the PCB. Can only be changed if parameter [Drop] is selected.

To temporarily edit the soldering profile parameters, please read Chapter [The \[Information\] tabulator under the \[Rework\] tabulator](#).



### 6.8.3.2 The [Heating setting] tabulator under the [Profile management] tabulator

The heating curves in the middle of the screen can be changed. Also the buttons in line [Process automation] (6) can always be changed. Use these buttons to enable or disable process steps.



If you want to edit the heating settings specified in the soldering profile, deselect the [Combined] button and instead select the [Soldering] or [Desoldering] one. Buttons [Soldering] or [Desoldering] can have their respective heating curve including detailed heating settings or, by selecting button [Synchronize], the heating curve will be identical for both soldering processes. Click on button [Synchronize] to set the desoldering heating curve to the values of the soldering one. The displayed heating settings are valid for the highlighted soldering curve.

#### The parameters in tab [Heater config]

[Change all zones]: if this button is selected, all [Tinit] heating phases up to T4 will be displayed in blue in tab [Heater config] as well as in chart (4). The parameters in tab [Heater config] will now apply to all heating phases. If button [Change all zones] is disabled, different heating parameters can be assigned to each of the four heating phases.

The following parameters can be edited here in the [Heater config] tab:

- Buttons T1 – T4: Selection of the heating phase to define the associated heating parameters. To highlight the corresponding button, you can also click on a heating phase in the chart.
- Horizontal controller: Distribution of top heating in % between hot air heating (fan sign) and infrared heater (heating spiral sign). The infrared heater cannot heat glossy surface components properly.
- Input field with round arrow under the fan logo: Hot-air blower speed. Set the blower speed with the small triangle buttons or highlight the blower value and overwrite it. 100 % = maximum blower speed. A high blower value will slightly reduce the hot-air energy.



- Vertical controller (top - bottom): Top heating/bottom heating percentage power ratio. Adjust the power ratio to the heat requirement of your soldering process.
- Two input fields above the bottom heating matrix field: Control of the heating energy for the two heating zones in the bottom heating matrix field.
- Bottom heating matrix field: it is divided into two adjustable zones, Left and Right.  
To edit the heating energy of a heating zone from 0% to 100%: Click on a number in the heating zone and overwrite the value. The darker a field is displayed, the higher the set temperature.  
The individual heating zones are switched on and off via both blue arrow fields below the heating zones.

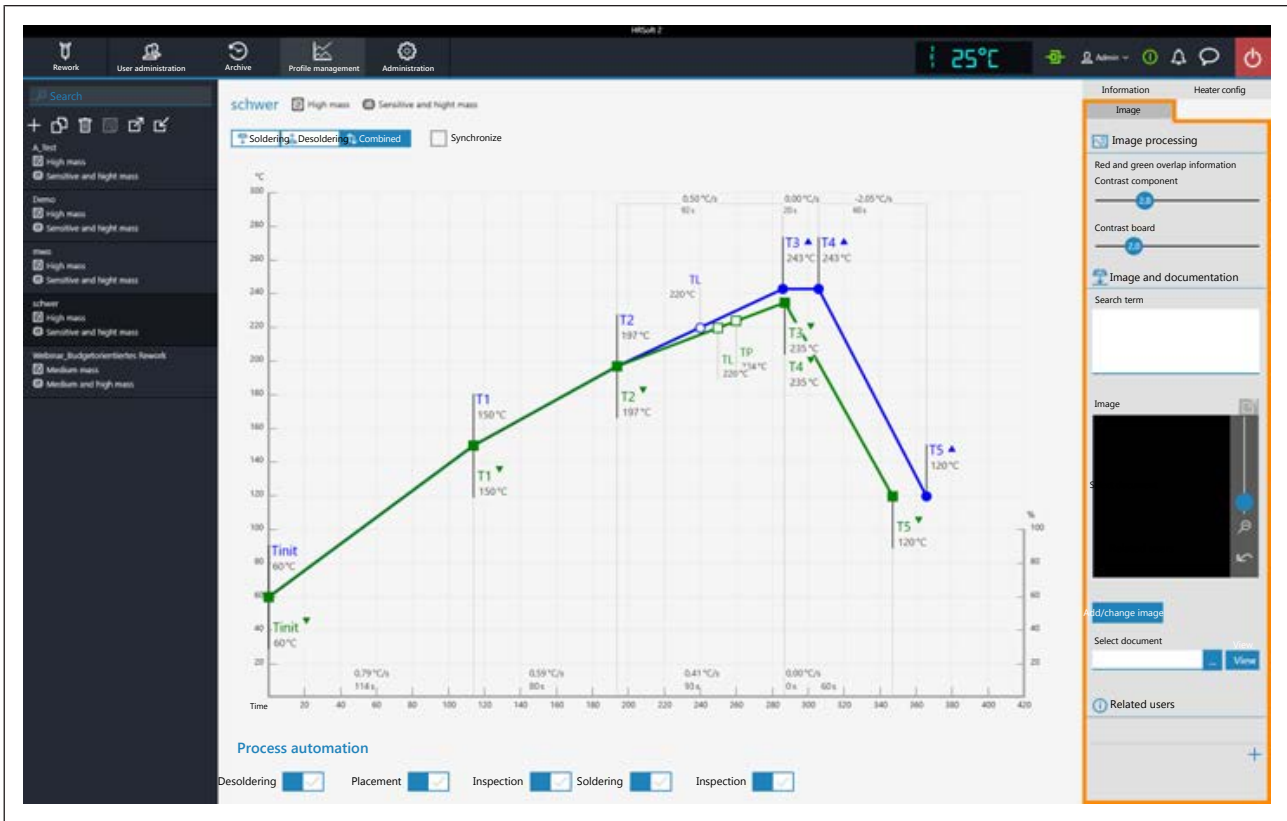
Note that the components should not be heated too quickly as only slow heating will result in uniform temperature distribution. This will increase the safety level of the process.

To temporarily edit heating parameters, please read Chapter The [Heating setting] tabulator under the [Rework] tabulator.






### 6.8.3.3 The [More] tab under the [Profile Management] tab / Create user



#### In field [Image processing]

- [Red and green overlap information]: Do not use.
- [Contrast component]: Do not use.
- [Contrast board]: Do not use.

#### In field [Image and documentation]:

- [Comment:]: Field for entering information to be stored for the users of this soldering profile.
- [Image]: Click button [Add/change image] to add an image that can serve as a piece of information for the user of this soldering profile. The camera image can be zoomed with the controller on the right of the camera image or with the mouse wheel. Click button  to activate the full screen mode.
- [Add/change image]: Add an image that can serve as a piece of information for the user of this soldering profile.
- [Select document]: Click the button with the three dots to integrate the soldering profile with a PDF file containing information on the soldering profile.
- [View]: Display of the PDF file for the soldering profile.

#### In field [Related users]:

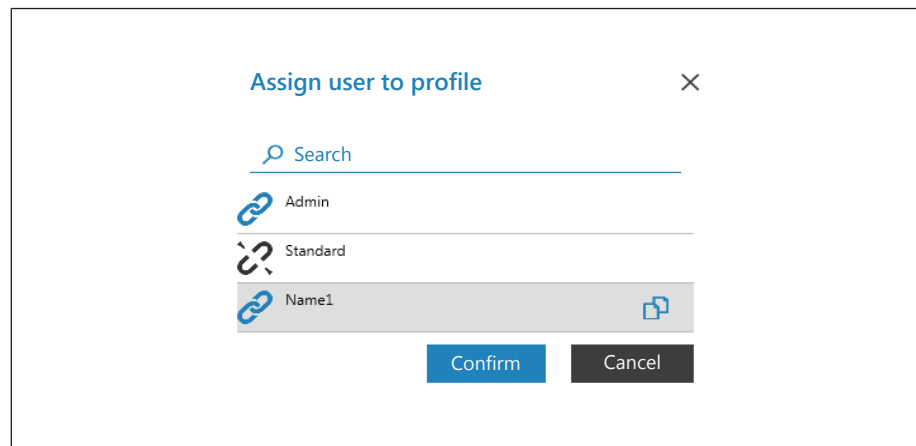
List of users, who can view and use this soldering profile in tab [Rework]. This may only be assigned here.

#### Assigning a user to the soldering profile

- Click the “plus” sign.



⇒ Dialog [Assign user to profile] will be displayed.



b) Click the user that you would like to assign. This one has an open chain icon.

c) Click the chain icon.

⇒ The chain icon is now closed.

d) Click [Confirm].

⇒ A user was assigned to the soldering profile. In dialog [Assign user to profile] you can also assign or remove other users by clicking on the chain icon.

### Deleting a user from a soldering profile

a) Click the username you want to delete in the tab with the small arrow button.

b) Move the mouse over the user name to be deleted.

⇒ A red trash icon will appear behind the username.

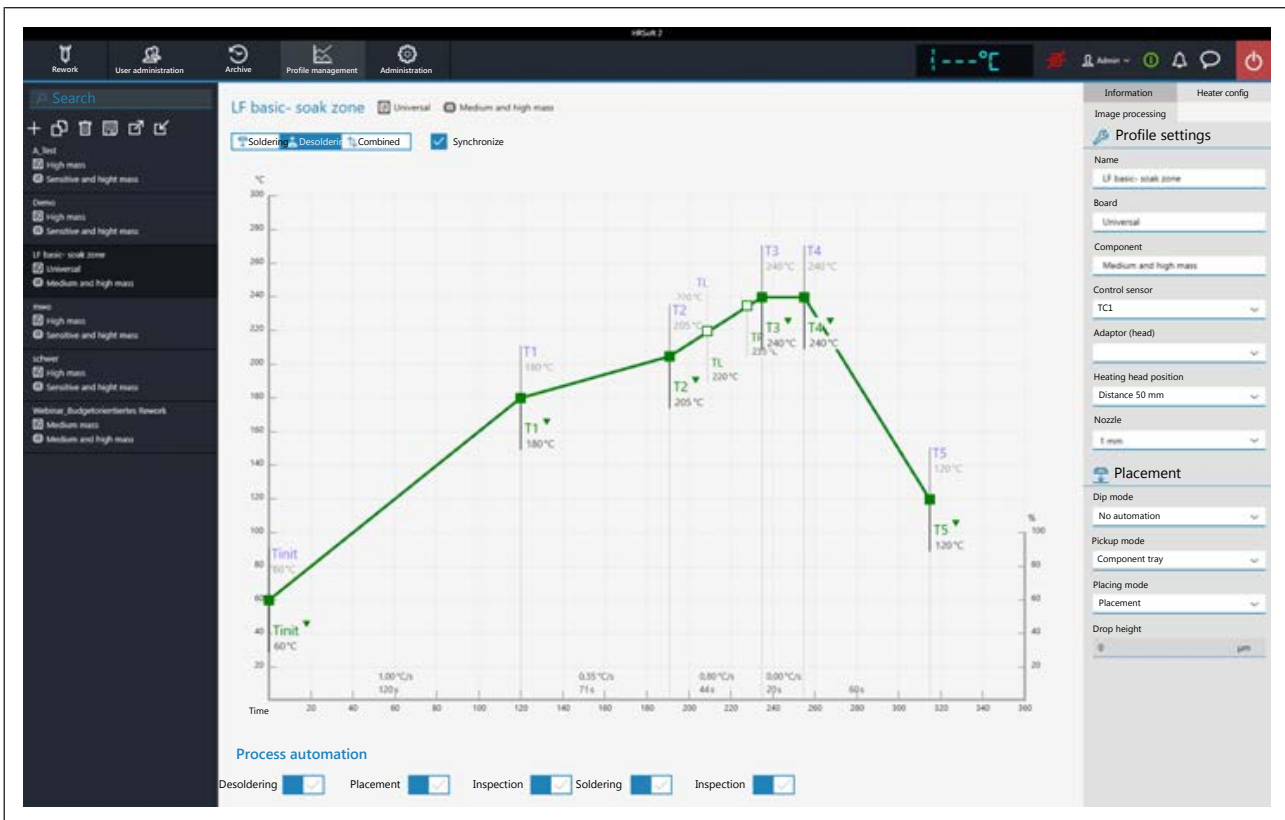
c) Click the trash icon.

⇒ A user was removed from the soldering profile.



### 6.9 The chart in the [Profile management] tabulator

Under tab [Profile settings], chart (4) with the heating curves will be displayed in the middle of the screen and, below, the button row for the [Process automation] (6). The heating curves can be changed here.



The following buttons are available:

- [Soldering]: The soldering blue heating curve is highlighted in the chart. The soldering blue heating curve can be changed and tab [Heater config] can be set for soldering
- [Desoldering]: The desoldering heating curve is highlighted in green in the chart. The desoldering red heating curve can be changed and tab [Heater config] can be set for desoldering.
- [Combined]: The heating curves of the soldering and desoldering temperature are highlighted in the chart. The complete soldering process is displayed. The heating curves cannot be changed and tab [Heater config] is locked. If you want to change the heating settings specified in the soldering profile, deselect button [Combined] and instead select button [Soldering] or [Desoldering].
- [Synchronize]: changes the desoldering heating curve to the soldering one. Both heating curves will be congruent. In this condition, the changes made to the chart and heater settings will affect both heating curves.

### 6.10 The heating curves in the chart in the [Profile Management] tab

A heating curve is divided into the five steps “Tinit – T1”, „T1 – T2“ etc. You may assign a specific temperature and time profile to each of these steps.

- [Tinit] = Temperature from which the process is displayed.
- Heating phase [Tinit] – T1, T1 – T2 and T2 – T3: Heating-up phases that allow for different configurations. The heating phases of the soldering and unsoldering process may differ starting from T2 .



- Heating phase T3 – T4: Hottest phase with constant temperature. The two values should always be identical: T3 = T4. At T4, the heatings turn off, and in case of unsoldering the component is picked up.
- Cooling phase T4 – T5: Cooling process after soldering. The cooler ventilation starts at T4 and cools until the selected T5 temperature is reached.
- TL = liquidus temperature, at which the solder becomes liquid. No function; however, you can mark this temperature.
- TP = only in case of unsoldering. Temperature at which the pipette moves to the component to lift it. The component is lifted from T4.

### Changing the heating curves

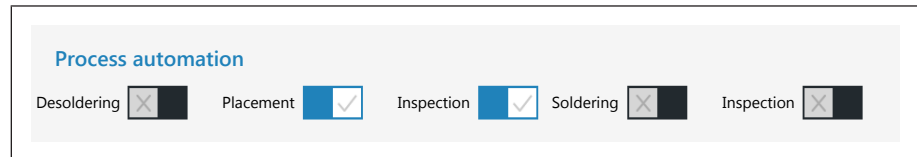
- Change temperature and heat phase duration at the first time: Click on one of the points [Tinit] – T5 on the heating curve and hold the mouse button down until the temperature is displayed in bold. Now move the point while keeping the mouse button pressed.
- Change the temperature: In the point to be changed on the heating curve, click on the relevant temperature. Enter the desired temperature or use the keys “Arrow up” and “Arrow down” in order to change the temperature.
- Change the heating power: In the heating phase below, click on the heating power to be modified and enter the new value. The maximum heating power is 2.5 K/s (2.5 °C/s). In the [Administration ] tabulator you may change the heating power unit by toggling between K/s and °C/s.
- Change the heating phase duration: In the heating phase below click on the time to be modified and enter the desired duration (in seconds) or use the keys “Arrow up” and “Arrow down” in order to change the duration.
- [TL] tabulator: Click on the temperature value of [TL] and enter the new liquidus temperature or use the keys “Arrow up” and “Arrow down” in order to change this temperature.
- [TP] tabulator: Click on the temperature value of [TP] and enter the new pipette temperature or use the keys “Arrow up” and “Arrow down” in order to change the temperature.

Please remember that the components should not be heated as quickly as possible: in fact, only a slower heating process can ensure an even temperature distribution. This will ensure a safe process



### 6.11 The [Process automation] buttons under the [Profile management] tabulator

Under the chart there is the [Process automation] (6) button row. Use these buttons to enable or disable process steps. The process flow starts with the first process on the left and continues by performing the selected process steps on the right one after another.



- [Desoldering]: desoldering a component.
- [Placement]: placing a component in the soldering position. To do so, place the component on the component tray.
- [Inspection]: checking the location of a positioned component with Visionbox.
- [Soldering]: soldering a positioned component.
- [Inspection]: final check of the soldering result with Visionbox.

How to perform a soldering process is exemplified in Chapter --- FEHLENDER LINK ---.

#### Also see

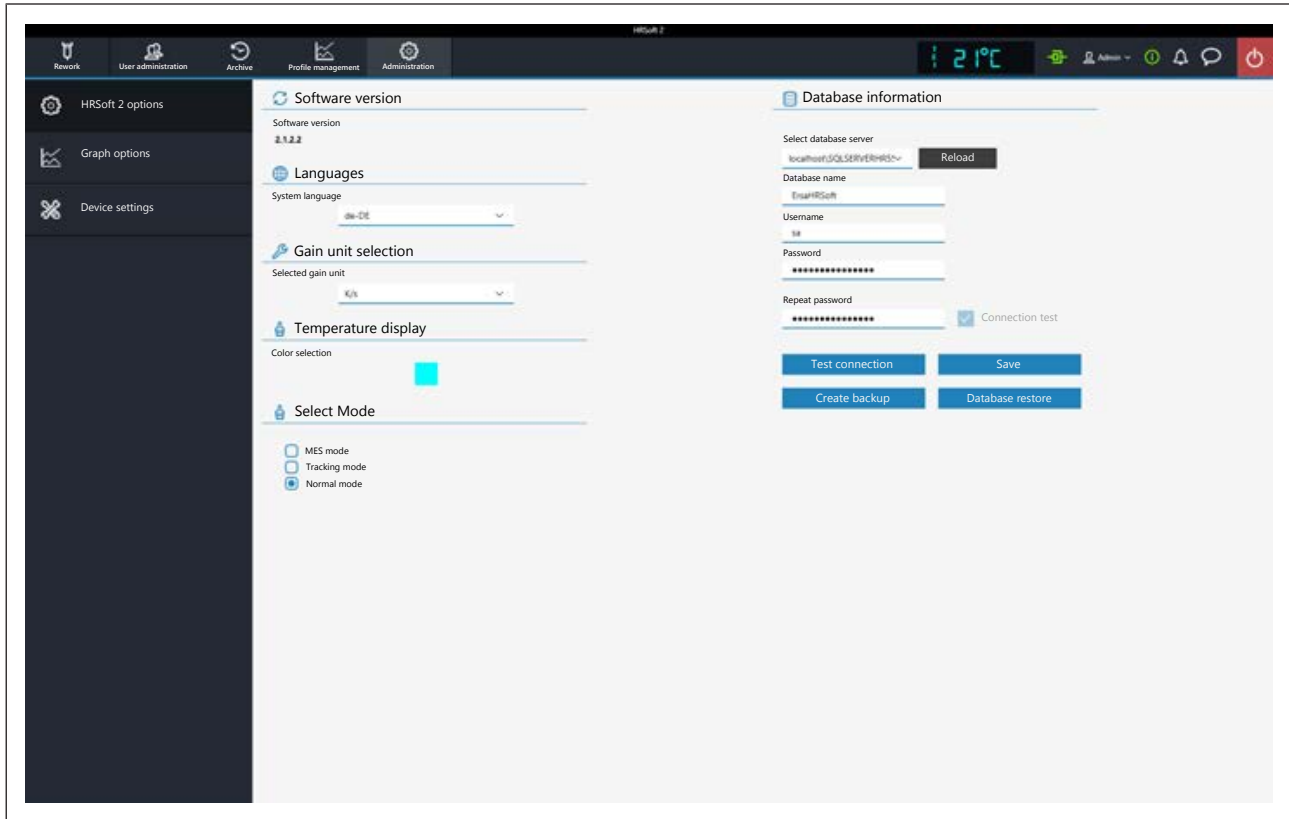
- 📄 Tutorial – Soldering or unsoldering a component [▶ 99]



## 6.12 The [Management] tabulator with three dialog windows

### 6.12.1 The dialog [HRSoft 2 settings]

In dialog [HRSoft 2 options], various default settings for the HRSoft 2 program are displayed.



#### Software version

The HRSoft2 software version.

#### Languages

[System language]: Switching the language of the user interface.

#### [Gain unit selection]

[Selected gain unit ]: Display of the unit in the chart as Kelvin per second or degrees Celsius per second.

#### [Temperature display]

[Color selection]: Colour of the temperature display top right. Click the coloured square to see all available colours.

#### [Select Mode]

Do not use.

#### [Database information]

The database stores user profiles and soldering processes among other things. In field [Database information] (see the description of the following functions), correct parameters must be entered to access the database.

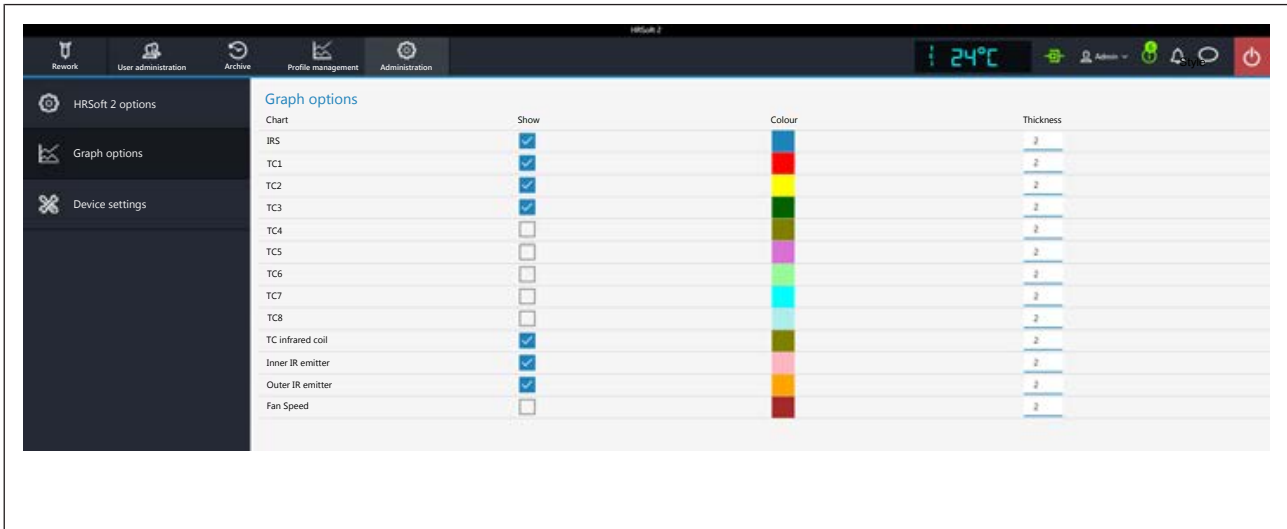


- [Select database server]: path to database. Click button [Reload] to determine the correct path.
- [Database name]: selected path of the database.
- [Username]: assign any user name.
- [Password]: password for network access protection.
- [Repeat password]: password for network access protection.
- [Connection test]: Click button [Test connection]. When the connection with the database has been established, a checkmark will appear.
- Button [Test connection]: Click this button for checking. When the connection with the database has been established, a checkmark will appear in checkbox [Connection test].
- Button [Save]: to save the database settings.
- Button [Create backup]: The database has been secured. The database includes, for instance, the soldering profiles, the archives and the system settings. A file with \*.bak extension is created. Use this function to send the database data to another computer.
- Button [Database restore]: A secured database (file extension \*.bak) can be read.



### 6.12.2 The [Chart settings] dialog

In dialog [Graph options], various chart default settings can be accessed.



You may access the following parameters:

In table [Graph options] determine which colours the measured curves in the chart should have. The measured curves in the chart can be displayed/hidden also during the current soldering process.

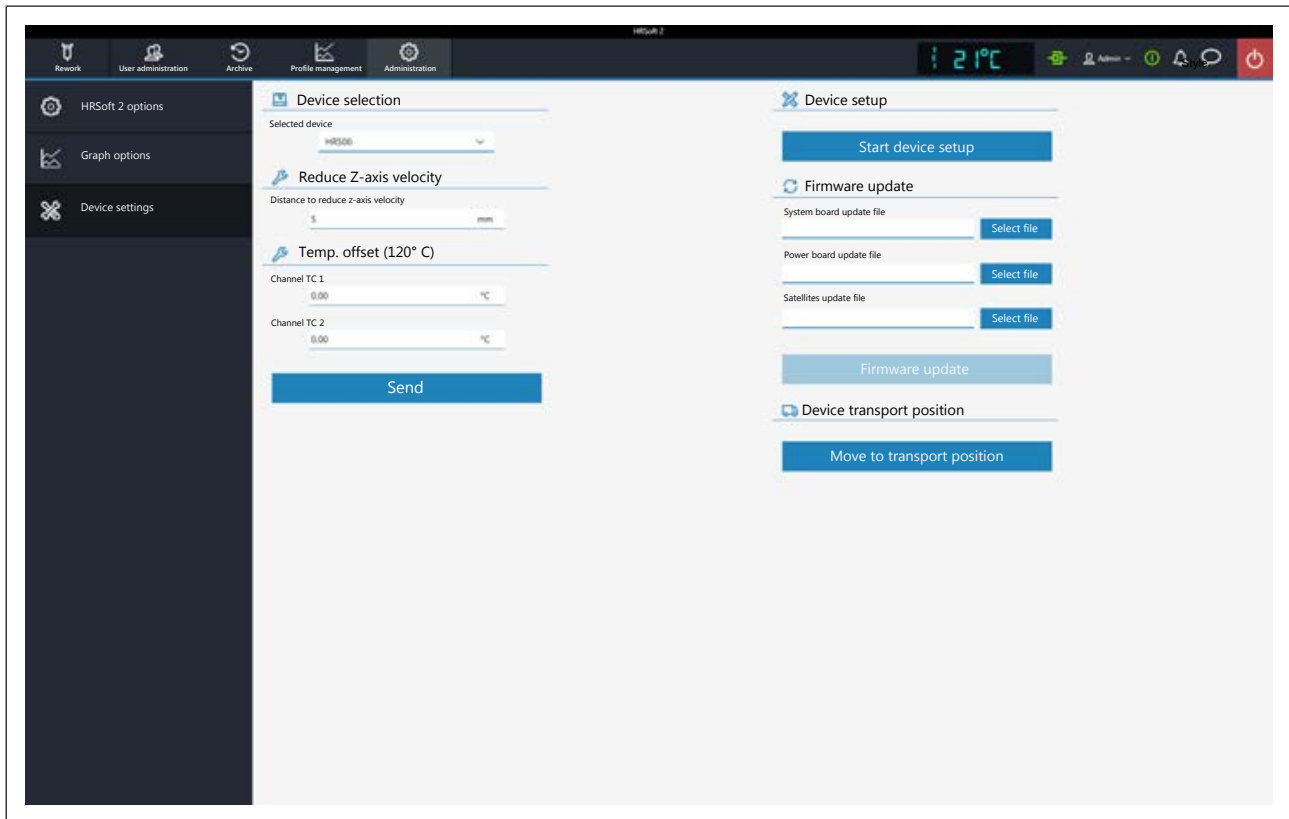
- Column [Show]: to display/hide the measured curve.
- Column [Colour]: colour of the measured curve. Click on the coloured square to display all available colours.





### 6.12.3 The [device settings] dialog

In dialog [Device settings], various pre-settings for the Rework System can be accessed.



#### Device selection

[Selected device]: select “HR 500”.

#### Reduce Z-axis velocity

– [Distance to reduce z-axis velocity]: For the last few millimetres before the contact point, the pipette must slow down the contact movement. The 0 value corresponds to the PCB surface.

- a) Enter the distance in millimetres at which contact movement must be slowed down. Keep a higher distance for large components.

#### Temp. offset (120° C)

– [Channel TC 1] to [Channel TC 2]: to enter correction values if the temperature readings of the thermocouples differ from the real temperatures.

- a) Measure the thermocouples with an external calibration tool at 120°C.
- b) Enter the values of the detected temperature differences (negative minus sign for negative values) into input fields from [Channel TC 1] to [Channel TC 2] to offset them.

#### Button [Send]

The temperature correction values were adopted and the Rework System will display the calibrated values of the temperature sensors.



## Device setup

### Button [Start device setup]

The process is guided by a wizard, similar to the wizard guiding you through the soldering process. The process is described in Chapter [The button \[Start Adjustment\]](#) [▶ 91].

### [Firmware update]

- [System board update file]: To update the system board firmware, click button [Open] and select the new system board firmware with file extension \*.bin. Then click button [Firmware update]. The system board firmware is updated. Normally, the required firmware update is shown by a bell icon in the display and button row top right. The number of required firmware updates will appear on the bell icon. Click the bell icon and start the update, which is run automatically.
- [Power board update file]: to update the Powerboard firmware, click button [Open] and select the new Powerboard firmware with file extension \*.bin. Then click button [Firmware update]. The Powerboard firmware will be updated. Normally, the required firmware update is shown by a bell icon in the display and button row top right. The number of required firmware updates will appear on the bell icon. Click the bell icon and start the update, which is run automatically.
- [Satellites update file]: to update the heating head and lower heating firmware, click button [Open] and select the new satellite firmware with file extension \*.bin. Then click button [Firmware update]. The Satellite firmware has been updated. Normally, the required firmware update is shown by a bell icon in the display and button row top right. The number of required firmware updates will appear on the bell icon. Click the bell icon and start the update, which is run automatically.
- [Amtel update file:]: only perform this, if specified by the Ersa service.
- [Xmos update file:]: only perform this, if specified by the Ersa service.

### Button [Firmware update]

- to start updating the firmware. The version of the installed firmware is displayed in dialog [Motion control information]. For this purpose, please read Chapter [The info icon: The \[System status\] dialog](#).

## Equipment transport position

### Button [Move to transport position]

- Before transporting the Rework System to another location, use button [Travel in transport position] to move the axis system to the safe transport position, thus avoiding any damage in transit! For this purpose, please also read Chapter [\[--- FEHLENDER LINK ---\]](#).

### Also see

-  [Switching off the Rework System](#) [▶ 97]



### 6.12.3.1 The button [Start Adjustment]

Always perform function [Start device setup] in Calibration of the heating head positions:

- after reinstalling the Rework system
- after relocating the unit.

Process [Start device setup] runs guided by a wizard, similar to the Assistant helping you through the soldering process.

A soldering nozzle must be always screwed to the pipette. As to this, please also read Chapter --- FEHLENDER LINK ---.



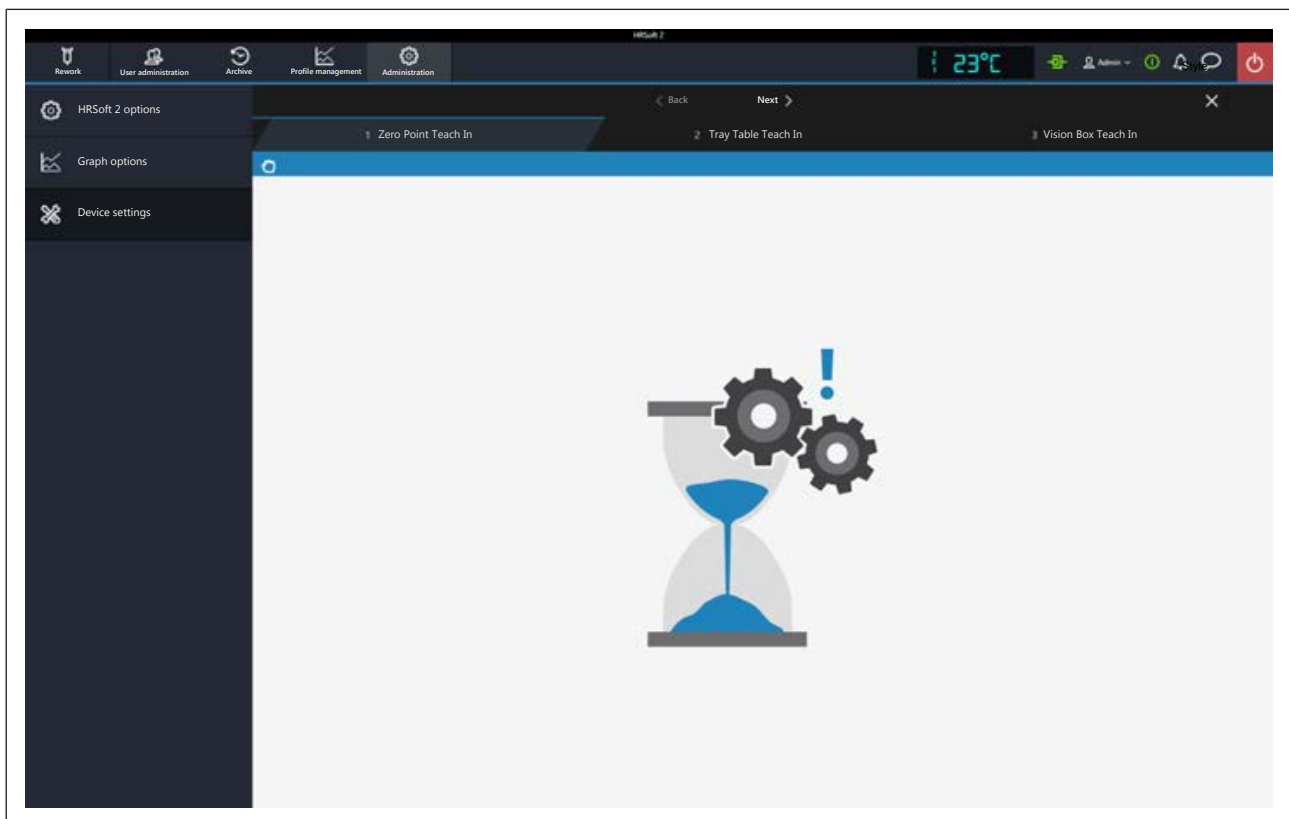
#### **CAUTION**

**Risk of burns from hot surfaces!**

- a) Touching the device surfaces may cause burns!

After clicking on the [Device settings] button in the [Start device setup] dialog, the Assistant will start maintenance mode. The information line above the diagram describes the work steps to be performed.

The pipette performs a reference run.



- Click on button [Next] or press the button “Next” at the bottom heating to proceed to the next work step.
- Place both the Visionbox and the heating head in central position.
- Place the black component tray on the right side of the bottom heating below the pipette. Then hold down the button on the front side of the bottom heating and move the bottom heating until the component tray lies below the position of the pipettes on the heating head.
- Click on the [Next] or press the “Next” button.



- ⇒ The pipette touches the component tray.
- a) Move the Visionbox to the left position, until the Vision Box is below the pipette.
- b) Click on the [Next] or press the “Next” button.
- ⇒ The pipette touches the Visionbox.
- ⇒ The calibration ends and the result is saved.

**Also see**

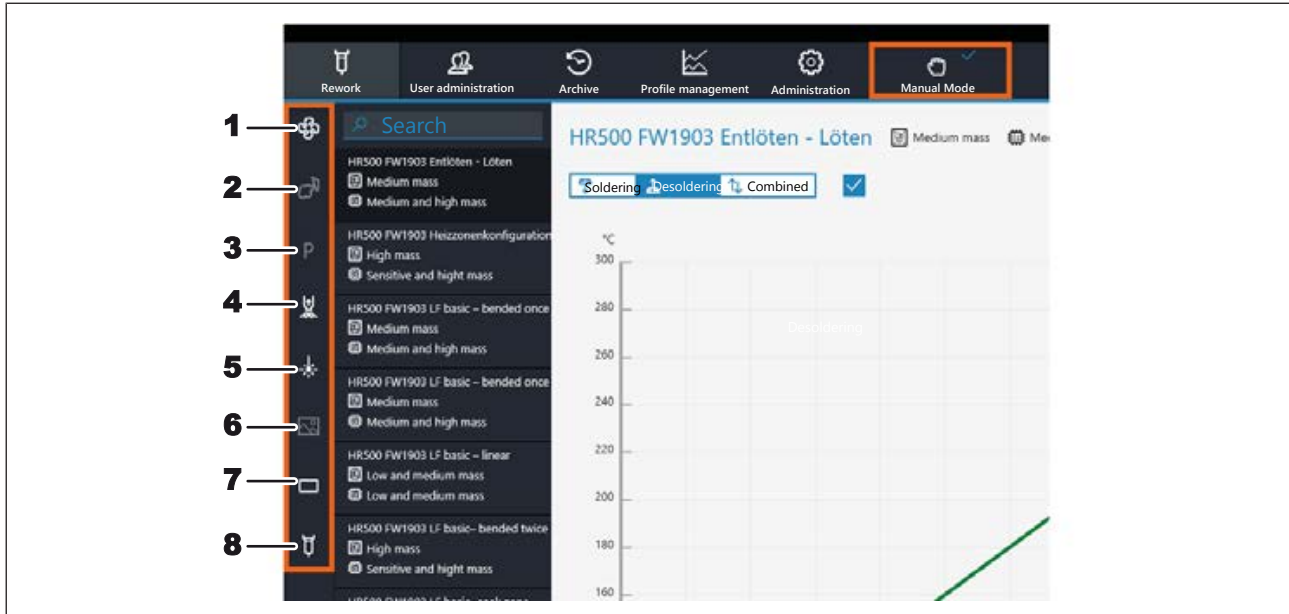
- 📄 Adjust the pipette size to the component [▶ 101]



### 6.13 The button [Manual Mode]

Use button [Manual mode] in tab [Rework] to display and hide the button row [Manual mode].

By moving the mouse over one of these buttons, a describing tool tip will be displayed.



The buttons allow the following functions to be switched on and off at any time:

- 1: Switching on/off the cooling blower
- 2: Optionally switching on and off the connected solder fume extraction system. If a solder fume extractor is connected, the button will be activated. The fume extractor switches on automatically at working temperatures above 120° C.
- 3: Move the pipette to parking position.
- 4: Switch on/off the pipette vacuum.
- 5: Switch on/off the pick-and-place laser.

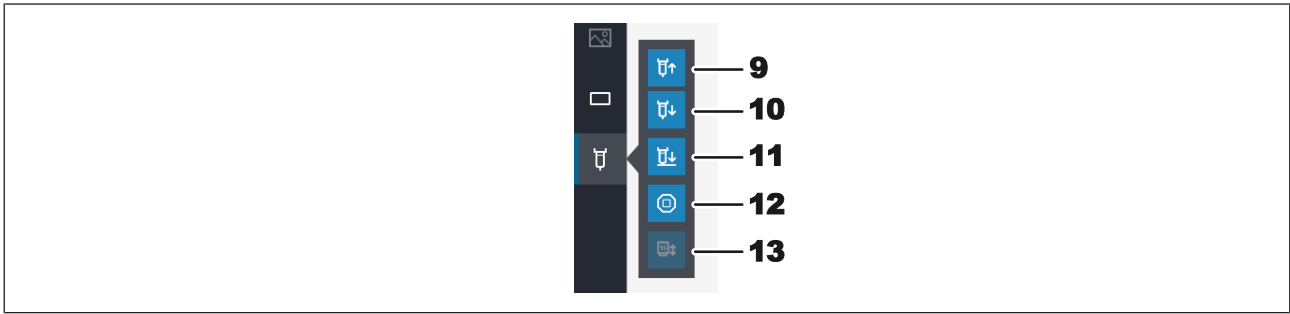


#### **! DANGER**

##### **Laser beam! Risk of injury due to retinal burns**

- a) Do not stare into the laser beam!
- b) Do not point the laser beam at other people! Reflecting surfaces under the laser generate reflections!
- c) Class 2 laser according to DIN EN 60825-1:2008-5, P < 1 mW,  $\lambda = 650 \text{ nm}$


- 6: By clicking this button the current image of the top camera is saved in data format \*.bmp in the folder C:\Temp\CapturedImages.
- 7: Switch on/off the Vision Box lighting. This opens a submenu for selection: red component camera at the top, white PCB camera at the bottom.
- 8: Manually trigger motor movements.  
A submenu with further pushbuttons is displayed:



- 9: The pipette moves up as long as the mouse button is pressed.
- 10: The pipette moves down as long as the mouse button is pressed.
- 11: The pipette moves down up to the contact.
- 12: Stop the pipette movement.
- 13: No function.

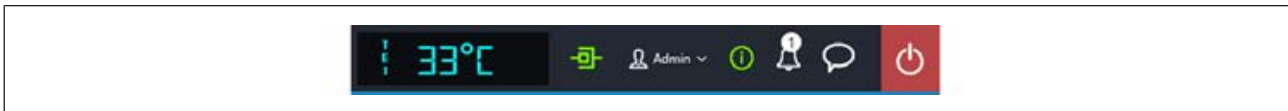
For details about the machine parts, please also read Chapter --- FEHLENDER LINK ---.

**Also see**

-  Overview of the machine parts [▶ 53]



### 6.14 The display and switch row top right



The displays and switches from left to right:

- In lower case and to the far left, the name of the selected temperature sensor. Next to it the current temperature measured by it.
- Icon for displaying the network connection between PC and rework system. Green = Network connection established.
- Button “User name”: To call up the edit dialog [Login] for changing user. As to this, please read Chapter --- FEHLENDER LINK ---.
- i-button to call up the [System state] dialog: If there are error messages, the digit in the circle will indicate the number of new error messages. Clicking the button opens the [System state] dialog with extensive status information on the single rework system components.

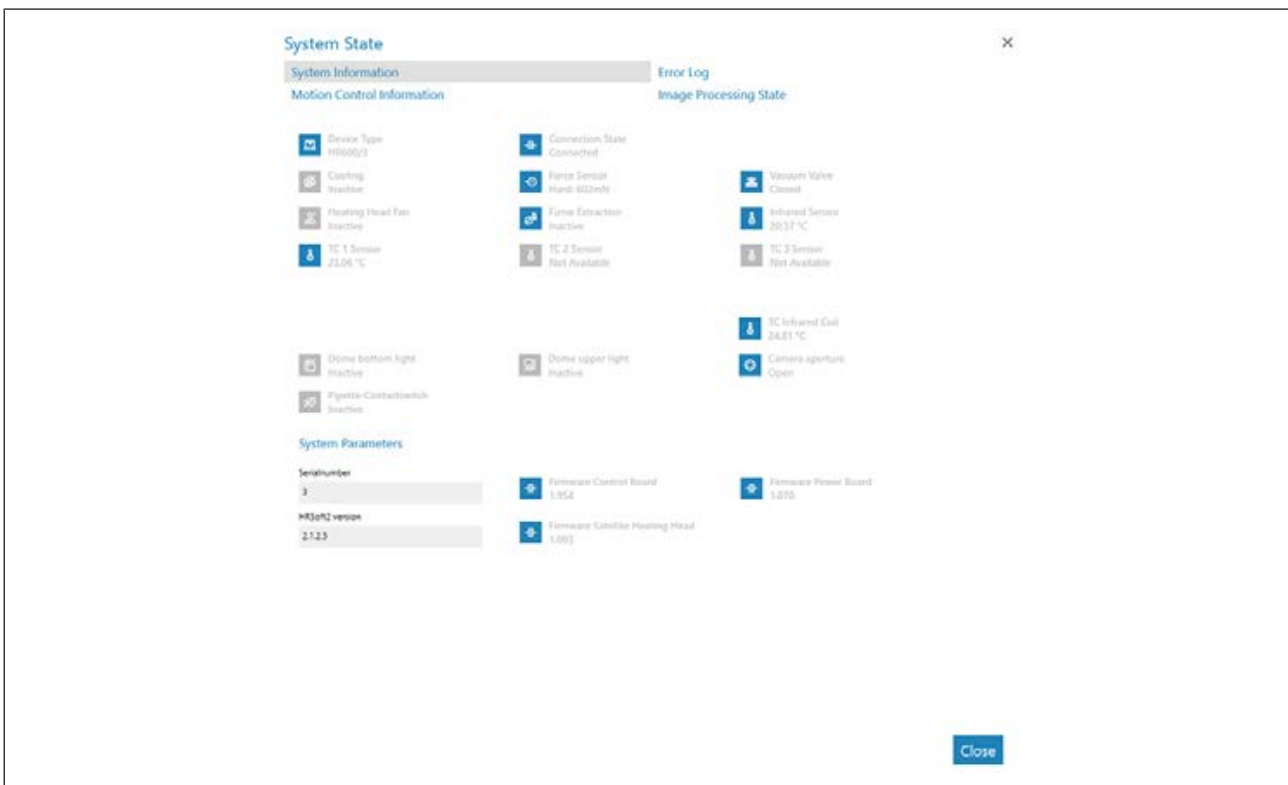


Fig. 19: Starting page of the "System State" field, example in English

The starting page of the info page [System state] shows three buttons [System information], [Error log] and [Motion control information], as well as, on the right, the arrow button [Image processing state].

- Click on the buttons and the arrow button in the top field to see the overview of the corresponding area.
- ⇒ The parameters displayed in blue are currently active. Depending on the parameter, additional info will be displayed. The parameters displayed in grey are currently inactive.

#### Range [System information]

- At the top: Display of the states of the basic Rework System components.



- Below [System Parameters]: Current levels of the installed HRSoft 2 version and firmware

#### **Range [Error log]**

List of accumulated error messages with date and descriptions. The new errors are highlighted in the [Active] column.

- a) If the causes of the active errors have been cleared, highlight these errors and deactivate them by clicking on the [Confirm] button.
- b) Sort the errors by type using the table with the [Severity filter] menu.

#### **Range [Motion control information]**

- [Top heater]: Statuses of the heating head components and firmware versions.
- [Table]: Only in case of Rework Systems of the 600 series. States of the bottom heating components and firmware versions.
- [Placer head]: Only in case of Rework Systems of the 600 series. State of the placing head components and firmware versions.

#### **The [Image processing state] arrow button**

- a) Click on the arrow button and then on the [Image processing state] button being displayed.
- Left column: State of the top camera components when the camera is active.
  - Right column: State of the optional RPC camera components when the camera is active:

#### **The bell icon**

indicates whether there are firmware updates for the Rework System. The number in the circle indicates the number of firmware updates.

- a) When a firmware update is displayed, click on the bell icon.
  - ⇒ A window will appear with info about the update.
- b) To perform the update, click on the [Update] button.

Please read Chapter The [device settings] dialog. It describes how to load the different variants of firmware updates into the Rework System.

#### **Speech balloon button**

Selection menu for problem reports, suggestions for improvement or general feedback to the manufacturing company (Ersa).

- Problem menu item: Dialog box to inform the manufacturer (Ersa) about a problem occurred with the Rework System.
- Suggestion menu item: Dialog box to submit the manufacturer (Ersa) a suggestion for improving the Rework System.
- Feedback menu item: Dialog box to give the manufacturer (Ersa) a positive or negative feedback on the Rework System.

#### **Red button to the far right**

- Closes the HRSoft 2 program.

#### **Also see**

- 📖 The [user management] tabulator [▶ 71]





### 6.15 Switching off the Rework System

Before relocating the Rework System, move the heating head to a safe transport position:

- a) In tab [Administration] open dialog [Device settings]. Click button [Move to transport position].

Regular switch-off:

- a) Terminate the HRSoft 2 program by clicking on the red Close button located in the upper right field.
  - ⇒ After editing the HRS file, you will be asked if you want to save the changes.
- b) Use the main switch to turn off the Rework System.
- c) Shut down the PC.





## 7 Tutorial – Soldering or unsoldering a component

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In what follows, the soldering and unsoldering process will be described step by step.

## 7.1 Insert the PCB

### NOTE

#### ESD hazardous components!



Electronic components can be damaged by electrostatic discharge. Please observe the warnings on the packaging or contact the manufacturer or supplier. To protect these components, an ESD (ESD = electrostatic discharge) safe workplace will be suitable. The HR 500 unit can be easily integrated into this environment. The user can use one of the push buttons on the front to, e.g., connect an ESD wrist band. The housing of the HR 500 is connected to a protective earth conductor of the power supply network through a low-heat device power cable. When handling the device, take the generally known precautions for ESD sensitive components.

### CAUTION



#### Material damage caused by overtightening the PCB holder!

Tighten all screws just enough to ensure that the PCB is securely fixed. Excessively high tightening torques can cause damage to threads and circuit boards!

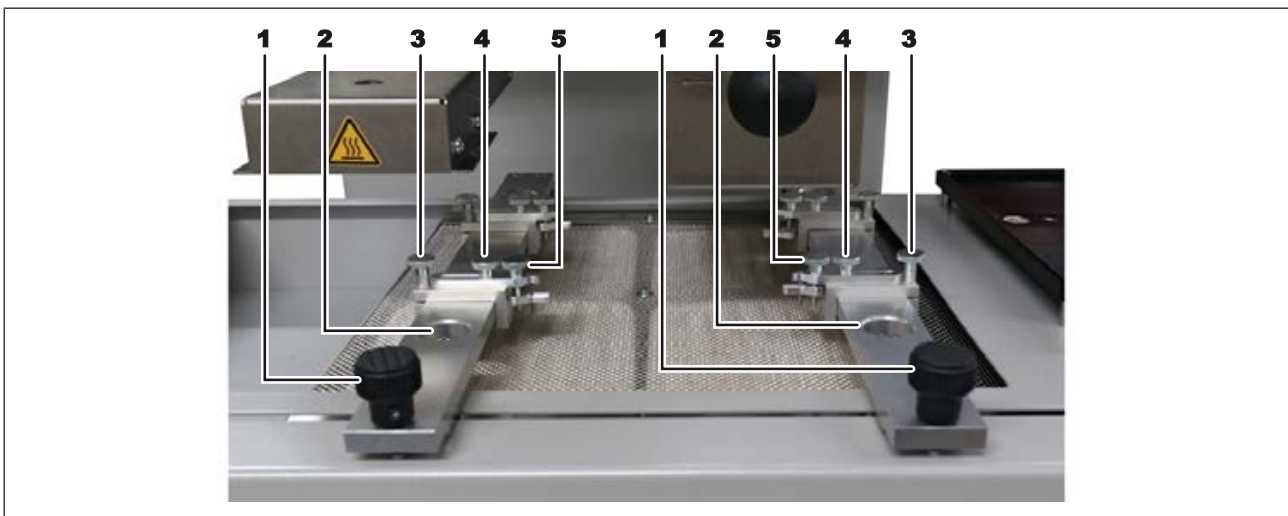


Fig. 20: Fixation of the PCB

- ✓ Insert a PCB:
  - a) Ensure electrostatic discharge protection.
  - b) Hold down the unlock key on the front of the bottom heating, while pulling the bottom heating forward until the PCB frame is easily accessed.
  - c) Release the two knurled screws (1) and adjust the distance of both rails approximately to the width of the circuit board.
  - d) Release the four knurled screws (3) and adjust the distance of the PCB holder to the dimensions of the PCB. Take also any interfering components into account.
  - e) Tighten the four knurled screws (3).
  - f) After releasing the knurled screws (4), the clamping position and angle can also be adjusted to asymmetrical PCBs.



- g) With the knurled screws (5) adjust the PCB clamping to the PCB thickness.
  - h) Insert the PCB and if necessary adjust the position of the PCB clamping.
  - i) Tighten the PCB clamping with the knurled screws (5) and tighten the knurled screws (4).
  - j) Position the PCB to achieve the best possible performance of the bottom heating.
  - k) Tighten both knurled screws (1).
- ⇒ You can now position the thermocouple. With regard to this, please read also Chapter [Position a thermocouple \[▶ 102\]](#).
- a) Now position the bottom heating so that the component being processed lies exactly below the pipette.

## 7.2 Adjust the pipette size to the component

Select the largest possible pipette for the component.

- ✓ If necessary, replace the pipette:
  - a) Wait for the heating head to cool down.

### CAUTION

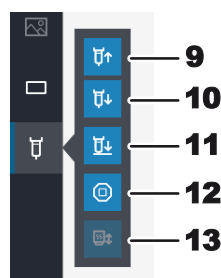
#### Risk of burning due to heated machine parts and PCB!

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!



- a) Switch to tab [Rework].
- b) Click tab [Manual Mode] to view the button row for manual operation.
- c) Click the “Pipette” pushbutton



⇒ A submenu with further pushbuttons is displayed:

- d) Press the pushbutton (10) until the pipette and its holder have moved far enough downwards.
- e) Screw on the pipette and tighten it only slightly

For this purpose, please also read Chapter --- FEHLENDER LINK --- where you can find a list of available pipettes.

#### Also see

-  Spare parts [▶ 124]



### 7.3 Position a thermocouple

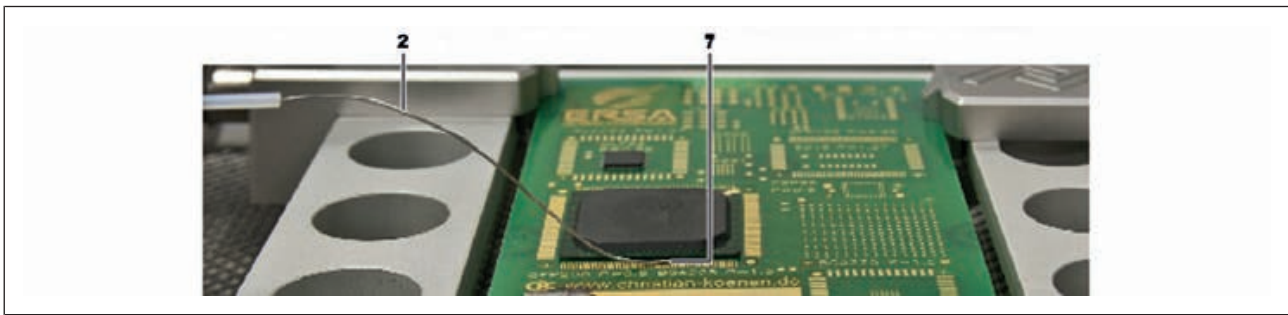
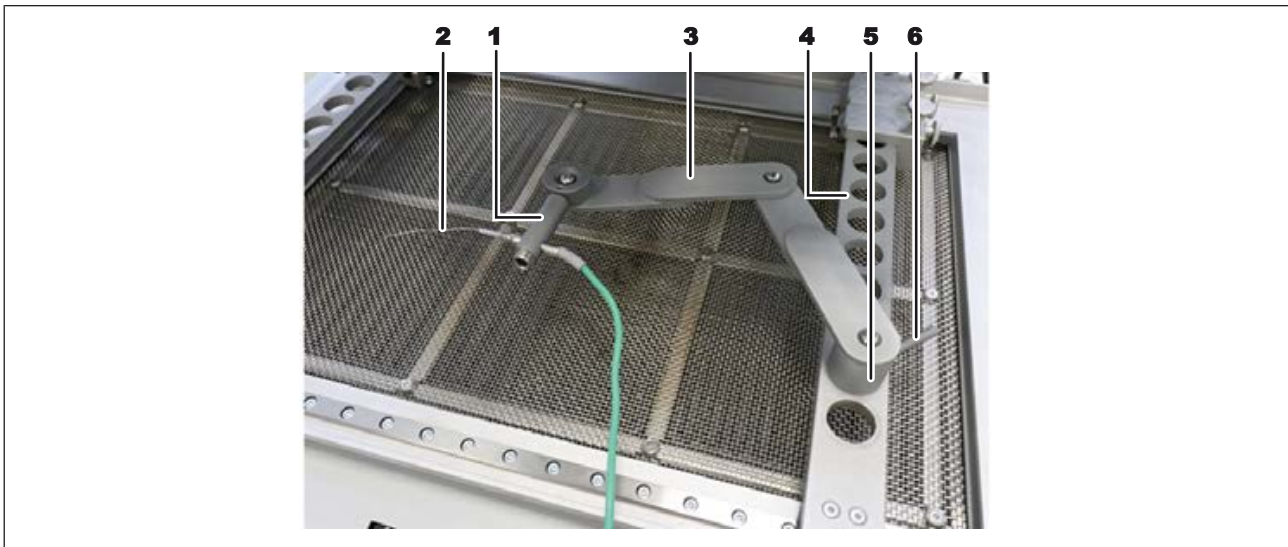


Fig. 21: Example images: Placing the thermocouple holder (top) and the thermocouple (bottom)

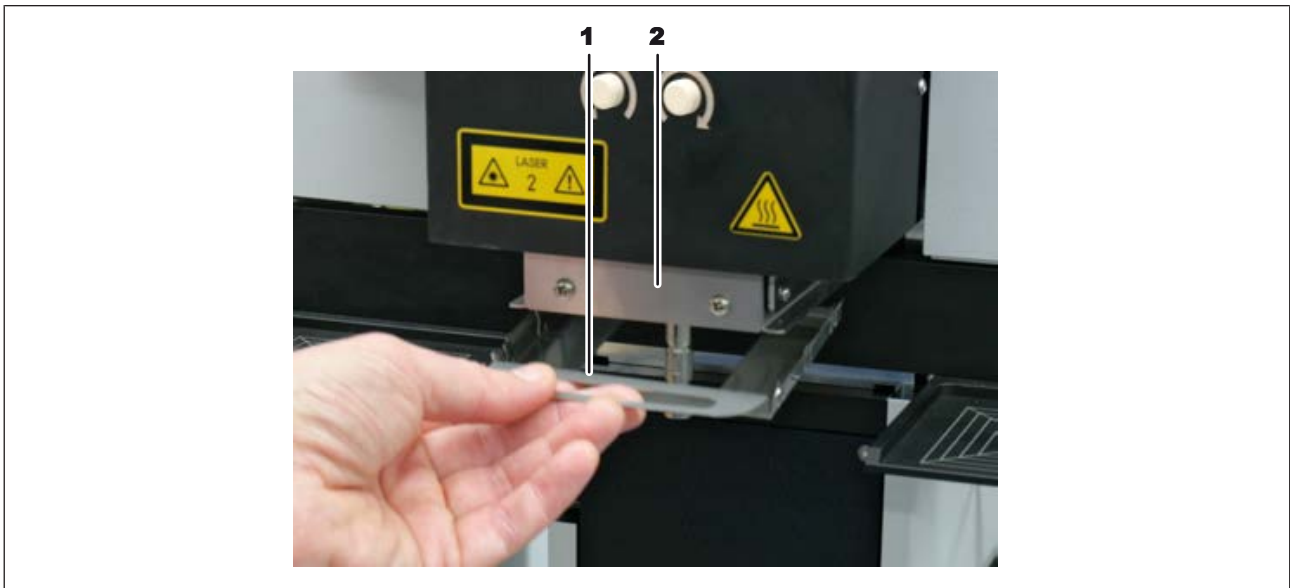
- a) Insert the holder (3) into one of the holes (4).
- b) Fasten the holder with the lever (6).
- c) Insert the plug of the thermocouple (2) the socket [TC1].
- d) Slide the thermocouple into the holder (1).
- e) Fit the holder (1) in such a way that the end of the thermocouple (7) can be placed very close to the component.
- f) Straighten the end of the thermocouple so that the front 3 millimetres of the wire lie in close proximity to the component on the PCB.

For exact values, the thermocouple should be in contact with conductive trace areas, e.g. trace or mass.

Note: The infrared sensor is not suitable for glossy and reflective surfaces.



#### 7.4 Shielding heat sensitive components



Use reflective strip and/or an adequate air deflector for shielding purposes.

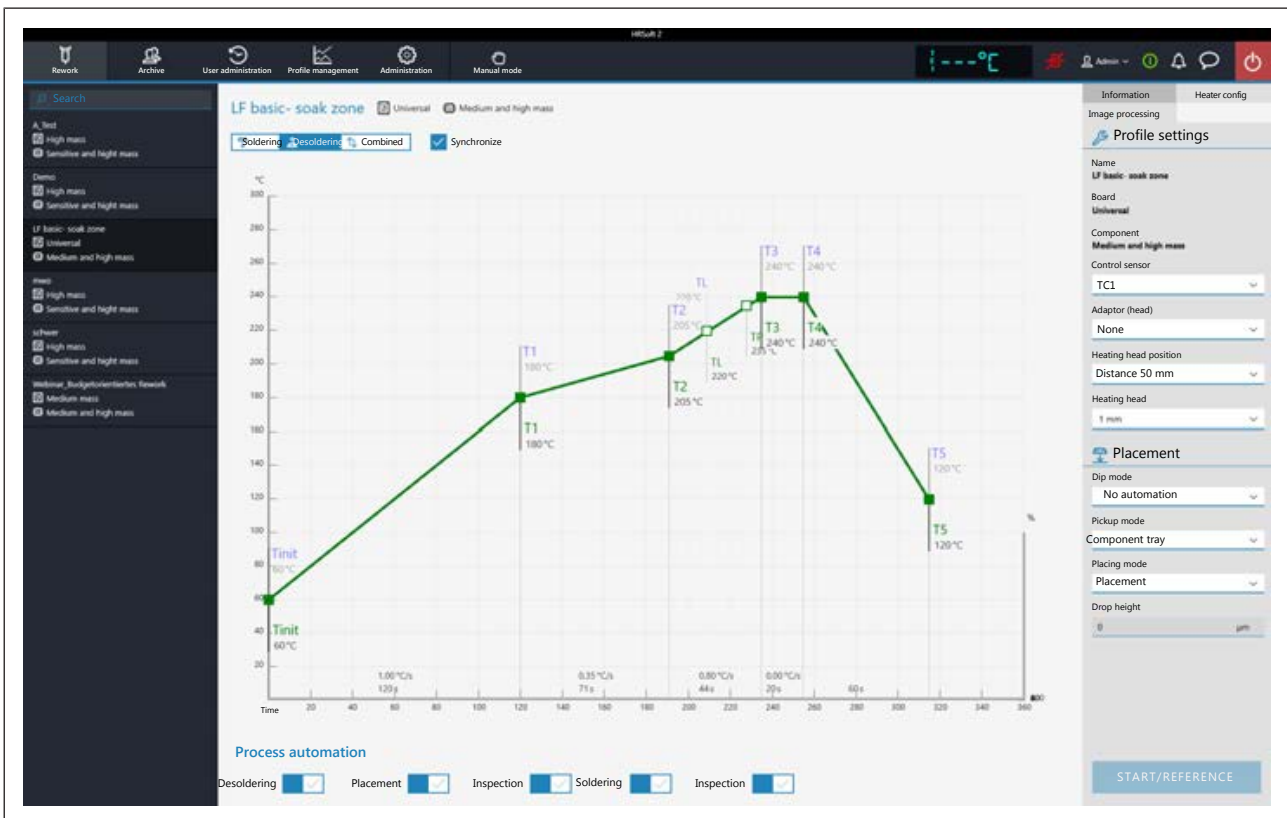
Select an air deflector (1) and let the lower end of the heating head (2) snap in from below.



### 7.5 Activate a soldering profile and prepare the soldering process

Open tab [Rework]. The available soldering profiles are listed in the left column. With regard to this, please also read Chapter [Use of the soldering profile in the \[Rework\] tabulator](#) [▶ 59].

Notes: If any change is made in tab [Rework], they cannot be saved. With regard to this, please also read Chapter [Temporarily editing the soldering profile in the \[Rework\] tab](#) [▶ 57] and the following ones. Only the administrator may save soldering profiles. With regard to this, please also read Chapter [Editing the soldering profile in the \[Profile management\] tab and changing it permanently](#) [▶ 73] and the following ones. Likewise, only the administrator can assign soldering profiles to the standard user, who can then select them in tab [Rework]. With regard to this, please also read Chapter [The tabulator with the small arrow key \(Image processing\) under the \[Profile management\] tabulator](#).



Click on the desired soldering profile to activate it. You can now work with this profile.

Use buttons [Process automation] to enable the desired process steps in the bottom field. The process starts from the left with the first activated process and is carried on to the right by performing the various process steps. With regard to this, please also read Chapter [The \[Process automation\] buttons under the \[Rework\] tabulator](#).

In the tab line, click on button [Manual mode] to display, in the left window area, the buttons for manually controlling machine functions such as: pick-and-place laser, pipette vacuum, heating head procedure, etc. With regard to this, please also read Chapter [The \[Manual mode\] button](#).

Check all the soldering profile settings, consisting of the chart, the buttons [Process automation] and the three tabs [Information], [Heater config] and the tab with the small arrow button (Image processing). If necessary, make corrections.





## 7.6 Start the process and work with the assistant.

### CAUTION



#### Risk of burning due to heated machine parts and PCB!

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

### NOTE



#### Use the soldering fume extraction system!

Solder fumes are hazardous to health. For this reason, a soldering fume extraction system should always be used. As regards the type of soldering fume extraction system, we recommend using the Ersa “Easy Arm” with prefilter, HEPA, particle filter and activated carbon filter. The device is equipped with a suitable connection for the soldering fume extraction system. The soldering fume extraction system prevents the device from accumulating dirt quickly.

In what follows, the entire soldering process is described along with all relevant steps. These include unsoldering, Placement the new component, Inspection the position of the new component, Soldering and finally Inspection.

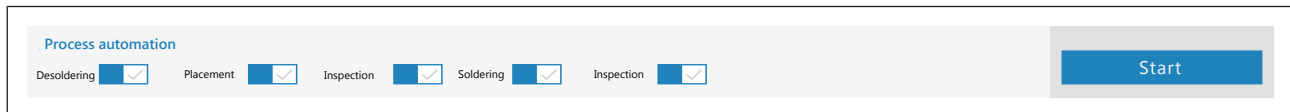
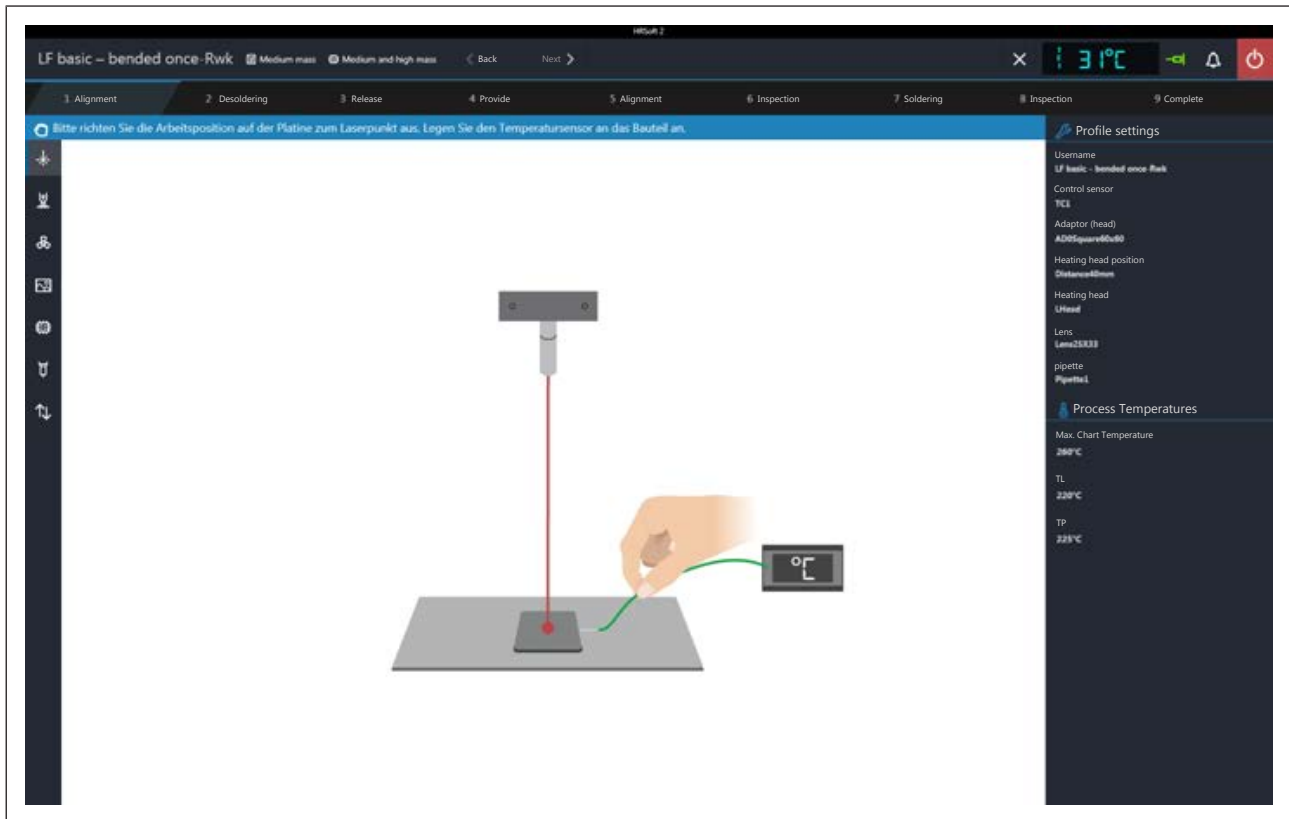


Fig. 22: All five steps are activated

a) Click on the [Start] button.

- ⇒ The Wizard starts and executes the various steps divided into several tasks. Perform all activities as required by the assistant.



In the information row over the graph you will find a description of the required tasks. In the dark area on the right you may view the most important process parameters.



## 7.7 Task 1 “Alignment”

The unit will first perform a reference run.



### **DANGER**

#### **Laser beam! Risk of injury due to retinal burns**

- a) Do not stare into the laser beam!
- b) Do not point the laser beam at other people! Reflecting surfaces under the laser generate reflections!
- c) Class 2 laser according to DIN EN 60825-1:2008-5,  $P < 1 \text{ mW}$ ,  $\lambda = 650 \text{ nm}$

- a) Slide both the heating head and the Visionbox in central position.
- ✓ The position laser is switched on. You are asked to set the work position exactly in the middle with the laser.
- a) Hold down the button on the front of the bottom heating and move the bottom heating by the side handles, until the laser detects the component to be soldered in the middle.
- b) Set up the temperature sensor. Fit the holder of the temperature sensor in such a way that the end of the thermocouple can be placed very close to the component. Shape the end of the thermocouple so that the frontal three millimetres of the wire lie in close proximity of the component on the PCB. For exact values, the thermocouple should be in contact with strip conductors, e.g. circuit path or mass.
  - ⇒ You can further connect optional temperature sensors for additional temperature information, e.g. on adjacent components or the PCB bottom side.
- c) If the component is positioned exactly under the laser, follow next work step. Click button [Next] in the upper window or press the green “Next” button on the bottom heating.

To interrupt the soldering process, you can always press the red button on the bottom heating or click the white “X”-marked button in the upper window.

  - ⇒ The selected desoldering process starts and the progress can be followed in the chart. At the end the pipette picks up the desoldered component from the PCB.
- d) Go to the next step.



## 7.8 Task 2 “Desoldering”

### ⚠ CAUTION



#### Risk of burning due to heated machine parts and PCB!

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

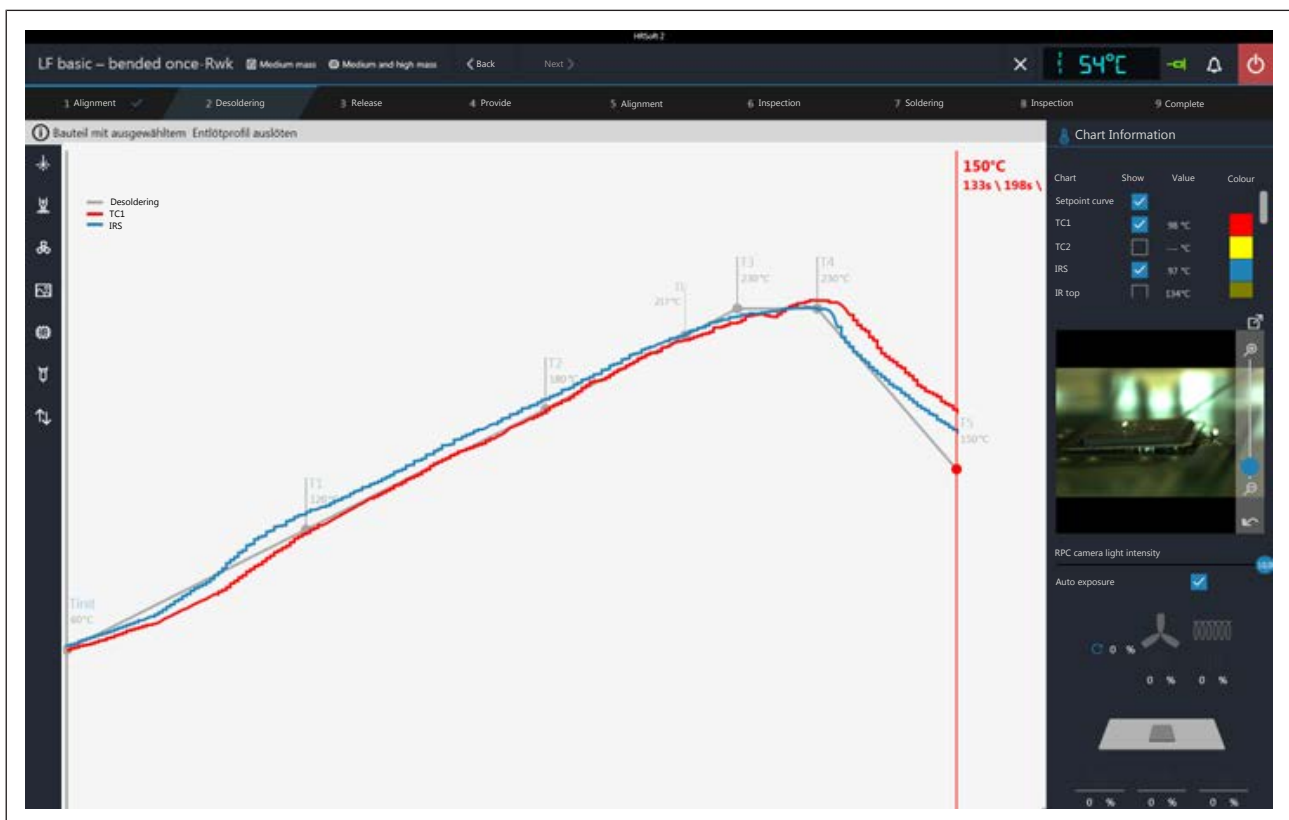
### NOTE



#### Use the soldering fume extraction system!

Solder fumes are hazardous to health. For this reason, a soldering fume extraction system should always be used. As regards the type of soldering fume extraction system, we recommend using the Ersa “Easy Arm” with prefilter, HEPA, particle filter and activated carbon filter. The device is equipped with a suitable connection for the soldering fume extraction system. The soldering fume extraction system prevents the device from accumulating dirt quickly.

The desoldering process is performed.



#### Chart information


- Column [Show]: display/hide the measuring curves.
- Column [Colour]: colour of the measuring curve. Click the coloured square to see all available colours.



### RPC Camera Live Image

- a) Adjust the ideal process observation angle through the retainer system of the optional RPC camera. The camera may not be found in the movement area of moving machine parts. The camera lens has a rubber ring in its front part for adjusting the focus. Move the rubber ring carefully with your finger to achieve the ideal focus point. Note: do not change the aperture setting of the camera lens. Should the lens screw loosen, clamp it back with aperture value 8.
- b) The camera image can be zoomed with the controller on the right of the camera image or with the mouse wheel.
  - [RPC camera light intensity ]: controls the camera lighting.
  - [Auto exposure]: When activated, the brightness of the image is automatically adjusted after changing the camera lighting or ambient light.



Click the button  to switch the live image to full-screen display. The zoom controller allows further zooming. Use the left mouse button to move the image section. Close the full-screen display by clicking the small red circle button in the upper right corner.

### Heating information

The lower field shows the updated status of the heating elements and hot air blower.

- a) When the soldering process ends, go to the next step.



### 7.9 Work step 3 “Position” and clean the desoldering point

The desoldered component is positioned on the component tray.

If you want to solder a new component at the desoldering point, you should remove any residual solder from the desoldering point:



#### **⚠ CAUTION**

##### **Risk of burning due to heated machine parts and PCB!**

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

- a) Distribute a small amount of not highly volatile flux on the residual soldering points.
- b) Remove any residual solder with a suitable tool.
  - ⇒ using, for instance, the Ersa soldering i-Tool bit, e.g. with the following soldering tips:  
PowerWell 0102WDLF23/SB (small), 0102ADLF40/SB (medium) or 0102ZDLF150/SB (large)
- c) Remove flux residue with Ersa Flux Remover (OFR200).
- d) Dry the solder joints with a clean, lint-free cloth.



### 7.10 Task 4 "Preparation"

If you selected the [No automation] mode:  
for regular soldering. Use this method even if a component was coated with soldering paste Ersa Dip & Print-Station and is ready on the Print template. The component is picked up from the component tray, aligned and placed in the soldering position.

a) Place the component to be soldered correctly aligned on the component tray.

Or:

a) Apply the soldering paste onto the component with the Dip & Print-Station. Insert the Print template with the component into the component tray holder. Screw on the template tightly.

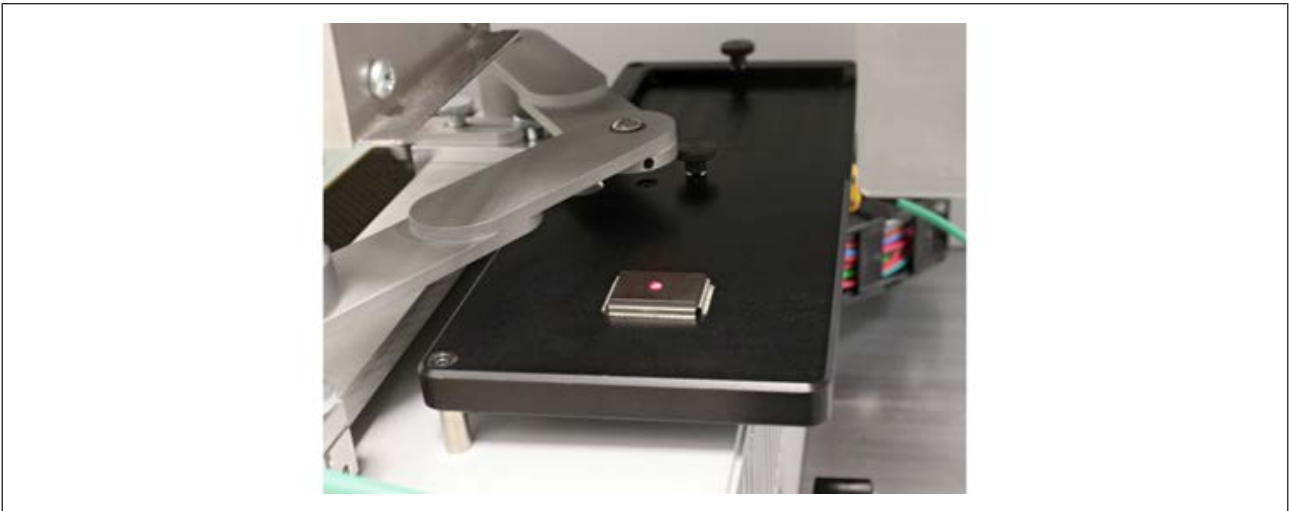


Fig. 23: The pipette picks up the component at the laser marked point

If you selected the [Auto. Dip] dip mode, .e.g. for QFN components:

a) Place the component to be soldered correctly aligned on the component tray.

b) Spread flux gel on the Dip template with a spreading knife and insert the Dip-template into the component tray. Screw on the template tightly.

– The wizard guides you through the work steps in order to pick up the component and immerse it into the flux of the Dip-template. Then the component is picked up from the DIP-template, aligned and placed in soldering position.

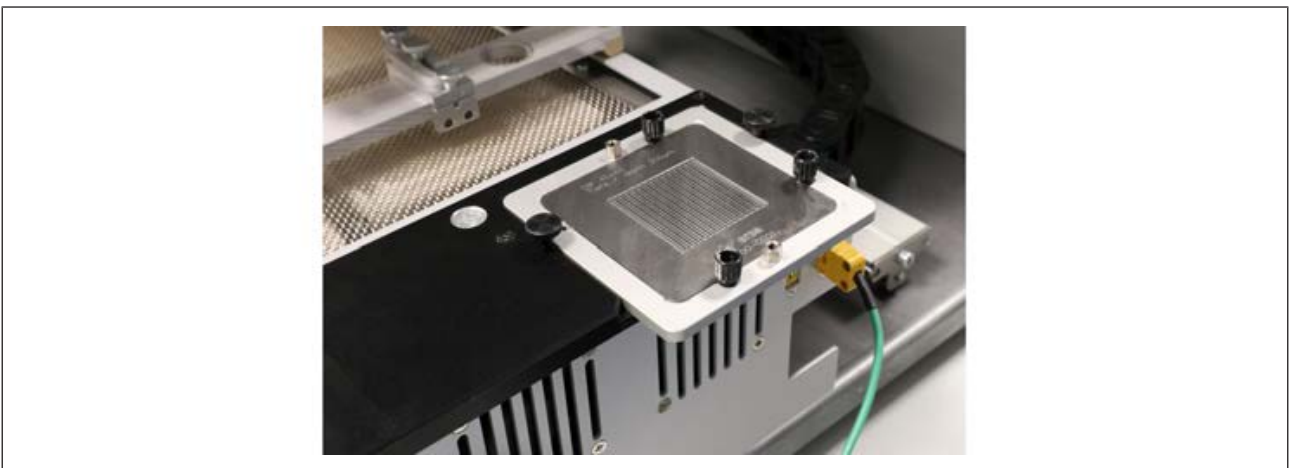


Fig. 24: Dip template on the component tray



### 7.11 Task 5 “Alignment”

- a) Align the component exactly with the board by means of the displayed live image.

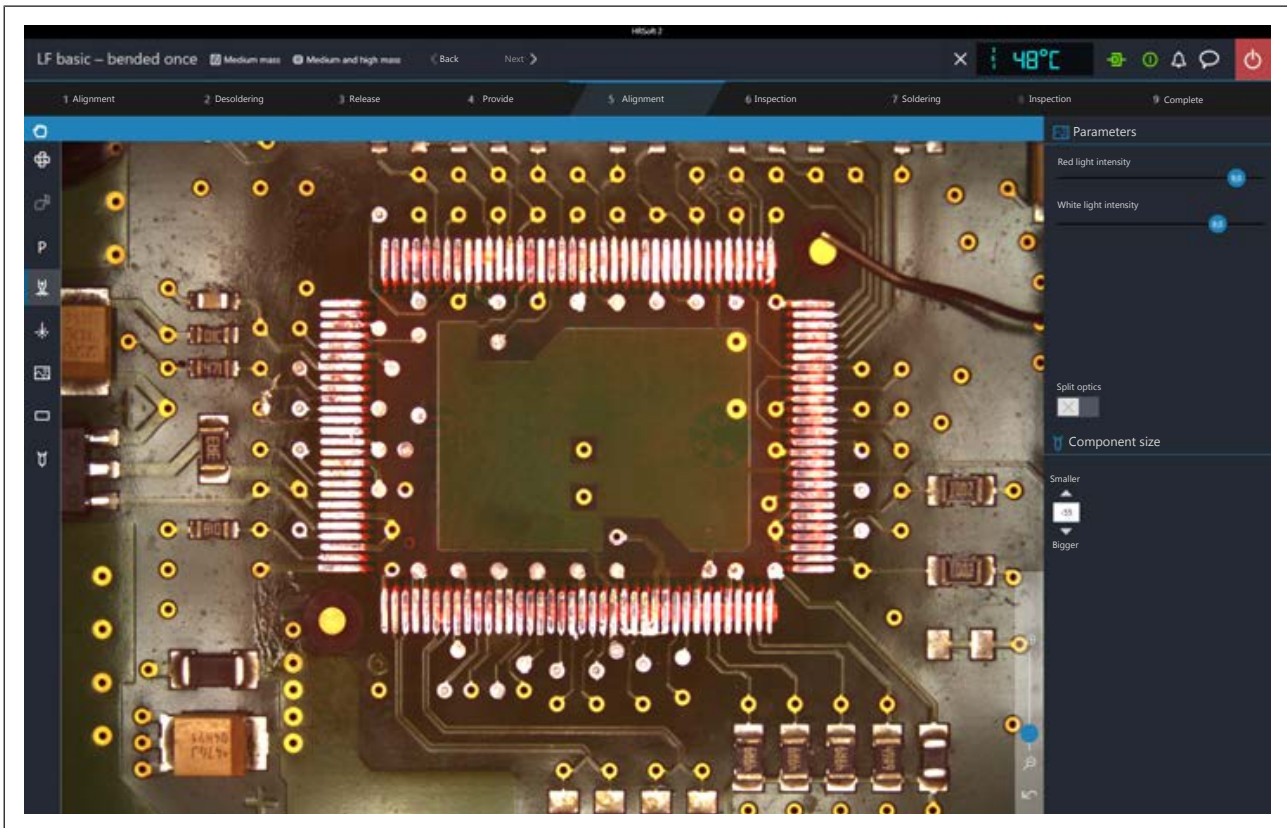


Fig. 25: Sample view after the correction of the component position

- b) You can zoom the Visionbox image using the mouse wheel and the controller on the bottom right of the camera image.
- c) Adjust the ideal display quality with the controller [Red light intensity] and [White light intensity].
- d) Adjust the congruent superimposition of the red component image using the two setscrews for fine positioning of the board in X and Y direction on the bottom heater. The rotation is set with the rotary button for rotating the component, which is positioned on the heating head. For this purpose, please also read Chapter --- FEHLENDER LINK ---. Use buttons [Smaller] and [Bigger] to change the scale.
- e) For example, in case of large components, click the [Split optics] button to see an enlarged display for the comparison of widely spaced image areas. Now click four times with the small blue rectangle on the four points that you want to see enlarged.



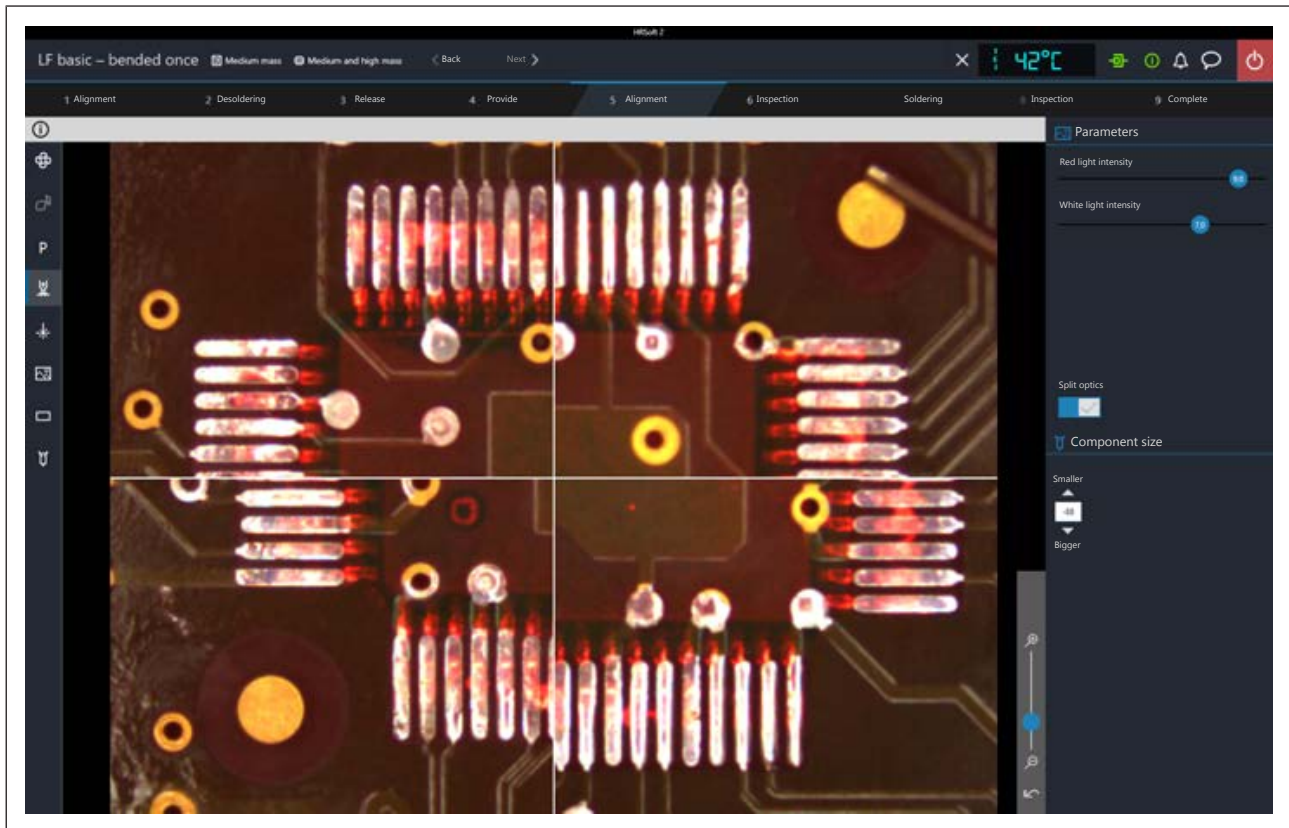


Fig. 26: Split screen view with simultaneous display of the four corners of a large component

- f) If the component is congruent with the solder joint, follow the next work step.  
⇒ The component is placed on the board.

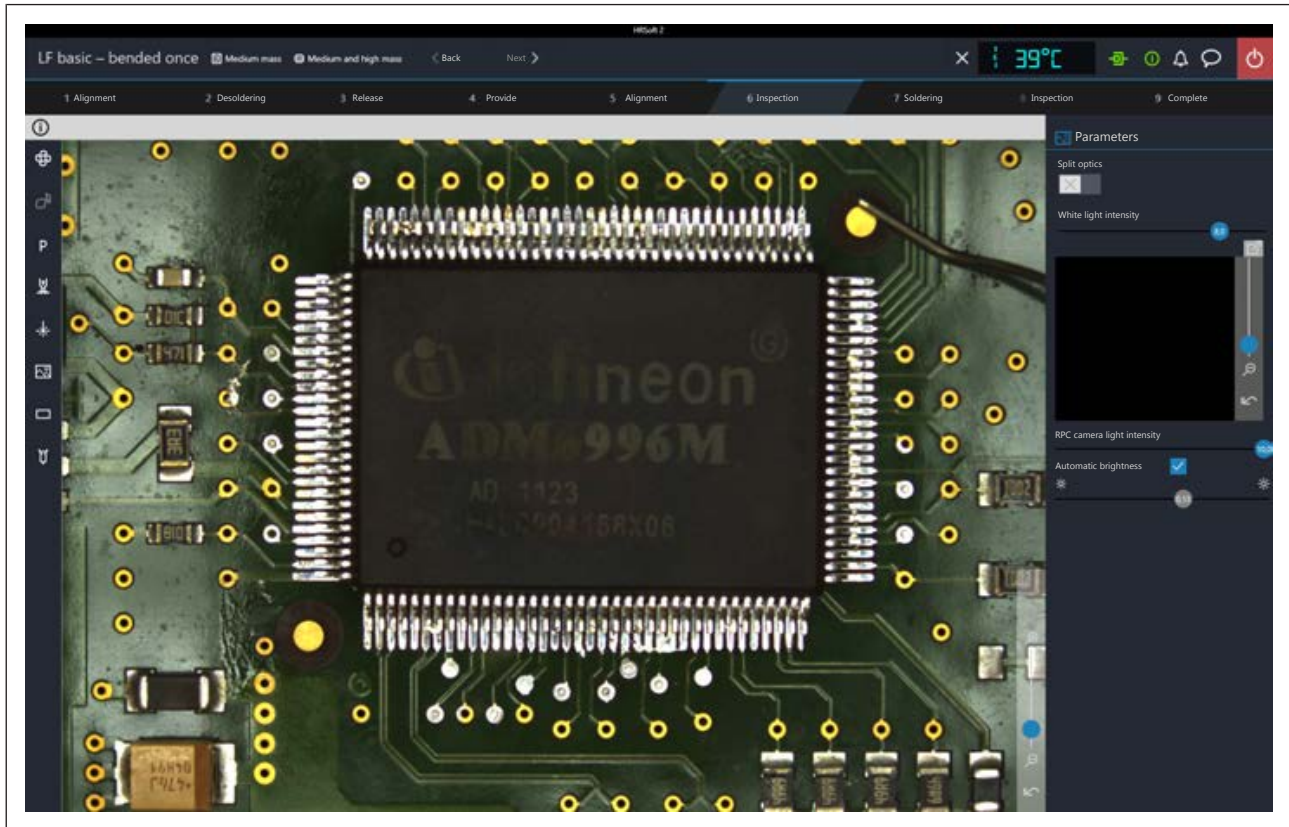
**Also see**

- 📄 Overview of the machine parts [▶ 53]



## 7.12 Task 6 “Inspection”

a) Check the position of the component based on the displayed live image.




b) For example, in case of large components, in order to see an enlarged comparison of widely spaced image areas, click button [Split optics]. Now click four times with the small blue rectangle on the four points that you want to see enlarged.

⇒ A split screen view will be displayed.

a) You can zoom the Visionbox image using the mouse wheel and the controller on the bottom right of the camera image.

- [White light intensity]: this adjusts the brightness of the white PCB lighting.
- [Automatic brightness]: When activated, the image of the optional RPC camera is automatically adjusted after changing the camera lighting brightness or ambient light.
- The RPC camera lighting is adjusted by the controller below it.

a) Click the button  to switch the live image of the RPC camera to full-screen display. The zoom controller allows further zooming. Use the left mouse button to move the image section. Close the full-screen display by clicking the small red circle button in the upper right corner.

b) If the component is correctly positioned, follow the next work step.



### 7.13 Task 7 “Soldering”

#### ⚠ CAUTION



##### Risk of burning due to heated machine parts and PCB!

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!  
Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

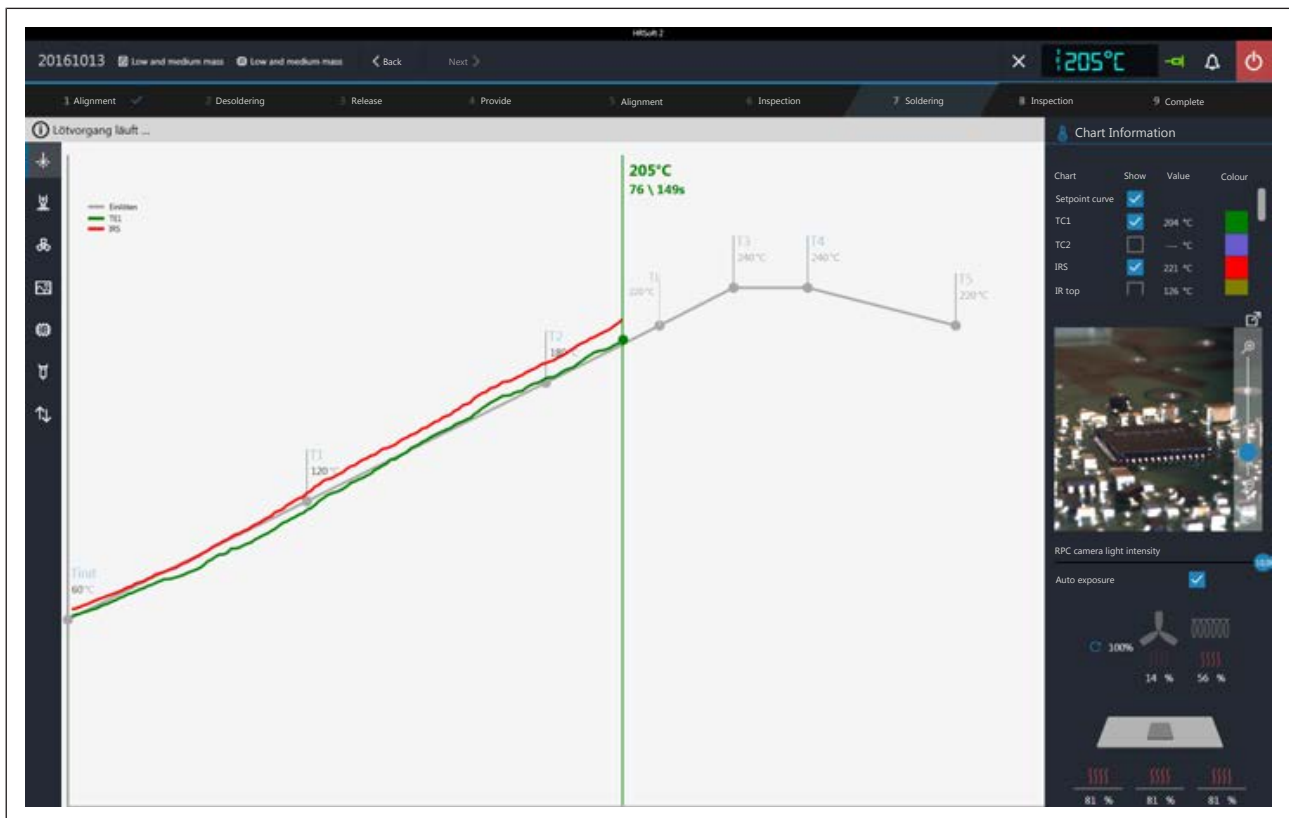
#### NOTE



##### Use the soldering fume extraction system!

Solder fumes are hazardous to health. For this reason, a soldering fume extraction system should always be used. As regards the type of soldering fume extraction system, we recommend using the Erska “Easy Arm” with prefilter, HEPA, particle filter and activated carbon filter. The device is equipped with a suitable connection for the soldering fume extraction system. The soldering fume extraction system prevents the device from accumulating dirt quickly.

The soldering process is carried out.




#### Information chart

- Column [Show]: Show/hide the measurement curves.
- Column [Colour]: Colour of the measurement curve. Click on the coloured square to view all available colours.



### RPC camera live

- a) On the support system of the RPC camera, set the ideal angle for monitoring the process. The camera must not be located within the operating range of the component trays. On the front of the camera objective, you will find a rubber ring to set the focus. Move the rubber ring carefully with a finger to focus the camera as accurately as possible. Note: do not change the setting of the objective aperture. If the locating screw of the aperture has opened, close it with aperture value of 8.
- b) With the right controller, you may adjust the camera zoom.
  - [RPC camera light intensity ]: Camera illumination controller.
  - [Auto exposure]: If activated, the brightness of the image is automatically adjusted as the camera illumination is changed.

Click on the button  to view the live image in full-screen mode. You may zoom in even more using the zoom controller. With the left mouse button you can relocate the image detail. Close the full-screen view by clicking on the red button in the right upper corner.

### Heating information

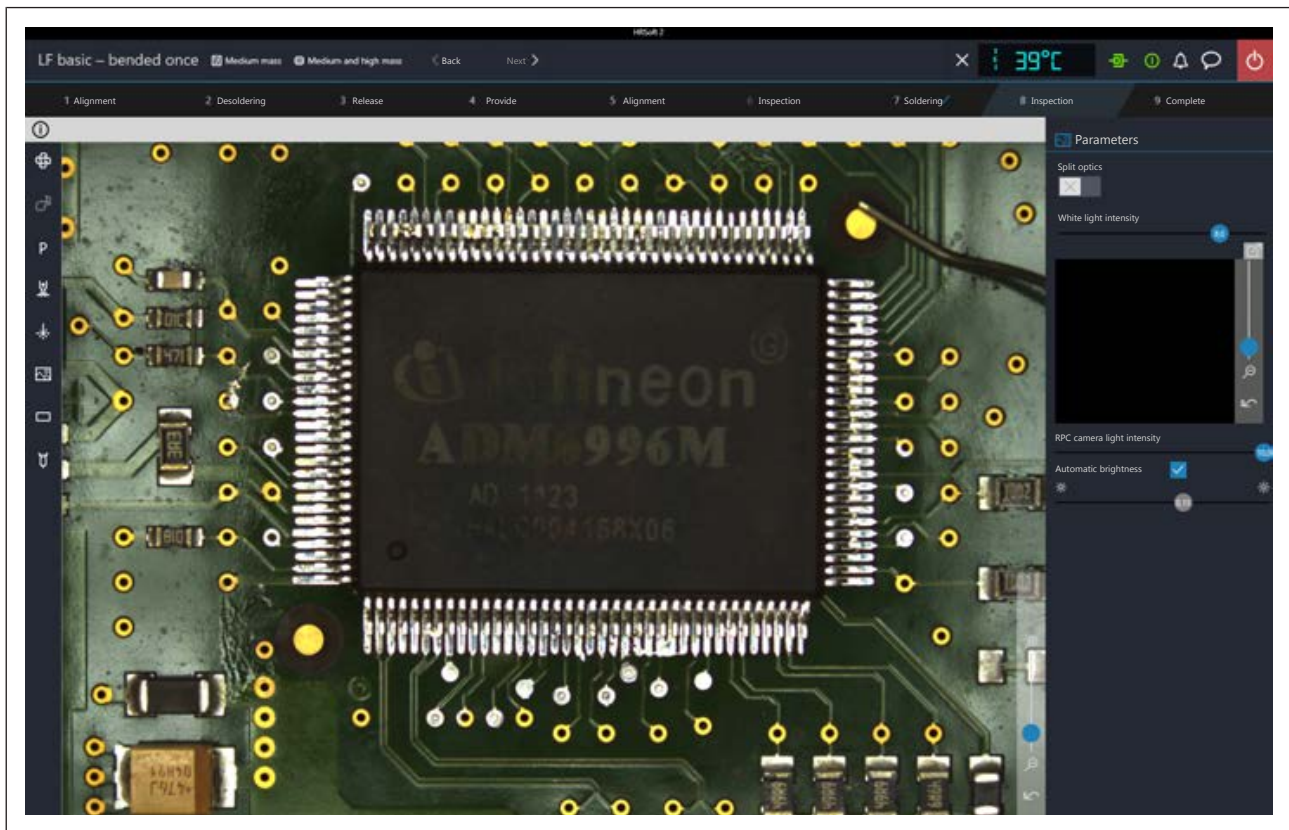
In the lower area, the current status of the thermocouples and blower elements is displayed.

- a) When the soldering process is over, move on to the next task.



### 7.14 Task 8 “Inspection”

The functions are identical to those of work step 6 [Inspection ].



a) If the component is correctly positioned, follow the next work step.



### 7.15 Task 9 “Complete”

The soldering process is completed. You have the following options:

- Repeat the process: The whole soldering process is repeated once
- Select profile: With this option you may cancel the soldering process and switch to another soldering profile.

### 7.16 Removing residual solder



#### **⚠ CAUTION**

##### **Risk of burning due to heated machine parts and PCB!**

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

- ✓ To remove solder residues form the PCB:
  - a) Apply some flux materials in the points with solder residues.
  - b) Remove the solder residues with a suitable tool.
    - ⇒ Use (for instance) the Ersa soldering iron i-Tool with the following soldering tips:  
PowerWell 0102WDLF23/SB (small), 0102ADLF40/SB (medium) or 0102ZDLF150/SB (large)
  - c) Remove any flux material residues (for instance) with the Ersa Flux Remover (OFR200).
  - d) Dry the soldering points with a clean, lint-free cloth.



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## 8 Service and maintenance

8.1	Check the rework system on a weekly basis for any dirt or damages. ....	120
8.2	Lubricate the Y-axis of the Visionbox every 6 weeks .....	120
8.3	Performing a HRSoft 2 update .....	121



### 8.1 Check the rework system on a weekly basis for any dirt or damages.

Check the following machine parts for dirt and damage on a weekly basis. If dirt is visible, clean these parts as indicated here. Clean without scrubbing and never work with hard or sharp objects!

Switch off the Rework System by the main switch before any cleaning and maintenance work!



#### **⚠ CAUTION**

##### **Risk of burning due to heated machine parts and PCB!**

All heated machine parts as well as the surrounding housing parts and product support frame, the circuit board and the components become hot even during warm-up to the process temperature [Tinit]!

Parts are particularly hot during the soldering process! After the soldering process, wait until the device and the PCB have cooled down and reached non-hazardous temperatures!

- ✓ Upper and lower Visionbox glasses:
  - a) Slide both the heating head and Visionbox to the right.
  - b) Clean the glass panels with a lint-free cloth and a commercial glass cleaner.
- ✓ Component tray:
  - a) Clean component trays with a lint-free cloth.
    - ⇒ If heavily soiled with flux material or solder paste: Use a cleaning agent recommended by the flux material or solder paste manufacturer.
- ✓ Housing parts:
  - a) Clean all housing parts with a soft, lint-free cloth and a household detergent.
- ✓ Check ceramic parts in the heating head:
  - a) Check the ceramic parts on the bottom side of the heating head for defects and deformation, and the heating coils in the ceramic parts for defects. Replace when damaged.

### 8.2 Lubricate the Y-axis of the Visionbox every 6 weeks

Lubricate the sliding surface of the Y-axis when dirty, or at least every 6 weeks. Shorten the lubrication interval in case of heavy use.

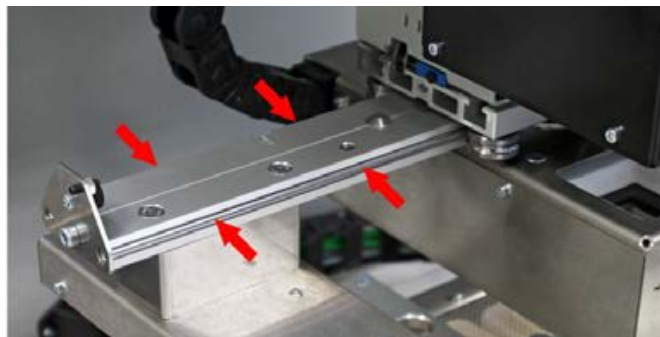


Fig. 27: Lubricate the slide rails on the front and back

- a) Put little lubricating grease GL 261 or equivalent on a lint-free cloth.
- b) Use it to clean and lubricate all of the sliding surfaces on the front and back of the rail.





### 8.3 Performing a HRSoft 2 update

Download the software

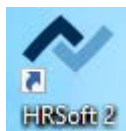
- a) On the Ersa website [www.ersa.de](http://www.ersa.de) click on "Login".
- b) Log in with your e-mail address and password.  
⇒ The Members Area will appear.
- c) Go to the area 6.2.3 (Software / Rework) HRSoft 2.
- d) Compare the version number offered with the installed version. The number of the installed version is shown by the Rework System in the [HRSoft 2 options] dialog under the [Administration] tab.
- e) If you wish to update the system, download the software package and save it on the Rework System PC under:  
C:\ProgramData\ErsaGmbH\HRSoft 2\Firmware.
- f) Extract the file in this directory.
- g) Open and read the "HRSoft2\_Liesmich" file.

#### Uninstalling the outdated HRSoft 2

- a) Switch off the Rework System.
- b) Click on the Windows start button once and enter "Programs" in the input field.
- c) In the Windows Start menu, click on the "Adding or Removing Programs" line.
- d) Uninstall the HRSoft 2 program in the "Apps & Features" program list.

#### Install the new HRSoft 2 version.

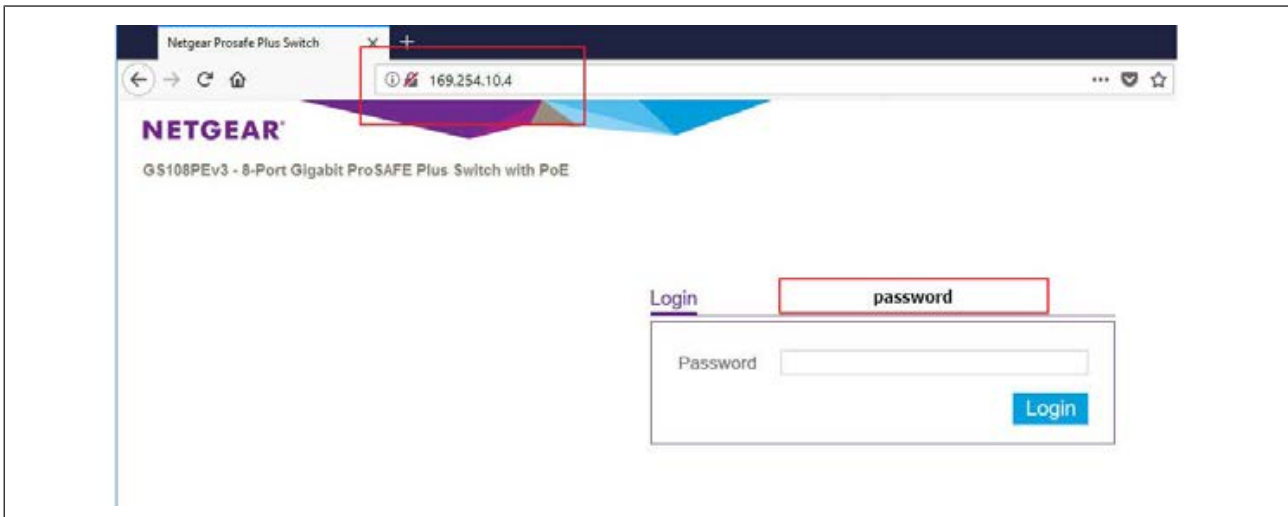
- a) In the C:\ProgramData\ErsaGmbH\HRSoft 2\Firmware directory launch the "setup.exe" file. Follow the instructions and confirm dialogues with OK/Continue.
- b) Once installation is completed, the HRSoft2 program will be started by double-clicking the program icon on the desktop.
- c) Switch on the Rework System.
- d) Switch on the PC and start HRSoft 2.
- e) Check if there is a connection between the Rework system and the PC. The "Connection" icon on the right of the temperature display must be green.
- f) If further firmware updates of specific modules of the Rework System are required, these must be executed in the [Device settings] dialog under the [Administration] tab. With regard to this, please read Chapter --- FEHLENDER LINK ---.



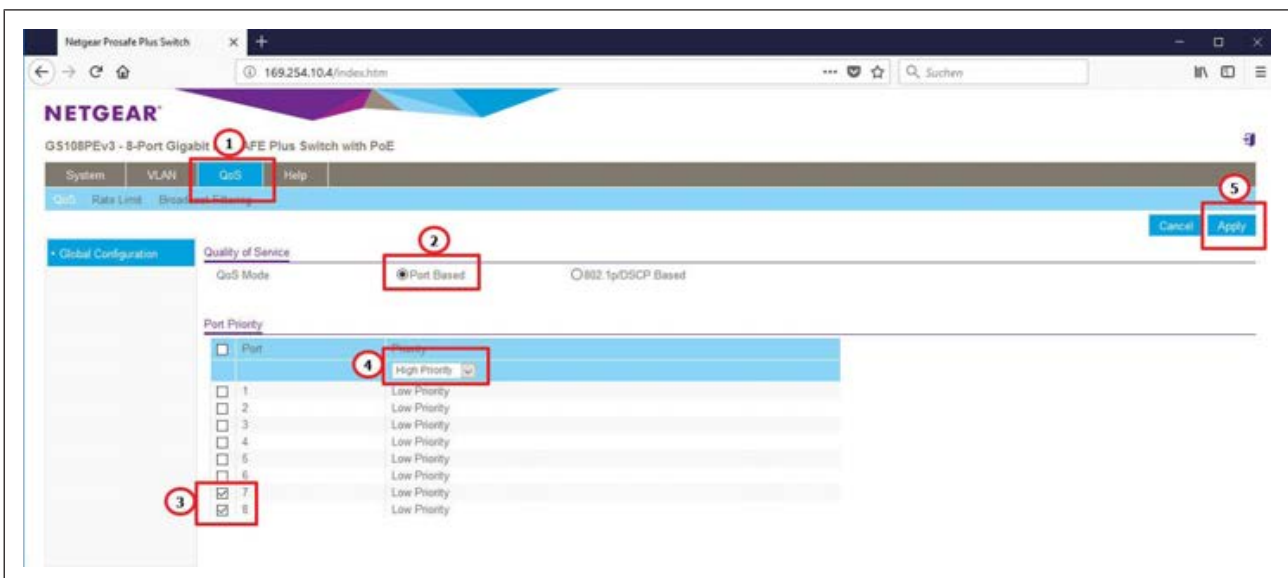
#### Checking the Netgear switches configuration

Switch on the Rework System and the PC.

- a) Open a web browser and enter the following IP address: 169.254.10.4. Press Enter.  
⇒ The Netgear user interface will be displayed.



- b) Enter the word “password” into the "Login" window and click on “Login”.
- ⇒ The following dialog will appear:



- c) The settings must match the illustration in the figure, otherwise make the following settings:
- d) Select controller “QoS”.
- e) Select the optional field “Port based” under “Quality of Service”.
- f) Highlight ports 7 and 8 under “Port Priority”.
- g) Select menu item “High priority” for both ports in the drop-down menu.
- h) Click on the “Apply” button to confirm all entries.
- i) Power cycle the Rework System.
- ⇒ The process has now been completed.



## 9 Spare and wear parts

### 9.1 Read this first!

#### 9.1.1 Target readers, permitted spare parts

##### **WARNING**

###### **Machine malfunctioning is possible!**

Personal injury or material damage due to the machine inadequate maintenance and improper operation!

- ✓ Maintenance work must be performed by trained and qualified staff only.
- ✓ Carry out the maintenance and inspection activities recommended in this instruction manual.
  - a) First, read the section "Safety instructions"!
  - b) Comply with the specified maintenance intervals!
  - c) Wear suitable protective clothing for all types of work! Also, check personal protective equipment for cleanliness and functional efficiency! Do not use damaged protective equipment, replace it with new items!
  - d) Use spare parts, replacement parts and wear parts exclusively authorized by the machine manufacturer!
  - e) Thoroughly clean the machine before starting work!
  - f) Re-tighten loosened screws after completion of maintenance! Install safety devices and check for their proper operation!
  - g) Dispose of operating and auxiliary materials, cleaning agents, and replacement parts properly and in an environmentally-friendly manner!



### 9.2 Nameplate and machine number



##### **NOTE**

###### **Important note**

When ordering spare parts always specify the machine number. This number is printed on the nameplate (see illustration above). The nameplate contains other important information about the machine such as machine type, electric power rating, conformity marking and disposal data.







### 9.3 Spare parts

	Name	Item number
	Silicone nipple 2.0 for 3.3 mm nozzle *	0HR5520-20
	Silicone nipple 3.5 for 5.0 mm nozzle *	0HR5520-35
	Support raili with two pins	0HR504-01
	Silicone nipple 8.5 for 10 mm nozzle *	0HR5520-80
	Switch PoE	295847
	Power supply	3ET00370
	Membrane pump	3VAPU011
	3/2 directional valve	119765
	Fan bottom heating	313959
	Rework powerboard	297445



	<b>Name</b>	<b>Item number</b>
	Rework controllerboard	285856
	Stepper motor controller	297444

\* Elastic silicone. Average service life 10-30 soldering processes.







## **10 Annex**

### **10.1 EC Declaration of Conformity [HR500]**

EG-Konformitätserklärung HR 500



## EU Declaration of Conformity

Ersa GmbH, Leonhard-Karl-Str. 24, D-97877 Wertheim

EU Declaration of Conformity as defined by:

- EU Machinery directive 2006/42/EC (version 2006)
- EU EMC Directive 2014/30/EC (version 2014)

We herewith declare that the product

**Designation:** Reworksystem

**Type:** HR 500

**Date of type approval:** 01.10.2019

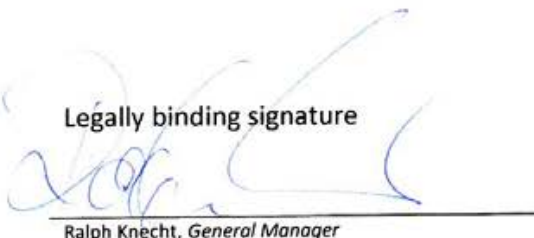
in the delivered model satisfies the above-named EU directives and DIN EN standards listed below:

Directive/Standard	Title	Edition
DIN EN 82079-1	Preparation of instructions – Structuring, content and presentation	2013-06
DIN EN 12100	Safety of machinery - Basic concepts, risk assessment and risk reduction	2011-03
DIN EN ISO 13732-1	Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces	2008
DIN EN 13849-1	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	2016-06
DIN EN 61000-6-4	Industrial equipment - Electromagnetic disturbance characteristics	2007+A1:2011
DIN EN 55011	Industrial scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement	2016+A1:2017A
DIN EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	2007-06
DIN EN 61000-3-2	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)	2014
DIN EN 61000-3-3	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A	2013
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards: Immunity for industrial environments	2019

Authorized for machine documentation: Kevin Friedrich (kevin.friedrich@kurtzera.de).

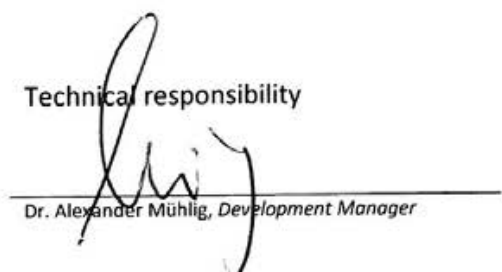
This declaration is rendered invalid if the machine is modified without our prior approval.

Legally binding signature



Ralph Knecht, General Manager

Technical responsibility



Dr. Alexander Mühlig, Development Manager