UNITEMP
Universal Temperature Processes

RSS-Series

Reflow Solder System

RSS-110-S

Programmable Inert Gas Vacuum Plate

Operation Instructions

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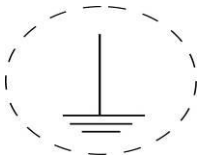
1 Safety

1.1 Safety and symbol definition

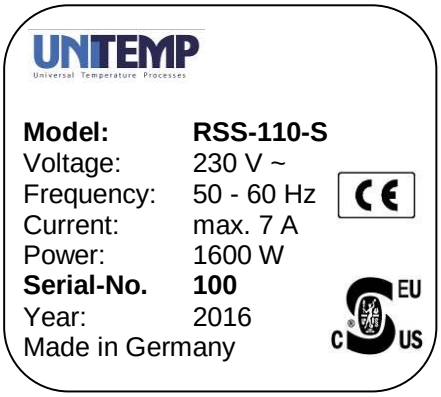
Symbols and labels at the system

Before opening the system turn off the main switch and disconnect mains



Grounding

Warning: Hot surface area



Type label showing model, technical requirements and serial number (only for example)

Please read these operation instructions thoroughly before operation. We do not assume any liability for injury, loss or damage to staff or the equipment, if the system is not connected or operated properly. Only qualified personnel and electronic technicians are allowed to service or repair the equipment.

<u>ATTENTION:</u> A risk of fire and electrical shock exists in all electrical appliances and may cause personal injury or death. Please follow all safety instructions.

- Please take time to thoroughly read this manual. It has been provided to help you to obtain maximum satisfaction and enjoyment with your new appliance by illustrating how to use it safely and efficiently.
- Make sure that system is turned OFF and connect it to outlet 230 V, 50 Hz.
- To reduce the risk of electrical shock, do not place any part of the system in or under water as well as other liquid. See also instructions for cleaning.
- Unplug from outlet when not in use and before cleaning. Always turn system OFF before unplugging. Allow to cool before cleaning the appliance.
- Do not operate any damaged appliance. Do not operate with a damaged cord or plug. Do not open the system. Repairs must be executed by authorized electrician only, or send the system to UniTemp facility for examination, repair, electrical or mechanical adjustment.
- The surface of the hot plate may remain extremely hot, even long time after disconnecting. Do not touch hot surfaces. Use handles or tweezers.
- Do not put any items or flammable materials (e.g. paper, cardboard, plastic, etc.) on the hot plate.
- Do not let cord hang down over edge of table or counter or hot surfaces.
- Do not suspend water cooling as long as the surface of the plate is hot.
- **Warning: no pieces may drop into the system between hot plate and chamber because cooling down process can be disturbed permanently and the hot plate can be damaged.**

The figures shown in this manual are only examples for your understanding. Labels and names on your device can differ hereof. As well the indicated values on the PC display by using the UniSoft software can differ from the values shown in the figures. The values from this manual may not be transferred to the corresponding arrays of the software!

1.2 Regular use of the RSS-110-S system

This RSS-110-S (reflow solder system) is specified for use in laboratories or industrial facilities use only. For any other use as mentioned in this operation instructions, UniTemp GmbH does not assume any liability and any warranty claim will expire.

The equipment is NOT to be used for:

- any usage which are not defined above, especially the processing of parts, equipment or gases for which this manual is not foreseen.
- the connection of any units or equipment which have electrically active parts.

1.3 Description of functions of RSS-110-S system

The process atmosphere is defined by using process gases or vacuum. Delivery, installation and commissioning are very comfortable to handle. The complete system is very small and requires only a minimum of space.

The inner walls of process chamber (both on fixed bottom and on hinged cover) are water-cooled. The process chamber can be evacuated by vacuum pumps (roughing pump, e.g. membrane pump or rotary vane pump).

The heating plate inside of process chamber is „hardcoated“ and therefore extremely stable and scratch-proof. The samples are placed on this heating plate. During cooling process the heating plate is pneumatically pushed down and brought in contact with permanently cooled chassis. No pieces may be dropped between heating plate and chamber because cooling down process could be disturbed permanently and the heating plate could be damaged.

The marginal thermal mass of the reflow solder system, the heating and the cooling system allow a controlled heating-up of the samples up to 120 K/min and a cooling down rate up to 150 K/min (depends on model). An integrated type-K thermocouple allows accurate temperature measurement. The process control enables the application of any inert process gas.

Check of the soldering chamber atmosphere
A gas distribution system permits an evenly controlled atmosphere in the process chamber. The present system is equipped with one process gas line controlled by mass flow controller enabling a maximum flow of nitrogen (N_2) gas of 2 standard liters per minute (Nlm).

Operation of reflow solder system
Programming and operation of this reflow solder system is done using the touch panel (Simatic TP700). The touch panel allows storage of 50 programs of up to 50 steps each. Process data can be stored onto USB 2.0 memory stick or to computer network (requires integration into network domain). Operation of touch panel is explained in a separate operation instructions.

2 Unpacking and installation of RSS-110-S system

Please unpack each part carefully!

Scope of delivery (depending on ordered options):

- Operation Instructions for reflow solder system RSS-110-S
- Operation Instructions for software SPS_Soft
- Corrugated pipe, seal rings and quick spanner (in case of ordering a vacuum pump)
- Power supply cable 230 V with blue Neutrik connector (2 m length)
- Power supply cable 230 V for vacuum pump with white Neutrik connector (2 m length)
- Remote cable 24 V for recirculating water chiller (2 m length)
- USB 2.0 memory stick
- Blue PU tube for process gases (outer diameter 4 mm, 4 x 2.5 x 0.75)
- Blue PU tube for cooling water (outer diameter 8 mm (8 x 6 x 1) for inlet, outer diameter 10 mm (10 x 7.5 x 1.25) for outlet connector)
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Front view of reflow solder system

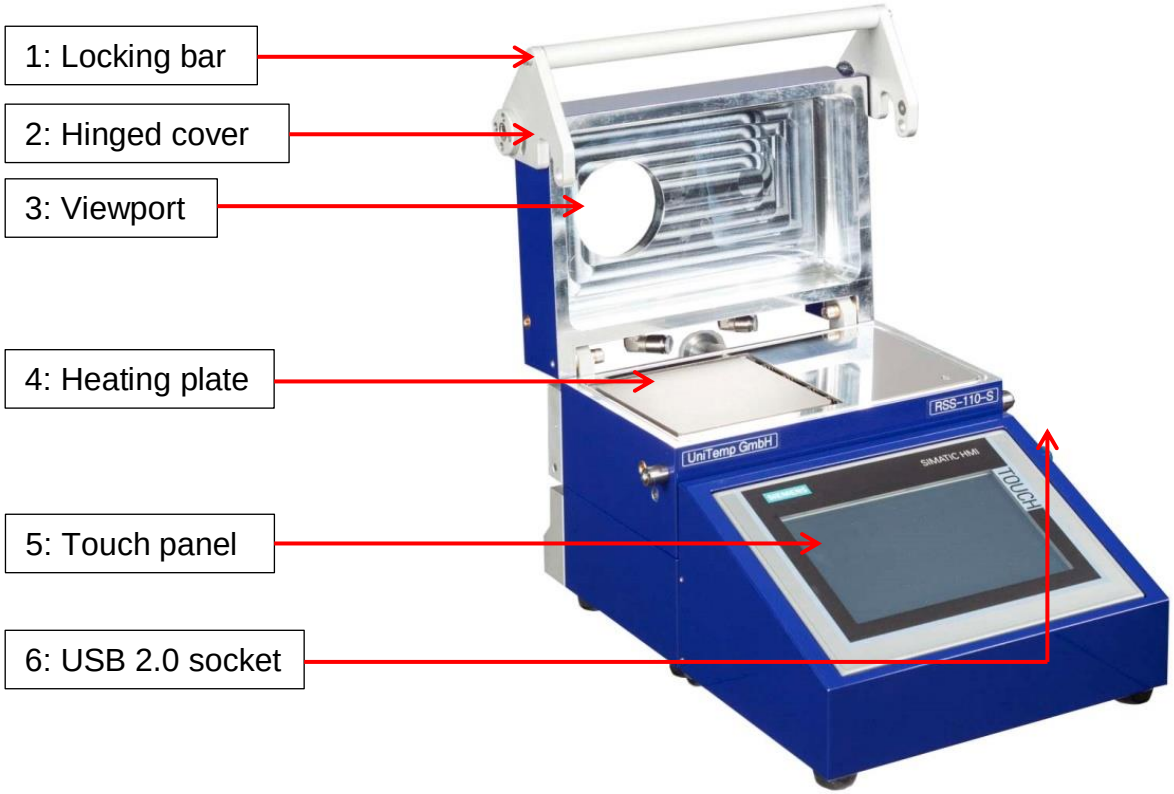

Figure 1: Front view of reflow solder system

Rear view of reflow solder system
Connector block

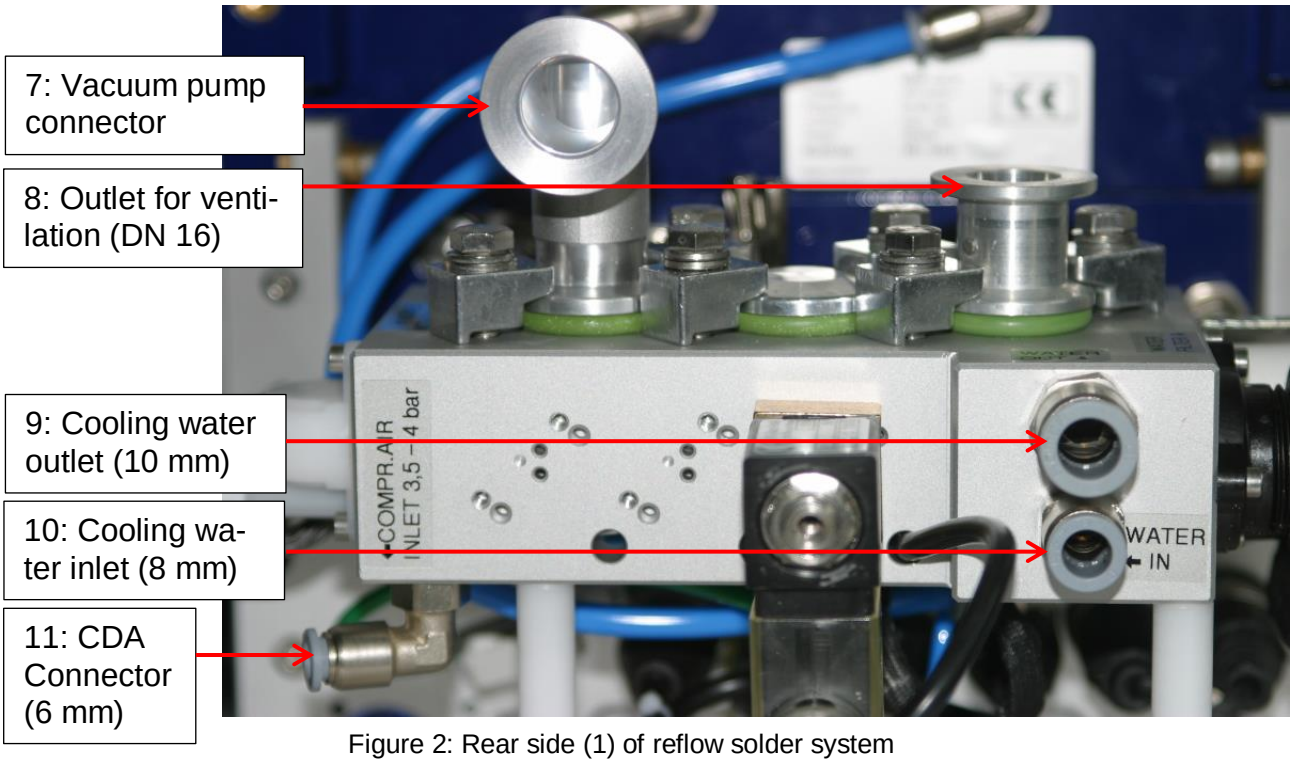

Figure 2: Rear side (1) of reflow solder system

Chassis rear side

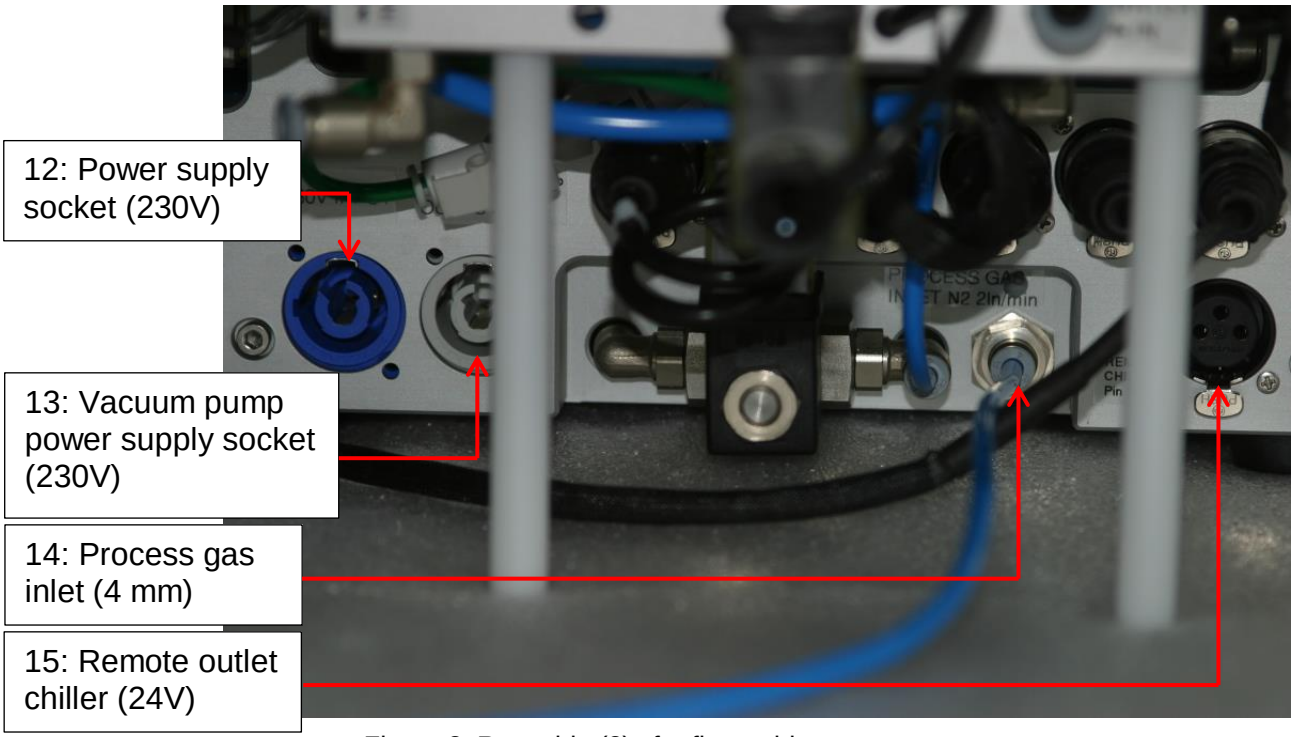

Figure 3: Rear side (2) of reflow solder system

The reflow solder system RSS-110-S is designed as table top machine and therefore has got very compact dimensions:

- Width: 274 mm
- Depth: 517 mm
- Height: 215 mm
- Weight: 14 kg

A stable laboratory table (working height approximately 70 cm) with a minimum floor space of 40 cm x 60 cm (W x D) is recommended. For service purposes it is required to have rear side accessible to disconnect peripherals from or connect peripherals to RSS-110-S reflow solder system.

Both the recirculating chiller WC I (available as option) or the optionally available vacuum pump can be placed in another room (noise emission). They can be remotely controlled by the RSS-110-S reflow solder system however you have to take care that both units are switched on before switching on the reflow solder system.

2.1 Power connection

2.1.1 Power supply of reflow solder system

The reflow solder system RSS-110-S is operated with 230 V, 50 Hz. For connection to a power socket with 10A maximum current (circuit breaker with slow characteristic) the provided 230V power supply cable with blue Neutrik connector (2 m length) has to be used (see no. 12 in Figure 3).

2.1.2 Power supply of chiller and vacuum pump

The reflow solder system RSS-110-S provides 230V electric output for the vacuum pump (see no. 13 in Figure 3) and 24V switching output for chiller (see no. 15 in Figure 3).
A chiller type WC I ordered through UniTemp is already equipped with an internal switchbox (24V switching relay). Any other chiller model can be operated on the RSS-110-S reflow solder system by using an external switchbox (option RSS-SW).

The external switchbox should be placed near to the chiller. The remote cable (24V) features a length of 2 m and has to be connected to both the remote outlet connector of reflow solder system (see no. 15 in Figure 3) and the remote inlet connector of external switchbox (see no. 16 in Figure 5).

Figure 4: Front side of external switchbox

The power supply socket (see no. 17 in Figure 5) has to be connected to local single phase power supply socket (100…230V). The chiller has to be connected to chiller power supply socket (see no. 18 in Figure 5).
The status LED shows a green light when the chiller is switched on by reflow solder system.

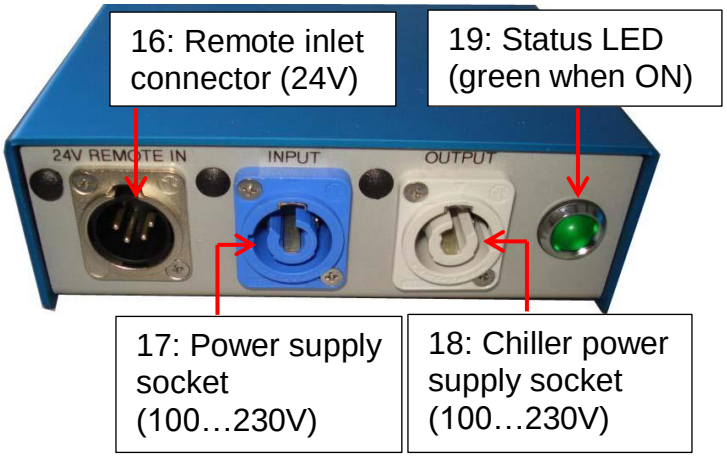

Figure 5: Rear side of external switchbox

2.2 Cooling water connection

The cooling water connections are placed at the rear side of the system. The cooling water inlet is done using plastic tube with outer Ø 8 mm (8 x 6 x 1) (see no. 10 in Figure 2), the cooling water outlet using plastic tube with outer 10 mm (10 x 7.5 x 1.25) (see no. 9 in Figure 2).

- Maximum inlet pressure: 5 bar
- ΔP Input - Output: 4 bar
- Water temperature: between 16 and 20 °C

Only decalcified water should be used. Optionally we offer a closed loop water cooling system; the cooling water will be enriched with a commercial available standard cooling water addition. For a limited period an operation with mains water is admissible.

Important - Attention:

Connection to tap water is at your own risk; there is no warranty for clogged cooling channels.

2.3 Connection of process gas and CDA

The RSS-110-S reflow solder system features two different types of gas inlet connections (see Figure 2 and Figure 3):

i) Process gas inlet: there is one inlet (PU tube with outer diameter 4 mm) located at rear side of chassis (see no. 14 in Figure 3). The maximum flow of nitrogen (N_2) gas is 2 norm liter per minute. A pressure of 2…3 bar (0.2…0.3 MPa) is required.

ii) CDA (compressed dry air): there is one inlet (PU tube with outer diameter 6 mm) located at left bottom side of connector block. Compressed dry air (cleaned, dry and oil-free compressed air) is required to drive the heating plate (pneumatic operation) and the vacuum valve (if vacuum option is ordered). As alternative inert gas (e.g. nitrogen gas) can be used. A pressure of 3.5…4 bar (0.35…0.4 MPa) is required.

2.4 Storage of process data

The RSS-110-S reflow solder system can store process data on a USB 2.0 memory stick. The stick has to be put in the USB 2.0 socket on right side of touch panel (see Figure 1). For network integration of RSS-110-S reflow solder system it has to be connected to a computer network using the network socket (at bottom side of touchpanel module) and being integrated into a computer domain. Please consult the IT administrator!
The USB 2.0 memory stick also allows the storage of exported programs from touch panel and later import back to touch panel.

2.5 VNC Server

A license free VNC server is installed on the RSS-110-S system. Connecting the RSS-110-S to a computer network or to a PC allows remotely controlling the system through TCP/IP protocol by using a VNC client. The IP address of touch panel is 192.168.178.90 (this IP address must not be changed!), the password for VNC sessions is “admin”.

2.6 Exhaust

The ventilation outlet (DN16) is located at the rear side of connector block (see no. 8 in Figure 2). If possible operate with the system beneath an exhaust (e.g. flow-box) or connect the ventilation outlet directly with ventilation, so that steam formation during the processes will not cause smells.

2.7 Vacuum pump installation

In case vacuum option is ordered, the pneumatically operated vacuum valve (with DN 16 KF flange) is already connected to the rear side of RSS-110-S reflow solder system. The flexible metal hose (provided with the delivery) has to connect the vacuum pump with the RSS-110-S system.
The vacuum pump (Ilmvac MP 601 Tp) has to be electrically connected to the connector at the rear side of RSS-110-S system.

3 Location of switch on/off button

On the rear side of RSS-110-S reflow solder system the button for switching ON and OFF the system is located. Before switching on make sure that all previous items of this chapter have been effected and the devices are thus correctly connected. Vacuum pump and water cooling have to be switched on. Make sure that soldering chamber and hot plate are freed and clean.

4. Operation and control functions

4.1 First switch-on and stand-by modus

After switching on the RSS-110-S reflow solder system (push button ON), the internal touch panel boots the process control software (SPS_Soft).

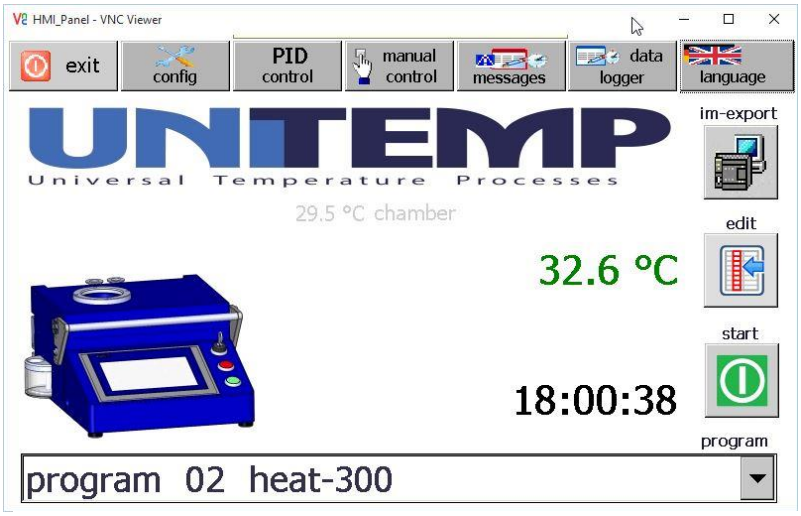

Figure 6: Start screen on touch panel

4.2 Opening and closing of the hinged cover

In order to open the hinged cover the handle has to be pulled to release the door latch. Then the handle has to be moved up until the hinged cover reaches its rest position.

In order to close the hinged cover, firmly grab the handle and carefully move down the hinged cover. With the cover being fully down lock the door latch by pushing the handle to its most rear position.

Be careful when loading the process chamber. We recommend wearing gloves when loading samples on the heating plate. Put your objects slowly and smoothly onto the heating plate.

WARNING:
Please be aware that the handle is not locked by any locking mechanism! Therefore be careful to not touch any hot surface inside the process chamber!
The touch panel always indicates the temperature of the heating plate.
THERE IS A SEVERE DANGER OF HOT SURFACES!

Some hints:

- We recommend to keep the top part closed. If should be opened and closed for loading and unloading parts only (risk of particles).
- Let programs run from start to finish! Abort programs only if absolutely necessary!

5. Technical data

Process chamber	Cold wall process chamber made of aluminium with integrated gas in- and outlet
Heating	4 heater cartridges at 400 W (230 V) electric power each (115V: 300W), total power: 1.6 kW (230 V), 1.2 kW (115 V)
Loading system:	Manual loading, heating plate (hard coated Aluminium) in process chamber,
Loading area:	110 mm x 110 mm
Controller:	Simatic S7 based process controller, 50 steps programmable (process steps), freely programmable process gas flow
Gas flow control:	1 process gas line (N_2) (controlled via mass flow controller (MFC)
Vacuum:	Process chamber can be evacuated down to 10^{-3} mbar/hPa using external vacuum pump (not scope of delivery)
Programs:	50 programs with up to 50 steps each storable in process controller (touch panel)
Temperature:	Room temperature up to 400°C
Ramp up rate:	Up to 120 K/minute (@ 230 V)
Cool down rate:	400 °C - 200 °C: 150 K/min 200 °C - 150 °C: 110 K/min 150 °C - 80 °C: 70 K/min
Cooling:	Water cooling required, inlet pressure 2…6 bar (0.2…0.6 MPa), minimum Δp = 4 bar (0.4 MPa), low water hardness, free of Cu particles
Interfaces:	USB 2.0 Memory Stick (at right side of touch panel module), Ethernet (at bottom side of touch panel module)
Dimensions:	274 mm x 517 mm x 215 mm (W x D x H) (Standard system)
Weight	≈ 14 kg
Voltage	230 V 1~
Frequency	50…60 Hz
Current	Max. 10 A
Power	1.6 kW
Ambient temperature	Max. 40 °C
Safety class	IP20
Ambient temperature	0 °C to 40 °C (Operating) / -20 °C to 60 °C (Storage)
Humidity	10-90% non-condensing 10-90% non-condensing

Enclosure (Declaration of Conformity)

Konformitätserklärung
Declaration of Conformity

Wir	**UniTemp GmbH**
We	UniTemp GmbH
Anschrift	**Luitpoldstr. 6**
Address	**D-85276 Pfaffenhofen**
	Germany

erklären in alleiniger Verantwortung, dass das Produkt:
declare under our sole responsibility, that the product:

Bezeichnung	**RSS System**
Name	*Reflow Solder System*
Typ, Modell, Artikel-Nr.	**RSS-110-S/US**
Type, model, article-No.	***RSS -110-S/US***

mit den Anforderungen der folgenden europäischen Normen
fulfils the requirements of the following European standards

Richtlinie/*Rule*	**EU No.**
EMV-Richtlinie/*EMC Directive*	2014/30/EU
Niederspannungsrichtlinie/Low Voltage Directive	2014/35/EU

EN61326-1, DIN EN 61010-2-010; VDE 0411-2-010:2004-06 , 2004-06
Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 2-010: Besondere Anforderungen an Laborgeräte für das Erhitzen von Stoffen (IEC 61010-2-010:2003); Deutsche Fassung

EN 61010-2-010:2003, zusätzlich zur DIN EN 61010-1: 2001

übereinstimmt und damit den Bestimmungen entspricht.
and therefore corresponds to the regulations of Directive.

Pfaffenhofen, 1.1.2015 Astrid Birkner

Name and signature of authorized persons
Place and Date of issue