

Multi-Coater through-hole plating

Original operating instructions



Table of Contents

Brochure.....	2	Cleaning and maintenance.....	18
Technical data.....	3	Spare parts list.....	18
Declaration of Conformity.....	5	Warranty.....	19
Intended use.....	6	Disclaimer.....	19
Safety instructions.....	6	Copyright.....	19
Structure.....	8	Appendix 1: Basin Approach.....	20
Commissioning	9	Appendix 2: Workflow.....	21
Control operation.....	11		

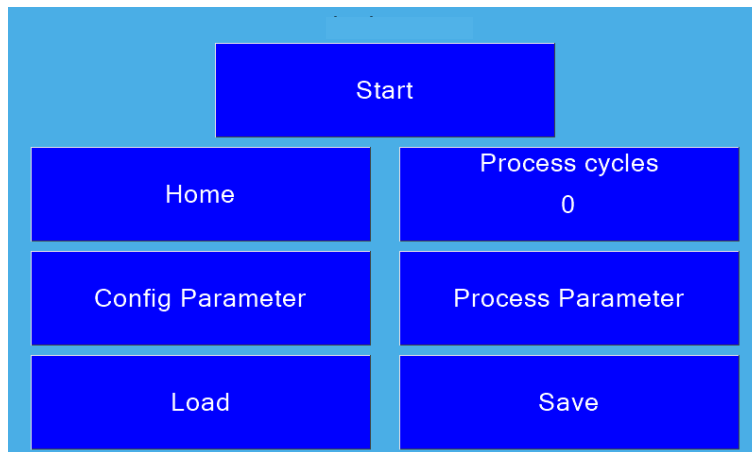
Brochure

THE new solution for your laboratory!

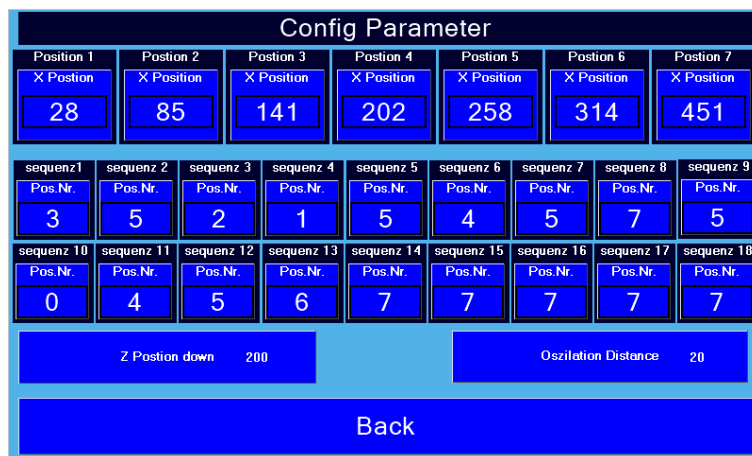


You want through-hole plating?
 A CNC axis system combined with tanks for galvanic through-hole plating of PCBs. (210x300mm here or 300x400mm optional).

Automated process control with touch screen menu guidance



Selection menu for the user - parameters can be freely stored



Technical data

Electrical connection:	230 V~, 50 Hz, approx. 3000W
External dimensions::	Feet: height adjustable
board size:	210x300mm or 300x400mm
Filling capacity:	5 pre-treatment basins 6.5 liters each, 1 electroplating basin with 25 liters basin, 1 combined spray/stand-up sink with 6.5 liters, All with ball valve drain (data for 210x300mm, for double board size all basins with double volume).
Weight:	Approx. 200 kg
Materials:	PVC, PP, Titanium
Rectifier:	50 A (100A), 0-5 volts, stabilized, low ripple.
Heaters:	2 pieces titanium heaters yes 1000 watts with thermostat control
Water connection	Inlet DI water spout: D20/dn14 Outlet DI water spout: D20/dn14 Outlet tanks: D20/dn14

Subject to technical changes at any time.

System advantages

- Modular design
- Compact design
- Clear operation, easy handling
- Clean operation
- Uniform copper deposition on the surface and in the borehole

Plant design (basic module)

- 5 treatment basins
- Combined stand and spray rinsing
- Electroplating tank
- Anode frame
- Drain cock and cover for each basin
- Air injection copper bath
- Bath movement over all basins, infinitely adjustable
- 2 titanium heating elements
- main switch
- separate rinsing
- electronic rectifier, current or voltage constant mode of operation

Available accessories and optional conversions

- Safety trough
- Vibration Device
- Anode set
- Chemicals
- Blank holder
- Filters for galvanic baths
- Ion exchange equipment for basins
- Adaptation of the basin size to the required working area

Optional process extensions

Due to the modular design, the following additional processes can be integrated into the systems:

- Tin plating (subtractive technology)
- Desmear, Blackening
- Chemical tin
- Organic protective coating (OSP)
- Electroless nickel/gold or
- Stripper Negative Resist

Declaration of Conformity



EG-Konformitätserklärung/Declaration of Conformity

Hersteller / Supplier:	Bungard Elektronik GmbH & Co. KG Rilkestraße 1 51570 Windeck Germany
Bevollmächtigte Person für die Zusammenstellung der technischen Unterlagen: Person in charge	Jürgen Bungard, Geschäftsführer /general director Rilkestraße 1 51570 Windeck Germany
Produkt:	Durchkontaktierungsanlage Multi-Coater 2023

Hiermit erklären wir, dass die oben beschriebenen Maschinen allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

Die oben genannte Maschine erfüllt die Anforderungen der nachfolgend genannten Richtlinien und Normen:

We hereby declare that the machines described above complies with all relevant provisions of the Machinery Directive 2006/42/EC.

The above machine meets the requirements of the following guidelines and standards:

- **Maschinenrichtlinie 2006/42/EG / Machinery Directive 2006/42/EC**
- **EMV-Richtlinie 2014/30/EG / EMC Directive 2014/10830EC**
- **Niederspannungsrichtlinie 2014/35/EG / Low Voltage Directive 2014/35/EC**

- **DIN EN 60204-1** Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen / Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- **DIN EN ISO 14121-1** Sicherheit von Maschinen - Risikobeurteilung - Teil 1: Leitsätze / Safety of machinery - Risk assessment - Part 1: Principles
- **DIN EN ISO 12100-1** Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze, Risikobeurteilung und Risikominderung / Safety of machinery - Basic concepts, risk assessment and risk reduction
- **DIN EN 55014-1 2012-05** Elektromagnetische Verträglichkeit, Anforderungen an Haushaltsgeräte, Elektrowerkzeuge und ähnliche Elektrogeräte, Teil 1: Störaussendung / Electromagnetic compatibility Requirements for household appliances, electric tools and similar electrical appliances Part 1: Emission
- **DIN EN 55014-2-2009-06** Elektromagnetische Verträglichkeit - Anforderungen an Haushaltgeräte, Elektrowerkzeuge und ähnliche Geräte - Teil 2: Störfestigkeit - / Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity
- **Niederspannungsrichtlinie / Low Voltage Directive 2014/35/EG**
- **Maschinenrichtlinie / Machinery Directive 2006/42/EG/37/EG**

Windeck, 01.02.2023

Jürgen Bungard CEO

The image shows a handwritten signature in black ink over a blue rectangular stamp. The stamp contains the text: 'BUNGARD', 'BUNGARD ELEKTRONIK', 'Rilkestr. 1 - 51570 Windeck', and 'Tel.: 02292 / 60 80 - Fax: 021 77'.

Intended use

The equipment is intended for through-hole plating of printed circuit boards with the Bungard PLATING system. In principle, the equipment can also be used for other DIRECT PLATING systems, but such other applications require our written consent or are at the full risk of the user. Bungard GmbH & Co. KG accepts no liability for damage caused by improper use of the machine.

Safety instructions

General

Please read the following text carefully and pay particular attention to the notes on work safety and start-up. Keep this folder in a safe place. It contains information which is also important for subsequent maintenance or cleaning work. The machines are not intended for integration or interconnection with other machines or systems. They may only be operated in rooms equipped for this purpose and only by qualified personnel. Children and pets must be kept away!

Transport

Only use suitable lifting and transport equipment such as forklift trucks or lift trucks. Secure the machine against slipping/tipping.

Installation site

The machine must stand level and there must be sufficient space around the machine for operation and maintenance work. To prevent the penetration of chemicals into the floor, the machine must be placed either a) in a sufficiently large room with chemical-resistant, waterproof flooring (no tiles, no concrete!) or b) in a chemical-resistant waterproof collecting tray that holds the entire filling volume (available as an option).

Electrics

The machine is manufactured using tested parts in accordance with the usual guidelines for electrical safety. However, this does not release the user from his duty of care when handling electrically operated equipment.

The main switch disconnects the machine from the power supply. The fuse protection of the circuit and the fault circuit must be carried out by the customer.

After finishing work, the main switch should always be switched off.

Before any work on the machine (filling, emptying, cleaning, etc.) switch off the machine and disconnect the mains plug.

The chemicals used in the machines often have a high electrical conductivity. Any contact of the liquid with live parts therefore represents a serious risk to electrical safety. In such a case, the machine must be immediately disconnected from the power supply and the defect must be immediately and professionally eliminated. To avoid hazards due to electric shock, the electronics housing must not be opened. There are no parts inside that can be serviced by the user. The device must not be exposed to rain or moisture.

If the device is not used for a longer period of time, the mains plug should be disconnected.

Water Supply

At the end of work or during longer interruptions, the water tap on the building side should be closed to prevent water damage due to a possible leak in the hose.

Chemicals

Before commissioning, it must be checked whether the materials used have sufficient resistance to the chemicals used. Chemicals distributed by our company are suitable for use. Please contact our company if chemicals other than those commonly used are used. Mix the chemicals outside the machine. Use a suitable container to prepare the chemicals.

Personal protective equipment

When handling corrosive chemicals, protective clothing, gloves and face protection must be worn. The safety instructions of the manufacturer or supplier must be observed.

Operation

Air injection in the copper tank should only be switched on when the plant is in operation in order to avoid an increased discharge of chemicals (especially brightener).

Temperature

Switch off the unit when not in use for a longer period of time and cover the baths to avoid evaporation losses and energy wastage. Please note that the heaters in the tanks must always be covered with liquid to avoid damage. PVC tanks may only be operated up to max 50°C. The thermostat is preset accordingly. If the bath liquids are prepared by dissolving salts or mixing liquids, this must always be done outside the machine! Observe the safety instructions of the chemical manufacturer. Before using substances whose chemical reaction behavior is known to be exothermic or is in question, additional measures for overheating protection must be agreed with us. This also applies to filling sulfuric acid into the copper tank! Observe the separate chemical instructions! The draining of the liquids should only be carried out approx. 10 min. after the heating has been switched off so that it cannot be damaged.

Occupational safety

Personal Protective Measures:

When handling chemicals (caustics, acids, alkalis, etc.), the following safety rules should always be followed:

Wear safety glasses and gloves during all work. Wear face shield and protective clothing when handling 98% sulfuric acid.

If necessary, work under a fume hood or at least in well-ventilated areas.

Avoid contact with skin, eyes and mucous membranes at all costs.

Immediately remove clothing soaked with corrosive substances.

If splashed on skin, rinse immediately with plenty of water.

In case of accidents or if you feel unwell, always consult a doctor.

The safety instructions of the manufacturer or supplier of the chemicals must be observed.

Remove the lid of the baths only when the bath movement is switched off. Otherwise there is a risk of crushing!

Exhaust air

Exhausting the room air through the built-in exhaust port above the machine body is recommended to prevent possible fogging of the panes.

Environmental protection

Dispose of used chemicals according to local regulations.

Waste water

Legislation prohibits exceeding certain maximum concentrations and quantities of copper (and other heavy metals) in wastewater (usually 0.5mg copper / liter of water). Therefore, the rinsing water may only be operated as a circulating rinse or must be fed to the sewage system via a water treatment system.

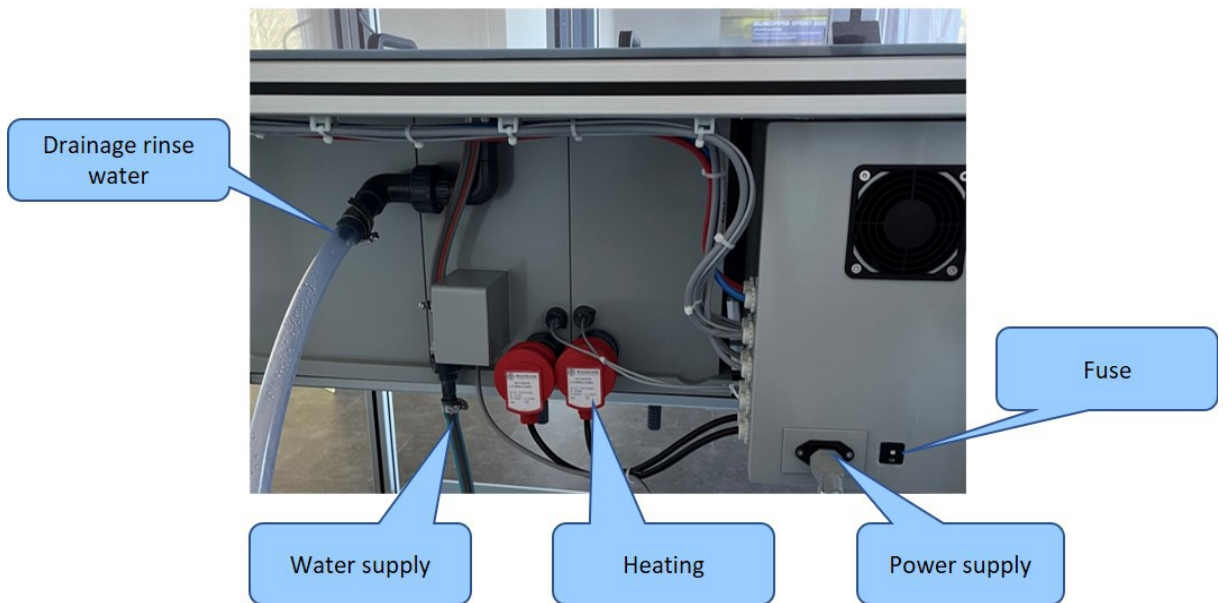
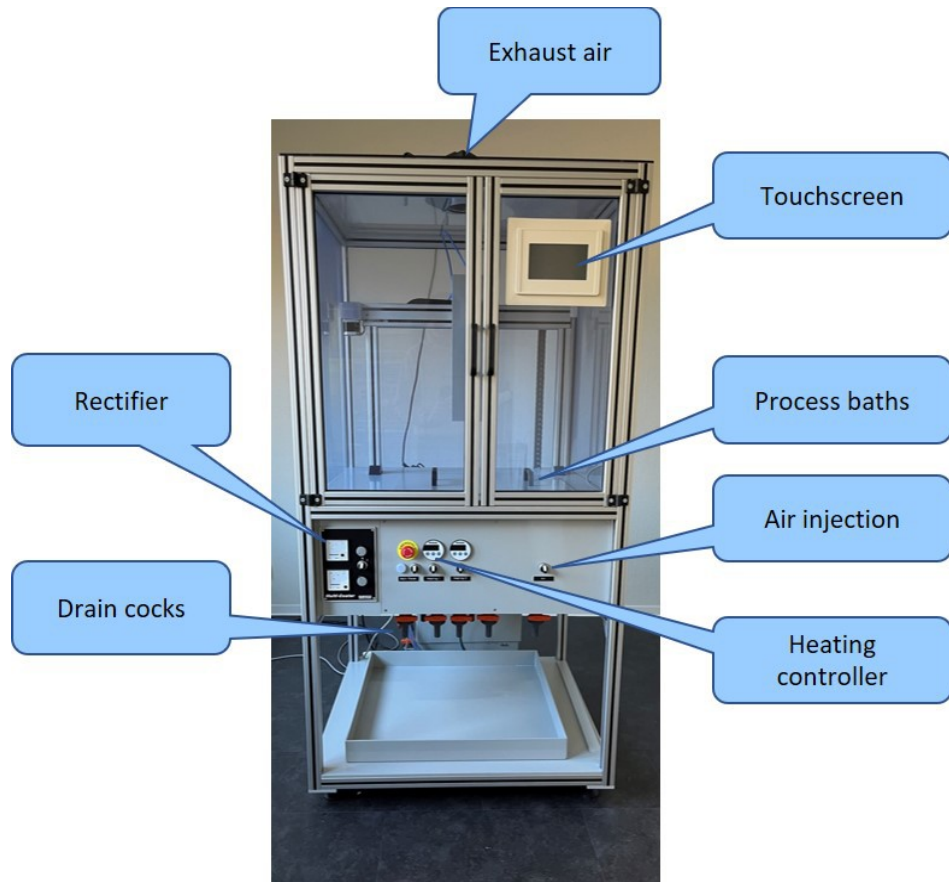
If you do not already have an appropriate water treatment system for the rinsing water in your house, we recommend our **Ionex** or **AquaPur** wastewater treatment system for this task.

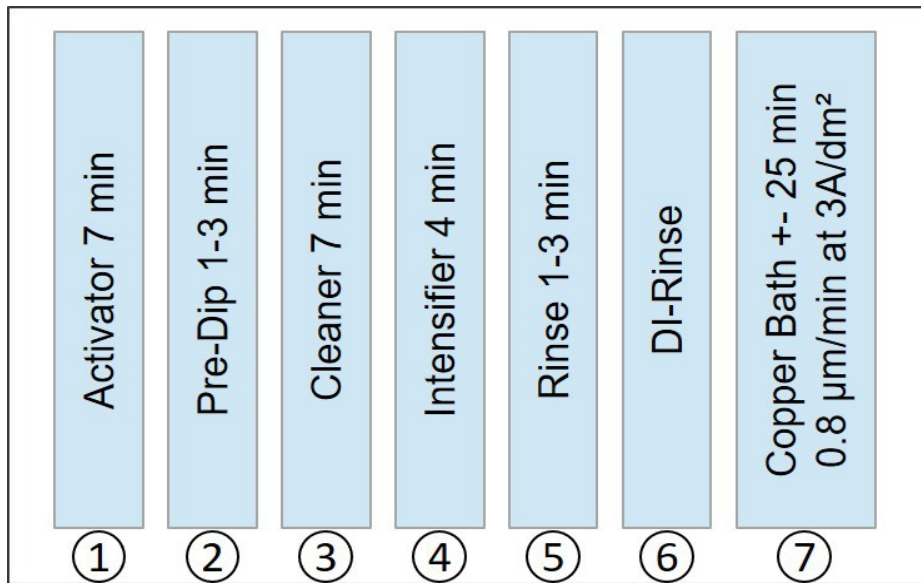
We recommend to use the water of the rinsing zone(s) as long as possible, to collect polluted water and to dispose of it later. Neutralization of the rinsing water or even the concentrate can and must only be carried out by a specialist company!

Cleaning work

Follow the manufacturer's recommendations when cleaning the device. Care must be taken to ensure that neither liquids nor other foreign bodies can enter the interior of the device through the housing openings. Do not spray the device with water. The device through be serviced only by a qualified professional. The user should never attempt to do more himself for the maintenance of his device than he is authorized to do according to the operating instructions. For maintenance work that is beyond his authority, he should always call in a specialist. Close the drain cocks from the tank before filling.

Structure





Bathoverview

Commissioning

Inspection of transport damage

After receiving and unpacking the machine, check it for possible transport damage. In case of transport damage, please inform your insurance company, the carrier and the manufacturer/supplier.

Transport to the installation site

Move the machine to the installation site with the aid of a lift truck and, if necessary, a pallet or similar.

Installation site

The machine must stand level and there must be sufficient space around the machine for operation and maintenance work. To prevent chemicals from penetrating into the floor, the machine must be installed either a) in a sufficiently large room with a waterproof floor covering resistant to chemicals (no tiles, no concrete!) or b) in a chemical-resistant waterproof collecting tray that holds the entire filling volume (available as an option).

Connection

Connect the machine to the drain pipes on the building side and to the supply line for the rinsing water. For the connection dimensions, please refer to the section Design or the technical data.

Electrical connection

Set all switches on the control unit to the 0 position.

Connect the power cord of the machine to a splash-proof (wall) socket. We assume that the power circuit is appropriately fused in the house.

Now switch on the main switch on the front panel of the machine. The control lamp in the front panel must light up.

Initial filling

To check for leaks and function, you should initially operate the machine with water only. After a successful test run, the water is replaced by your chemical.

Test run

Check the function of the air injection as well as the function of the solenoid valve for the water supply. For operation of the control unit, see the next section. The air injection may only be switched on when the discharge nozzles are covered with liquid.

Emptying

Switch off the machine completely and disconnect the power plug. To replace the filled water with chemicals, open the two ball valves at the front.

Filling

The machine is filled with the chemical from above.

Approval

If any problems or irregularities have occurred during commissioning that are not covered in these instructions, please contact us immediately.

Control operation

As soon as the machine is switched on at the main switch, the status light at the bottom lights up and the start screen appears on the touch screen.

Start Menu:



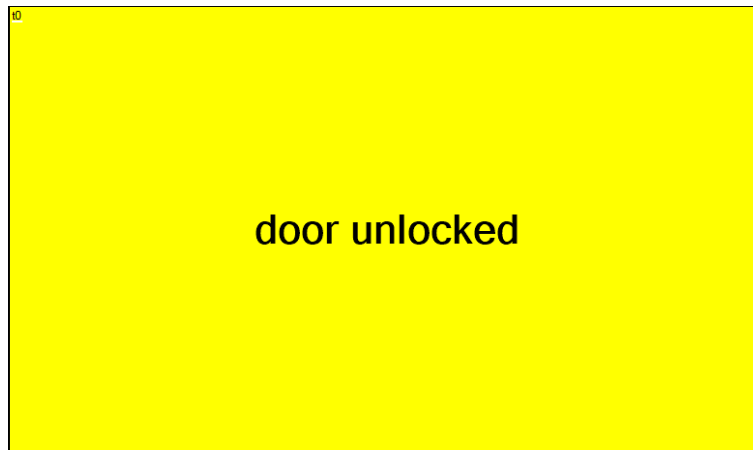
Tapping the home screen takes you to the main menu.

Door Release menu:



The doors are electrically closed at all times, i.e. the doors cannot be opened when the machine is switched off, after switching on or while the machine is running. To open the door, the "Door unlock" key on the touch display must be pressed. The left door must be opened first in order to open the right one too.

If the doors are successfully opened by pushing the button, the following text will appear:



The machine will not run if the doors are opened and the following text will appear:

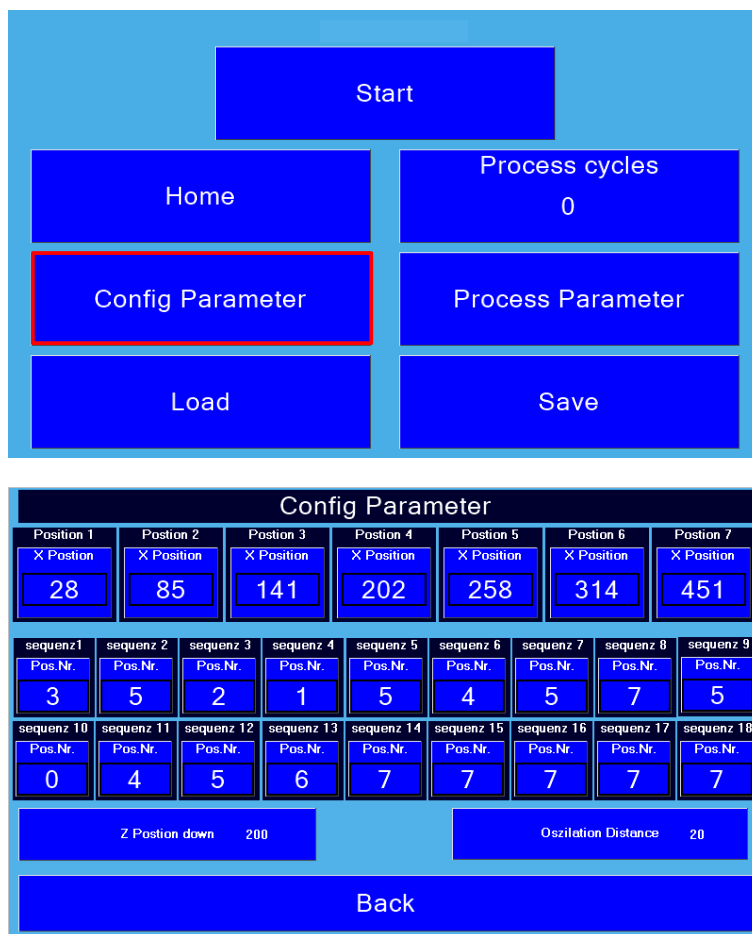


If for some reason there is a technical breakdown and the doors need to be opened, they can also be opened manually with a gray emergency plug inserted into the small socket under the machine. Also there is a fuse disconnecter that can be put in the door closing device. The two parts will be part of the delivery and look like the following images:



This plug is intended for use in emergency situations only! The fuse disconnecter is only intended for repairs and testing and may only be used by authorized personnel.

Config Parameter menu:



Position 1-7: Sets the position above the basins. Unit of measurement is **millimeters**. Caution: Changing the parameter is not necessary for the user and can lead to collision of the immersion unit/sample holder with the basin housing. Changing the parameter may be useful if the dipping unit/sample holder is mechanically changed in order to position it optimally between the spray nozzles.

Sequence 1-18: A total of 18 sequences can be set. As soon as a "0" is entered in a sequence, the machine stops operation and stops at this sequence position.

Z Postion Down: Sets the depth of immersion in the developer and rinsing basin. Unit of measurement is millimeters. Caution: Changing this parameter is not necessary for the user and can lead to collision of the immersion unit/sample holder with the basin housing. It may be useful to change this parameter if the immersion unit/sample holder is mechanically modified in order to position it optimally between the spray nozzles.

Oscillation Distance: Defines the oscillation distance in the respective basins. Unit of measurement **Milimeter**.

If a parameter is to be changed, it must be selected. The **input window** of the respective parameter opens.

Displayed is:

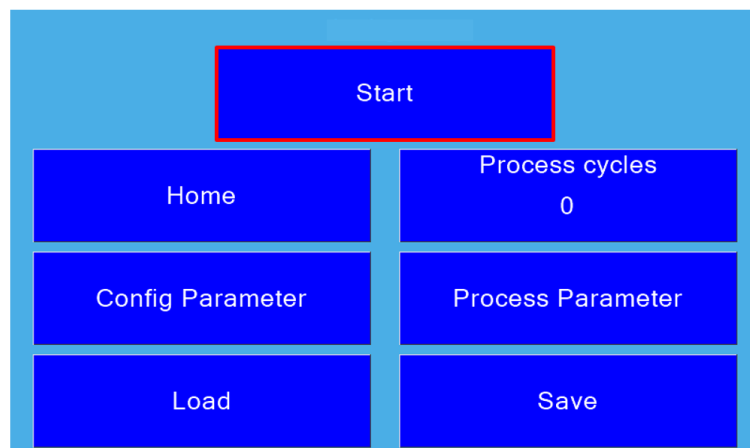


The parameter can then be entered here. If confirmed with **OK**, the new value is accepted and the previous parameter window opens again.

From the **Parameter** menu, you can return to the **main menu** by pressing the **Main menu** button.

If you press the **Start** button, the through-hole plating process starts with the values set in the parameter menu.

The **status window** opens. The current process step is displayed.



Basic procedure:

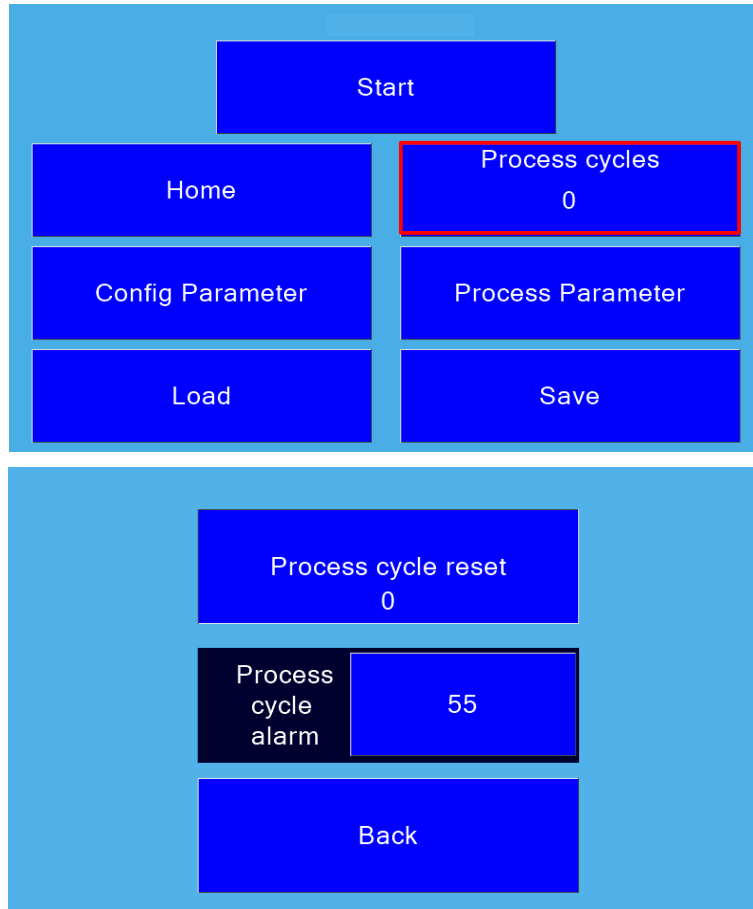
1. Move to home position. Corresponds to the loading and unloading position.
2. Start Cleaner Conditioner and immerse for 7 minutes.
3. Static rinsing combined with spray rinsing for 1 minute.
4. Pre-dip without rinsing.
5. Immersion in activator for 7 minutes.

6. Static rinsing combined with spray rinsing for 1 minute.
7. Immersion in intensifier for 4 minutes.
8. Static rinsing combined with spray rinsing for 1 minute.
9. Immersion in copper bath for 23 minutes.
10. Static rinsing combined with spray rinsing for 1 minute.

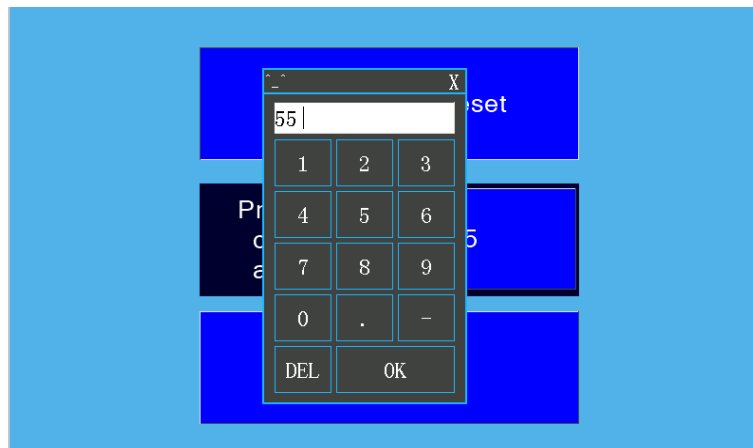
This sequence is already stored for you in two processes according to the parameters set by default and taking into account the default bath sequence (see "Bath overview" figure).

Process Cycles / Process Counters menu:

Counts each process cycle. Can be reset to zero by pressing Process Cycle Reset.



Setting of the process alarm:



Pressing the number opens an input window in which the desired value can be specified. When the process counter reaches the entered value, the "Process Cycles" field in the main menu appears as a red box.

Pressing **Back** opens the **main menu**.

Process parameters menu:



Time Dip: Setting the time in the bath. Unit of measurement is **seconds**.

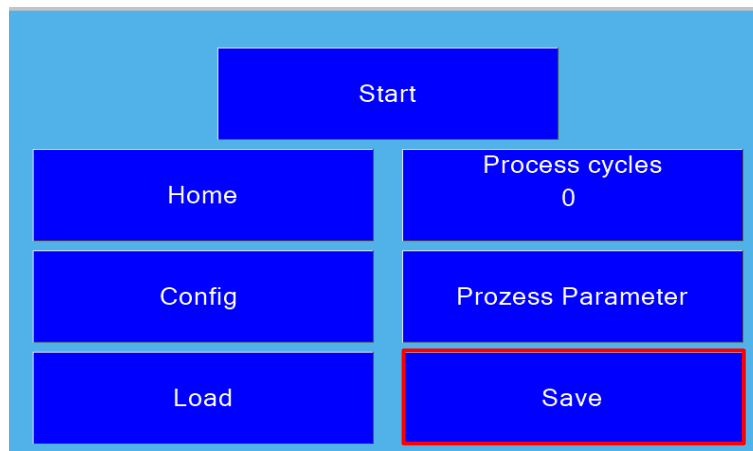
Time Up/ Drip Time: Setting the drip time after the bath. Unit of measurement **seconds**.

Speed OSC: Setting the oscillation speed in the individual basins. Unit of measurement **millimeters/second**. If set to "0", no oscillation takes place.

If a parameter is to be adjusted individually, it must be selected. The **input window** of the respective parameter opens. Confirmation is made via "OK".

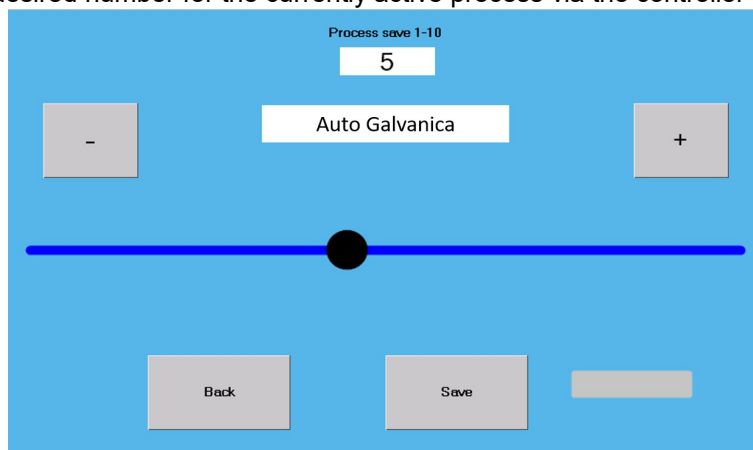


Menu Save / Save process

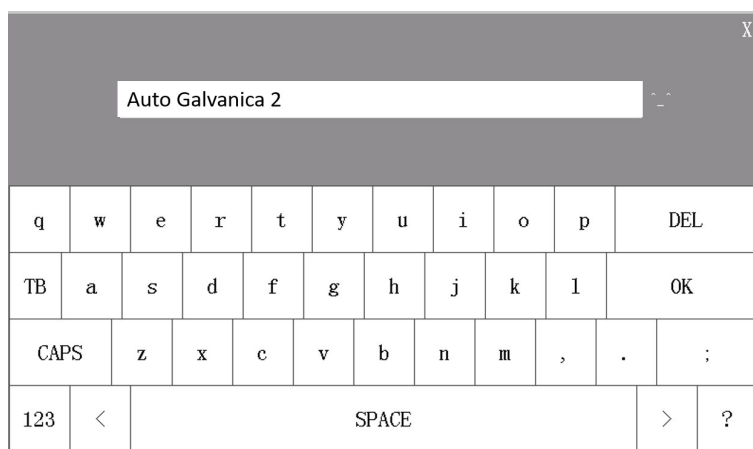


The Process Save window opens. Now all currently set parameters can be saved under a number. Up to 10 processes can be saved. Two standard processes are already stored for you.

Example: Assign a desired number for the currently active process via the controller or via the +/- key.



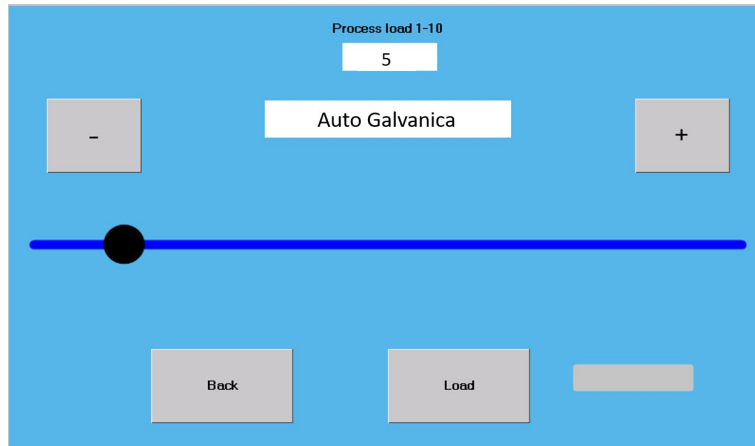
Then click in the white text field and enter the desired process name by clicking on the individual letters with the mouse and confirm with "OK".



By pressing **Save** (see above) the desired process is saved. Without saving by Save, the process is not saved. Pressing **Back** opens the **main menu** again.

Load / Process selection menu

The menu item is used to call up a previously saved process. The Process selection window opens.



By pressing +/- key or by operating the controller, set the number of the desired process and confirm with **Load**. Pressing **back** opens the **main menu** again

Cleaning and maintenance

The design of the machine allows almost maintenance-free operation. The primary focus is on the periodically recurring work of changing chemicals and cleaning the machine.

Cleaning

All parts of the machine body except the hood can be cleaned with a mild soap detergent if necessary. The removal of soiling and etchant residues must always be followed by thorough post-cleaning with clear water.

Disposal

The disposal of the medium must be agreed with the chemical dealer. The machine was mainly manufactured from recyclable materials and must be disposed of properly and thus in an environmentally friendly manner if it is scrapped at a later date.

Spare parts list

MC-1	Thermostat
MC-2	Titanium heater
MC-3	Rectifier
MC-4	Voltmeter
MC-5	Amperemeter
MC-6	Fine potentiometer
MC-7	Switch
MC-8	Drain grommet D20/dn14
MC-9	Cover
MC-10	Ball valve
MC-11	Touch display
MC-12	Power supply main
MC-13	Power supply control voltage
MC-14	Optocoupler board
MC-14	Main board
MC-15	Relay board

Warranty

All machines are tested for function and fatigue strength before delivery. We grant our customers a factory warranty of 12 months from the date of purchase on the machine with regard to freedom from defects in material and workmanship. We provide warranty at our discretion by replacing defective parts or by repairing the machine in our factory. Old parts become our property.

Disclaimer

Bungard GmbH & Co. KG reserves the right to make such changes or improvements in machines or machine specifications as it deems necessary in its sole discretion and assumes no obligation with respect to the implementation of said changes in machines previously sold.

Bungard products and services are subject to the prices and terms then in effect. These prices and conditions are subject to change without notice.

The information in this document is subject to change and does not constitute a representation by Bungard.

Terms of sale and delivery: These are available to the buyer no later than the time the contract is entered into. We do not guarantee or accept liability for damage to the material or injury to persons if it is caused by any of the following reasons:

Improper use of the machine

Incorrect assembly, set-up and operation of the machine or inadequate service

Use of the machine with defective safety devices

Failure to follow the manual regarding transport, storage, assembly, setup and service of the machine

Unauthorized modifications to the machine

Improper or incomplete repairs

Destructive forces applied to the machine as a result of foreign bodies or strong external violence

Use of non-original spare parts

Wear parts are excluded from the warranty.

We cannot accept claims for compensation or consequential claims arising from damage to or destruction of workpieces processed in the machine, since the influencing variables during operation of the machine are largely beyond our control.

This applies analogously to claims arising from damage to objects, buildings and persons as well as the environment.

All information has been compiled with care. However, we reserve the right to make errors and technical changes, even without prior notice.

Operation in aggressive, dusty, humid, extremely hot or explosive environments is at the user's own risk and responsibility.

The user is responsible for taking appropriate precautions and providing protective equipment. Any liability for damage caused by operation in such an environment is hereby expressly excluded.

Copyright

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Appendix 1: Basin Approach

Basin	Amount	Amount	Postscript	Packaging unit
Product	For 6,5 L (H23)	For 13 L (H34)	for 10 m²	
	Multi-Coater 2030	Multi-Coater 3040		
Basin 3				
DI Water	6.305 L	12.61 L		
DS270	0.195 L	0.39 L	30 ml	500 ml*
Basin 2				
DS400	6.5 L	13 L	2 L	20 L*, 5 L
Basin 1				
DS400	6.175 L	12.35 L	2 L	See above
DS500	0.325 L	0.65 L	50 ml	500 ml*, 250 ml
Basin 4				
DI Water	2.99 L	5.98 L		
DS650 L	2.795 L	5.59 L	430 ml	5 L*
DS650 P	0.65 L	1.3 L	100 ml	5 L*
DS650C	0.065 L	0.13 L	10 ml	500 ml*
Basin 7				
	for 28 L	for 1x 56 L		
CU 400 D ready made solution 2020	28.0 L	56.0 L		30 L*
CU 400 A	120ml	240 ml	1L / 8000 working hours	1 L*, 5 L
DI Water	Fill up to 30 L, if necessary.	Fill up to 60 L, if necessary.		

*= Part of the starter set for Compacta 30 / HITEC PLATE / MULTI-COATER

Exothermic reactions are possible when mixing chemicals! Mix in a suitable container outside the machine. Do not add water to acid! Always add the acid to the water! Wear protective clothing! Mix slowly

Please check the tank size of your machine. Deviating tank sizes possible!

DI water are not part of the delivery and must be purchased locally!

Appendix 2: Workflow

Step	Basin	Process	Time	Temp. °C	Remarks
1	3	DS270	7 min	50	Cleaner Conditioner
R	5	Static Rinse	1 min		
	5	Spray Rinse	1 min		
2	2	DS400	1 min	20-25	Pre-Dip
		No rinse!			
3	1	DS500	7 min	20-25	Activator
R	5	Static Rinse	1 min		
	5	Spray Rinse	1 min		
4	4	DS650	4 min	45	Intensifier
R	5	Static Rinse	1 min		
	5	Spray Rinse	1 min		
5	7	CU 400	23 min	20-25	18 µm Cu plating, 0.8µm/min, 3A/dm ²
R	5	Static Rinse	1 min		
	5	Spray Rinse	1 min		

Subject to technical changes at any time.