



## 8 Maintenance / technical data

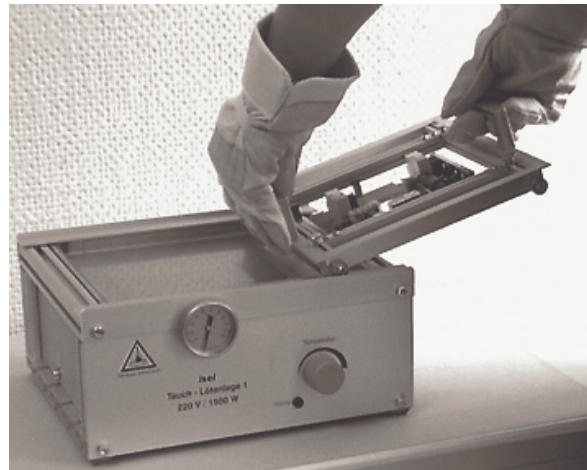
Only a minimal maintenance is necessary for the soldering device. Check the following things from time to time and according to use:

- Soldering tin height (fill tin up where appropriate)
- Scrape off or sucking up soldering residues of the surface of the tin after the cooling of the equipment.
- Caused by the thermal separation of soldering tub and housings (soldering equipment 2) spilled soldering tin can may appear between housing and tub. You can remove this tin after the cooling down of the equipment (remove the front panel or use long nose pliers or similar).

|   | Soldering plant 1  | Soldering plant 2  |
|---|--------------------|--------------------|
| Input voltage                                       | 230 V              | 230 V              |
| Current consumption                                 | 6.5 A              | 8.7 A              |
| Heating power                                       | 1500 W             | 2000 W             |
| Heating-up time > 250 °C<br>Tin temperature approx. | 30 min             | 30 min             |
| Heating regulation                                  | Bimetal thermostat | Bimetal thermostat |
| Regulator type                                      | ON/OFF regulator   | ON/OFF regulator   |
| Bath temperature                                    | max. 290 °C        | max. 290 °C        |
| Tub size  | 210 x 235 mm       | 180 x 350 mm       |
| Tin filling amount                                  | approx. 4.0 kg     | approx. 5.5 kg     |
| Device dimensions                                   | 260 x 295 x 140 mm | 440 x 250 x 137 mm |
| Weight  | approx. 9 kg       | 13 kg              |

## 7.2 Soldering course

- 1) Put the soldering carriage onto the soldering carriage tray (attachment) and adapt the soldering carriage rails to the width of the board.
- 2) Guide the equipped board through the soldering carriage rails until it engages into the holding springs. Engaging the board should be possible without great power in order that the components do not leap out.
- 3) Now the flux and drying procedure take place (refer to the isel flux and drying equipment).
- 4) The soldering plant must be operational. That means, the soldering bath must have a temperature of approx. 260° C and remain constant (where appropriate, adjust the thermostat until the value is attained).
- 5) Take the soldering carriage equipped with the board into both hands and descend it into the soldering bath in an angle of 15 - 20 degrees. The stripping-off sheet metal on the front side of the soldering carriage immerses in the soldering tin and frees the tin surface from the oxide layer when moving forward (repeat the procedure if necessary). Completely lower down the carriage on the run rails if it arrives at the other end.
- 6) In case of one-sided basic material, a soldering time of 2 - 3 seconds would be allowed to suffice. With two-sided boards, you must wait until the soldering tin penetrated the drilling holes (capillary effect).
- 7) For the conclusion of the soldering procedure, two methods proved successful:
  - With the small boards, lift the soldering carriage at the front (at the stripping-off sheet metal). Move it quickly out in one angle of ca. 20 - 30 degrees. Next, wait until soldered points are set.
  - With larger boards, take the soldering carriage quickly vertical upward from the bath and wait until soldered points are set.



**The heating-up time with the Erstbefüllung lasts ca. 1 Stunde, with the following filling only approx. 0.75 hours.**

## 7.3 Checking and further handling of the board

Test the board after the soldering procedure.  
The soldered points should appear as follows:

- Metal silver shine, well spread out.
- Remove present soldering jumpers with soldering irons and possibly using soldering sucking device.
- Remove flux residues using solvent (type no. : 156 090).

## 6 Safety notes



- The work areas should be held in a clean, orderly state. Keep dirt, dust, oil and other unnecessary devices away from the soldering job.
- The basis of the soldering equipment (e. g. work bench) should be horizontally and stable.
- The basis and the floor should not be combustible and easy to clean.
- Eating, drinking and smoking (fire) are prohibited at the soldering job.
- Wear protective gloves and goggles during working with hot soldering tin (260 °C) and clothing that is not roastable or easily combustible (cotton).
- Ensure an exhaustion of fumes (thermal decomposition of the flux) or at least a good airing of the work area.
- Cover the device with the soldering tub cover after any use or during soldering breaks.
- Under no circumstances, foreign substances (liquids, objects, chemicals, etc.) should get into the hot soldering bath.  
*Danger of fire! Poisonous steams!*
- The maximum soldering temperature should not exceed 290 °C with continuous operation in order to avoid a damage of the device.
- Hot surfaces are present during use. Therefore, note the danger to get burned if touching the device.
- The device may be operated only under supervision; the personnel working with the device are to be referred to the dangers (read the Operator's Guide!).

## 7 Operation

### 7.1 Preparations for soldering

- 1) At first, assemble the soldering carriage.  
Specially note the adjustment of the stripping-off sheet metal made of stainless steel. This is supposed to project approx. 12 mm under the front rail.
- 2) Put the soldering device on a horizontal (stable) basis, so that the board immerses with all sides uniformly into the soldering tin during soldering.
- 3) Connect the device to 230 V mains.  
The soldering equipment and also the flux and drying equipment is accordingly laid out that both devices can be operated at the same time with 16 A fuse-protected mains. For security reasons, the used circuit should have a personnel protection, e. g. 30 mA fault-current protective switch or similar.



**Perform the following adjustments as directly as possible before soldering!**

**Carry protective clothing during this work!**

- 1) Place some crooked soldering tin rods on the tub ground and turn the button of the thermostat to level 10. The red control lamp indicates the operation of the heater. If the inserted tin is melted, further tin can be added until the liquid reaches up to approx. 2 mm below the tub edge.
- 2) The exact height of the tin level is adjusted for the first soldering procedure. A waste board is suitable for this. The basic material should be as large as possible. In addition, clamp the board into the soldering carriage. Place it with all four wheels onto the run rails of the soldering equipment. At least the board should immerse into the tin up to the half thickness of the material.
- 3) After this setting, cover the bath with the soldering tub cover up to the use (where appropriate switching off the equipment).

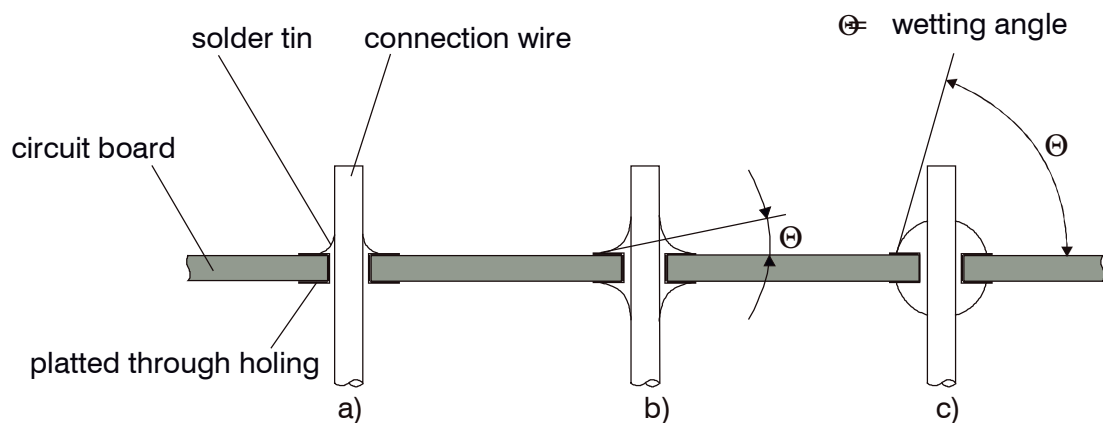
## 5.1 Inserting of the components

Before equipping the printed circuit board, the components should be cut and bent accordingly.



**The cut component connections should not extend to more than 1-1.5 mm on the soldering side in order to minimize jumper development and errors.**

A good soldered point is recognized by the still visible contours when the connection wires are bent.



- a) too little amount of solder tin, small firmness
- b) optimal amount of solder tin, small wetting angle
- c) too large amount of solder tin, large wetting angle, soldered point no longer testable

The wetting angle is a further quality characteristic: an angle up to  $25^\circ$  indicates a successful soldered point,  $50^\circ$  are only just tolerable.

The solder tin surface are supposed to be as smooth as possible, shining and without porous places. Grained surfaces indicate an overheating or a constantly too long soldering time.

## 4 General notes regarding soldering

### Cleanliness

The most important requirement for a successful soldered point is absolute cleanliness. The printed circuit board and components must be free of dirt, oil and oxidation (oxidation is the chemical reaction of the metals with the oxygen of the air).

Using suitable cleaning and solvents or alcohol you are able to remove dirt or oil and grease films.

### Flux (refer also to the isel flux and drying equipment)

Also at shining and cleaned metal surfaces, oxidation films are practically always present (invisible). The metal surface reacts constantly with the air oxygen. It is the task of the flux to remove the oxide coating during the soldering procedure so that the solder tin can wet the chemically pure surfaces of the basic metals.

The flux is output by the liquid solder tin spreading out (with rosin-based flux) or evaporating almost completely (in the case of solid particle-less flux).

Moreover, the flux supports the flowing and spreading out of the solder tin.

The flux and drying procedure are indispensable for a successful soldering!

### Solder tin

In soldering equipment a so-called eutectic solder tin is used. The tin portion amounts to 63% and the lead portion to 37 % .

The melting or the solidification temperature is about 183 °C.

The working temperature of the soldering plant should be 80 - 100° above the melting temperature.

## 5 Changes in the dip-soldering units 1 and 2

The dip-soldering units 1 and 2 have been modified technically to permit soldering with lead-free soldering tin.

To account for the necessarily higher temperatures, the heating output of dip-soldering unit 1 was increased from 1500 W to 2000 W.

The thermostats have been adapted to the higher temperatures.

It remains possible to use soldering tins containing lead.

In such cases, it is merely necessary to lower the temperature setting at the thermostat.

If the dip-soldering unit has been used with soldering tin containing lead and is later to be converted to lead-free soldering tin, the soldering bath can be exchanged.

Replacement baths are available as spare parts under the following article nos.:

Soldering unit 1 Art. no.: 742034

Soldering unit 2 Art. no.: 742069

For soldering with lead-free soldering tin, we are able to offer an alloy which requires only a temperature of approx. 270°C. This soldering tin can be ordered under Art. no. 412293.

This alloy is intended for the initial filling of the soldering bath.

As the copper content in the soldering bath gradually increases when soldering circuit boards, we recommend an alloy with a lower copper content for topping up, to be able to compensate the natural increase.

This soldering tin can be ordered under Art. no. 412294.

## 1 Introduction

Soldering is a process for connecting metallic materials using an additional metal (solder tin) under supply of heat. The connection is mechanically sealing and electrically conducting.

The melting temperature of the soft solder tin is close to only 183° C. Thus, the basic materials to be connected are wetted by the liquid solder tin without melting themselves.

soldering equipment work according to the immersion soldering and conveying soldering principle. The equipped board is immersed in a static state soldering bath and taken out again after short staying time.

Using this process, printed circuit boards can be soldered quickly and surely.

## 2 Purpose

immersing soldering equipment enable you to solder boards (equipment 1) up to a size of 180 x 180 mm or 175 x 350 mm (equipment 2).



***A further often overlooked use is the desoldering of electronics components (e. g. integrated circuits) as well as the tin-plating of cable ends, wires etc.***

The devices have the following key features:

- good soldering quality
- simple handling
- quick availability of the devices
- density
- small amount of tin (4 kg or approx. 5.5 kg)
- small resultant costs of current, tin, maintenance

## 3 Scope of delivery

immersing equipment consist of the following components:

- immersion soldering plant
- soldering tub cover (assembly kit)
- soldering carriage 1 or 2 (assembly kit includes assembly drawing)
- Operator's Guide

### 3.1 Accessories, materials

The following Accessories and materials are available:

- **Soldering carriage 3**  
specially for soldering PC expansion boards  
Assembly kit inclusive, assembly drawing type no. : 142 024
- **Soldering carriage tray**  
so to speak, the 3rd hand when the carriage is equipped with the board to be soldered  
Assembly kit includes instruction: type no. : 142 025 (for equipment 1)  
Assembly kit includes instruction: type no. : 142 023 (for equipment 2)
- **Soldering tin 1 kg**, type no. : 412 291

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