GEWO FEINMECHANIK

Operating instructions

Pipette Washing Machine

PSD

Stand: 01.07.2023

I. Preface

The business Gewo Feinmechanik (Department: H. HÖLZEL) is since years a well known firm in the laboratory and research-sector. It is our task with equipment from Hölzel to simplify your routine-work in the laboratory and therefore help to relief the qualified specialist staff.

With the investment in the new pipette washing machine, type PSD you decide vourself for a innovative product. The PSD is a modern development based on the since years proven pipette washers type TL/T\L. The PSD features besides a very simple handling an low susceptibility against interruption breakdowns.

In case you belong to our new customers you soon will be convinced from the quality of our washing and drying automates. But have you already tried the strength of our equipment in former times you also count to the broad number of customers who will because of the excellent features of the Gewo products be open to technical innovations and will again decide for a long living quality product.

In the following you will be guided through the different points of the operating instructions. Should there turn out questions use our hot-line. Our well informed employees will always try to answer your questions to your full satisfaction as well as to receive constructive critics.

Hot-Line Tel.: 0049 / 8122 / 9748-0
Fax: 0049 / 8122 / 9748-21

Email: info@gewo.net
Internet: www.gewo.net

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1 Description of equipment

1.1 Operation of the pipette washer

The thorough cleaning procedure of the fully automatic cleaning program is controlled by an internal microchip which allows the user to adjustable important cleaning parameters like:

- The water level of the inner container can be preadjusted with the key' ***"Wasserstand"*** on the front panel according to the size of the pipettes to 45 cm or 65 cm.

- Drying or non-drying of the pipettes with the key ***"Trocknen"*** on the front panel.

- The amount of the automatically addition of the liquid detergent is adjustable between 0 ml - 400 ml with the "arrow-key's" besides the display'
- ***"Reinigungsmittel ml"*** o\'er the front panel.

- The temperature of the cleaning lye is adjustable between 30°C – 95°C with the „arrow-ke\ys" besides the display' ***"Kochtemp./Isttemp"*** over the front panel. The display' signals the user the current temperature in the inner container during the heating of the lye and also during the drying period of the pipettes.

At the lighting up LED' s on the front panel is the current program-status of the cleaning-programs anytime recognisable.

The thorough cleaning effect of the pipette washing machine result from the principle that the dirty pipettes are boiled in a cleaning lye of demineralised water. The temperature of the cleaning lye is corresponding the category of the dirty adjustable between 30°C – 95°C over the front panel. As well as the temperature also the addition of the liquid detergent is adjustable between 0 ml - 400 ml over the front panel. The dosage of the liquid detergent is working automatically through an integrated pump and a container which provided the liquid detergent. Both cleaning parameters, the temperature of the cleaning lye and the quantity of the fluid detergent have to be chosen before starting the cleaning cycle.

The intensive cleaning effect of the pipette washer consists in that, that the pipettes to be cleaned, in the first step of the program before starting the rinsing

cycles in a specific alkaline cleaning solution are heated up to temperature between *30°C* – 95°C. If the cleaning lye reached the adjusted temperature they will be keep on as long as the preset heating time is over. The heating time of the solution inclusive the warm-up time takes about 2 hours and is fixed programmed in the internal microchip. This means that the user have no possibility to alter the heating time itself.

For producing of the cleaning lye to achieve a perfect cleaning result it is necessary to use distilled or neutralised water. Normally in household-water there are a lot of dissolved salts. These salts form through the warming-up of the cleaning lye in water undissolvable salts f. x. magnesium or calcium carbonates which then become visible as lime deposits on the pipettes.

The cleaning of the pipettes with the alkaline cleaning solution is followed by rinsing of the pipettes. This ensue by the PSD with norma1 household water and demineralised water too. The rinsing cycles are absolutely necessary for a perfect cleaning of the pipettes. During these cycles the dirt particles taken off from the pipettes and the rests of the cleaning solvent are reliably removed and carried out of the inner container. After each finishing of the rinsing cycles the water is completely pumped out from the container and the container is refilled. By the complete emptying of the cleaning container the abducting of dissolved pollution's in widely avoided.

Responsible for the high quality of the cleaning process is not only the amount of the rinsing cycles. The high quality results mainly from the duration of the rinsing cycles this means the effect of the water on the soluble dirt particles between the rinsing cycles.

The whole rinsing process are subdivided in six rinsing cycles with normal household water with about 15 minutes to effect on the soluble dirt particles and two cycles with demineralised water with also about 15 minutes to effect on the soluble dirt particles. The different rinsing cycles are monitored by a level control, by which the unit operates independently from waterpressure and furthermore flooding of the rinse -container is avoided. The water level of the inner container can be preadjusted with the key ***('Wasserstand')*** on the front panel according to the size of the pipettes to 45 cm or 65 cm. As well as the heating time also the amount of the rinsing cycles of the cleaning process are fixed programmed in the internal microchip.

After the rinsing cycles are completed the water will be completely pumped out of the container the pipettes being in the rinse-container are heated to the preselected drying temperature of approx. 130°C centigrade and dried about 2,5

hours. During the drying time the water dripping from the pipettes is permanently removed by a pump and led into the sewage system. It has to be kept in mind that the water supply during the whole cleaning procedure may not be interrupted i.e. the water taps must remain open during the complete cleaning procedure to achieve an optimal cleaning of the pipettes.

The water taps must remain open during th Complete cleaning procedure to achieve an optimal cleaning of the pipettes.

Should the pipettes not be dried after finishing the heating cycle and rinsing period the key ***(Trocknen)*** on the front panel must be deactivated before starting the cleaning
process. This causes that the last rinsing of the whole cleaning procedure distilled water. remains in the container. Thereby the pipettes stand up to their taking out in demineralised water. The in the container remaining water can be taken for the following cleaning-process. This enables a economically cleaning of the pipettes. At the lighting up LED' s on the front panel is the current program-status of the cleaning-programs anytime recognisable.

Additional the exceptionally thorough cleaning of the pipettes the big advantage of the pipette washing machine type PSD is situated in the fact that these machine is able to take out the whole cleaning procedure independently during the night. So on the next morning the user can disposal about cleaned and dried pipettes.

The awkward and lengthy and over it out not harmless handle with chrome-sulphur-acidity escapes consequently.

The function ***"Neutralisieren"****is* only' for the user which connect the PSD to a normal household water supply. Is the PSD connected to a water system with demineralised water the addition of the detergent is automatic through an integrated pump and a container with liquid detergent provided. If the PSD is connected to a normal household water supply for neutralisation of the water a buffer-solution from the tank-container is additionally pumped to the water. The adding of the detergent has to be done manually.

It is not allowed to use the PSD with buffer-solution. In this case you have to discuss this with us before because we havye to alter the program on the microchip.

2 Your contribution to active environmental protection

2.1 Economical rinsing

In the cleaning program between the rinsing cycles pauses are integrated. These pauses cause the water need of the cleaning unit to be decisively reduced so that a permanent rinsing of the pipettes to be cleaned can be avoided. Furthermore the cleaning quality is decisively aided by this effect because in the rinsing pauses the water can have a better effect on the already detached soiling particles. So it is obtained that the operation of the pipette washer is very water and energy saving.

In addition you can contribute to the economising of your equipment if you take the following suggestions into consideration.

- Connecting the pipette washer to a hot water system leads only to a minimal saving of energy because heating and boiling time of the cleaning leach is preset. In case you still prefer a hot water supply you should discuss this intention with us before. If the running-in temperature is higher than 600 centigrade the built in solenoid valves can be overheated. In the following there can be considerable malfunction of the valves.

- Fully exploit the capacity of the rinsing container without overloading it (max. 8 fully load boxes). See step *5.2 Inseration of pipettes* So you rinse most economically and therefore contribute to a careful dealing with vital resources.

- If possible avoid to rinse pipettes of different lengths. By this you are forced to conduct the rinsing with high water level (63 cm).

- The measuring of the detergent should be chosen according to the degree of soiling of the pipettes. In general a quantity between 100 ml - 250 ml by an high water level and about 70 ml - and 150 ml by an low water level of fluid detergent is sufficient. Too much or unsuitable detergent can lead to a boiling over of the cleaning leach. At this point it is said that the Hölzel firm uses and offers only detergents which are free from phosphates and also are over 90% biological decomposable. By a proper and correct use of the detergent the sewage will not be loaded unnecessahly and the environment will be taken care of.

2.2 Disposing of transport packaging

The intention of a costly packaging of technical products is to beware the equipment from transport damages. Because of a distinctive environmental feeling the firm GEWO Feinmechanik GmbH attaches great importance that the packaging materials are chosen according to environmental amicability and waste managemental criteria i.e. they can be recycled.

- The cardboard box consists mainly of wastepaper.
- The Styrofoam parts are foamed without the use of FCKW.
- The foil is made of polyethylene (PE) and therefore is neutral to ground water.

The recycling of the packaging material into the value material cycle saves raw materials and minders the waste quantity.

NOTE

Important transport information for the PSD:

For transportation of an already used unit. the supply tank has to be completely emptied before. The black cap of the val\'e have to be assembled on the supply' tank aQain or the tank ha\'e to be removed out of the pipette washer.

Remove the front sheet-metal by opening the screws on the top of the unit. Now the user have to open the coupling between the supply tank and the pump for the detergent. Now the tank can be taken out of the rinser

3 Safety notice and warnings

This unit in general conforms to the prescribed safety rules of DIN EN 292-2. (German industiy standard). But improper use of the unit can lead to damage to people and objects.

Therefore before the first use of the unit carefully read the instructions before the unit is operated. By doing this you will protect yourself and avoid damage to the unit.

NOTE

Always keep the operating instructions at hand!

3.1 Use according to determination

- This unit shall be used only to clean pipettes. Every other use is prohibited and can lead to damage to persons and objects. For damage which ohginates by improper use the manufacturer cannot be made liable.

CAUTION

The unit is not allowed to he used to clean pipettes with which, without any further treatment, liquids are to be carried which come into the human organism.

3.2 Avoiding of injuries

- The unit is only then electricallv safe if it is connected to a ground system installed to regulations. This fundamental safety rule must be present for a safe operation of the pipette washer. If in doubt the electrical installation is to be checked by an authorised electrician. The manufacturer cannot be made liable for damages which are due or were due to a faulty or interrupted ground lead. (f. x. electrical shock).

WARNING

- *Never use the pipettes washer without a ground lead ! Danger to operators life could result !*

- The units are built for connection to a power socket with ground connection which is fused with a 16 Amp. slow blow fuse. For safety reasons i. e. danger of overheating it is illegal to use extension cords. Because of the relatively high power consumption of the heating elements of the pipette washer, the unit should be connected to a separate power line, to which no other consumer of electricity is connected. Repairs should not be performed without first having consulted the manufacturer, after that the repairs should be performed only by authorised experts. By impropeily performed repairs damage to the unit or to people could originate for which the manufacturer cannot be made liable.

CAUTION

- *For maintenance and repairs alwayss disconnect the unit from the power line.*

- Because of the relatively high power consumption of the heating elements of the pipette washer. the unit should be connected to a separate power line, to which no other consumer of electricity is connected.

- A damaged unit can endanger your safety. Therefore the unit has immediately to be shut down and the manufacturer is to be informed.

- Fill into the washing container besides the provided liquids like water only selected *H. Hölze detergents* (liquid or powdered) ***Do not add any additional solvents or detergents.***

- During or immediately after completion of the washing cycle do not grab into the washing container and/or touch the metal of the cover to avoid burnings. Also taking out the cleaned pipettes after ending of the cleaning cycles should be wait until the temperature in the inner container is sunk about 50 °C. After finishing the cleaning process the current temperature will be shown the user on the display. Each different program cycle of the whole cleaning program will the user be indicated through the corresponding lighting up LED. At the lighting up LED' s on the front panel is the current program-status of the cleaning-

programs anytime recognisable. Is the cleaning process finished the LED *"Programm abgeschlossen"* nearby the red *"Stop"* button is shining up. Sunk the temperature in the inner container under about 45 °C the unit will be reset. All LED's of the different cleaning cycles and the LED *"Programm abgeschlossen"* go out. Now the unit is ready for a restart or for some alteration of the cleaning parameters.

- The safety and danger notices for the use of the detergent agent are strictly to be observed. See also the safety notices on the label of the detergent package.

- The water in the detergent container is not drinkable!

- Pay attention to a safe standing of the part the pipette washer is put on. For this reason the unit shall be placed on a stable, not interrupted base.

- The detergents and neutralising agents must be kept separate from food, beverages and animal feed. They shall not come into contact will eyes or skin. The detergents, if improperly used can lead to etchings and irritation of the respiratory tracts. During work suitable protective cloths, gloves and goggles resp. a visor has to be worn.

- If detergent has come into the eyes immediately rinse eyes thoroughly with water and consult a physician and show the security label.

CAUTION

- *Cleaning or neutralising agents never shall come into the reach of children!*

- By participation the red „Stop"- key on the keyboard the cleaning process is interrupt and all cleaning parameters will be reset. The cleaning process could now start again.

3.3 Avoiding of damage to property

- Make sure that voltage, frequency and fusing of the powerline to which you want to connect the washer correspond with the details on the identification plate.

- Detergents proposed by the manufacturer normally lead to perfect rinsing results. Therefore it is advisable to obtain the deteigent from the manufacturer. Using customary detergents the result of the rinsing can be influenced negatively. f. x. after a short time different detergents remove the paint from the graduations of the pipettes or leave a thin alkaline film on the glassurface.

The manufacturer cannot be made liable for damages to objects or persons which occur by the use of detergents not proposed by the manufacturer especially in combination with a neutralising agent (boiling over of the cleaning leach).

- Glass splinters and broken pieces of pipettes immediately have to be removed carefully after the end of the rinsing cycle and the cooling off of the unit. Class splinters also in small quantities can lead to a reduced water drainage and therefore can lead to damage of the unit. Already in very small quantities glass splinters can negatively influx the function of the pump integrated in the unit. Condensed steam on pipettes and cover of the housing after completion of the of the cleaning cycle can be signs of reduced water drainage.

Water damage can be reliably avoided when the following requirements are observed.

- Closing of the faucet during longer rinsing pauses (f. x. annual holiday)

- Glass splinters of broken pipettes can lead to a blocking of the drain and so negatively influx the water drain. Furthermore the glass splinters of broken pipettes can reduce the cleaning effect. (limited function of the pump).

- The water connection at the unit and the supply line shall be inspected in regular intervals for tightness.

- The unit should not remain water filled for a longer period of time. Because by this the diaphragm of the level regulator is kept under load and this could lead to a deformation of the diaphragm. Such a fault can be recognised by overflowing i. e. non turning off of the water flow when the normal water level is reached. In this case the unit at least shall be filled twice with water and be emptied twice until the diaphragm of the level regulator has backformed again.

The manufacturer cannot be made liable for damages to persous or objects which are caused by disregard of the safty notices aud warnings.

4 Putting the washer into operation

4.1 General notices for setting up

Put the unit into the desired position and determine the lengths and the elbows of the drain hose. Use the enclosed couplings and ring clamps. The pipette washer is, according to the attached drawing (see 7 Appendix) to be placed in the vicinity of a water drain or a large basin. The drain hose should be placed directly into a drain tube or led into a larger basin. If the drain hose has to be installed in a 90° direction from the present direction when the unit is put into operation this must be done with the attached couplings and elbows to definitely avoid bending of the hose. At the same time the drain hose is to be shortened to a favourable length.

Now put the prepared drain hose without any bending into the desired position. The maximum height of the drain hose should be not more than 400 mm above the bottom of the unit because the built-in water overflow control otherwise will be affected in its function. Place the unit into the planned position and slide the black rubber hose over the metal nozzle on the rear side of the pipette washer. Now secure the installed drain hose with the big ring clip delivered with the unit. The drain hose should be controlled in a period of about 6 months if they is flee from ally bending. Pay attention to a safe standing of the part the pipette washer is put on. For this reason the unit shall be placed on a stable, not interrupted base.

Then connect the water supply hoses to your water supply system corresponding their identification normal household water W l and demineralised water W2. Test the water supply connection by a short closing of the faucet during the filling of the inner container.

The connections for W 1, W 2 and W 3 by an EPS III should not confused by no means otherwise the function of the unit is picked up.

NOTE

The electric power outlet must be fused with a 16 Amps slow blow fuse min.

After a power loss in the unit the program used again active and restarted at this position automatically and execute the cleaning process. The absolute running time of the interrupt program will be lengthened accordingly.

By an pipette washing machine with an extemal demineralised water pump the water connection ensued with the at the extemal pump on the pressure-side fixed transparent connection-hose. A direct connection of the pipette washing machine to a demineralised water supply results consequently not. The connection-hose at the suck-side of the pump is connected with a filled distilled water-basin.

To begin of the cleaning-process the user has always to provide for a sufficient filled distilled water-basin with at least about 150 litre and 0.5 bar water-pressure. Otherwise the cleaning process of the pipettes can not be started or the process will not be completely executed.

4.2 Important operating steps

a) Connect water Wl (tap water or household water) W2 (distilled water) and the drain hose on the unit. Pay attention to a sufficing safeguard of the drain hose through the enclosed hose-clamps. By the assembly of the grey water supply hoses might the in the connections integrated seals not be bend because otheirwise the thickness of the hoses are not guaranteed.

The pipette washing machine PSD is equipped with an automatically working dosage for liquid detergent. The PSD is only offered with two sorts of water (water Wl and water W2).

b) Before running the PSD for the first time the black cap of the valve in the supply tank for the fluid detergent have to be removed. For this the swing-mechanism integrated into the front-sheet metal is thiough pulling on the grip to operate. After this the black cap between the two yellow covers could be removed.

c) Open the water faucets and check connections of the water supply hoses and the drain
Hose for tightness. Turn on main switch on the front sheet of the unit.

- The green lamp in switch will light up

The last activated parameters of the cleaning process the programmed temperature of the cleaning lye and the dosage quantity of the fluid detergent will the user be indicated through the shining up of the corresponding LED's on the front panel.

Trough pressing the green *"Start"* button on the front panel the cleaning process will be started. After a power loss in the unit the program used again active and restarted at this position automatically and execute the cleaning process. The absolute running time of the interrupt program will be lengthened accordingly.

d) Pressing the red *"Stop"* - key on the front panel causes the active program to stop and to reset it too. The LED *"Programm aktiviert"* nearby the green *"Start"* button goes out. Only the LED's of the chosen cleaning parameters and the display for the quantity of fluid detergent and the required temperature of the cleaning lye are activated. After depressing the *"Stop"* - key' once again the container if filled with water will be emptied by a integrated pump. All other settings f. x. Water level and rinsing means

quantity remain activated but can be altered before a new start of the cleaning program.

e) With the key *"Wasserstand"* the user can choose bet~'een a high water level (about 63 cm above the container bottom) and a low water level (about 45 cm above the container bottom) in the unit. The chosen water level is shown by the shining up of the conesponding LED on the front panel. Make sure that the high water level after filling the unit is approx. 6 - 10 cm below the tipper rim in the marked area of the container. To the first operating of the pipette washing machine choose the low water level with the described button.

If the water level reached the appointed Water-height of about 45 cm or 63 cm the water inlet will be interrupted. .At this position a singular control of the water level should be executed from time to time. Make sure that the low Water level after the filling of the container is about 45 cm above the container bottom. Press the red *"Stop"* button and alter the water level by an operating the *"Wasserstand"* - key. The water inlet starts again up to the high water level. The cleaning program remain active. Control the high water leve1 and make sure that the high water level after filling the unit is approx. 6 - 10 cm below the upper rim in the marked area of the container.

f) The activating of the cleaning program is indicated by the respective LED *"Programrn aktiviert".* After a power loss in the unit the program used again active and restarted at the interrupted position automatically and execute the cleaning process. The absolute running time of the interrupt program will be lengthened accordingly. The different worked up cleaning cycles e.g. water inlet, heating of the cleaning lye are the user signalled by the shining up of the corresponding LED on the front panel. Through pressing the red *"Stop"* button the cleaning program will be interrupted and reset. Now the parameters of the cleaning program could be altered corresponding to the wishes of the user and restarted. Starting the cleaning-process through an operating the green *„Start"* – key. The container now be filled with demineralised water (W2).

g) The pipette washing machine type PSD can run with an

- automatically dosage of fluid detergent als

- with a manually addition of the detergent (fluid or powdery) and

also

- without any detergent addition too.

h) So that the efficient of the pipette washing machine in the case of an manually dosage of the detergent (fluid or powdery) will be guaranteed, it is strictly forbidden for the user to give the detergent in the container when there is no water in it. After the end of the filling-process of the container with water the user have to dosage the detergent manually during the cleaning cycle of boiling the cleaning lye ***("Kochen").***

The quantity of the detergent should amount between 70 - 250 ml by the fluid „Hözel-Spezialmittell"and about 50 - 100 g by the powdery detergent. This means that the whole cleaning program will be executed without any interruption after pressing the green ***'Start"-*** key.

The amount of the detergent which should dosage in the inner container could be altered step-wisely' through 5 ml gradations in the area ***"Reinigungsmittel ml"*** of the front panel with the arrow-keys near the display. The quantity of the dosage have to be chose before running the cleaning program like all parameters of the cleaning process.

- raise up the quantity of the detergent which should dosage in the inner container with the arrow-keys step-wisely in 5 ml gradations.

- decrease the quantity' of the deteigent which should dosage in the inner container ~'ith the arro~-key's ' ' st ep-\\'isely' in S ml gradations.

ls in the program-point of the detergent quantity 0 ml entered, the cleaning program will be executed without any addition of liquid detergent. An operating without any detergents can led to a impairment of the cleaning-quality.

If there is about 1 litre fluid detergent left in the supply tank blinks on the display of the keyboard alternating the adjusted amount of fluid detergent and naught. This signifies the user that the supply tank have to be refilled before starting the next cleaning process with the *"Hölzel Spezialmitte/"* fluid detergent again. The started cleaning-process 15 executed however without any impairment of the cleaning result.

The tank for the fluid is by setting the unit into operation empty. Fill the supply tank carefully with the funnel included into the operating environment. To the filling of the tank, is the swing-machanism integrated into the front-sheet metal is through pulling on the grip to operate.

To the filling occurrence the supply tauk must not remove out of the unit.

To the filling of the supply tank the user have to remove the yellow tank cover on the left side of the supply tank an which is nothing installed. Use the " filling aid" (funnel) packed with the epuipment. Now carefully fill the supply tank with the liquid cleaning detergent observing the safety notes given in chapter 3.2 Avoiding of injuries.

The supply tank must not filled completely. To the above rim of the tank must be al least a space of about 4 cm. The max. amout of fluid detergent in the tank should not exceed 5 litres. The PSD should only be operated with the liquid detergent „Helimatic Cleaner alcalline" of the company B. Braun..

To run the pipette washer the black cap from the valve should be removed. Spilled quantities should immediately be removed from the unit, supply tank and other devices in the vicinity.

Manners the users of the pipette washer necessarily on the formal dealings with the detergent and die filling of the supply tank, too.

The manufacturer cannot be made liable for damages to persons or objects which are due to disregarding the above mentioned commet.

i) The user has the possibility to alter the temperature of the cleaning lye step-wisely in the area ***"Kochtem./Isttemp.°C"*** of the front panel with the arrow-keys near the display corresponding to the kind of dirty which the pipettes are contaminated. The temperature of the lye have to be chose before running the cleaning program like all parameters of the cleaning process.

- raise up the temperature of the cleaning lye with the arrow-keys step-wisely in 1°C gradations up to a maximal temperature of 95°C.

- decrease the temperature of the cleaning lye with the arrow-keys step-wisely 1 °C gradations to a minimal temperature of 30° C.

The chosen temperature of the cleaning lye will be indicated the user of the PSD in the corresponding display of the front panel

With operating the green *"Start"* button on the front panel the cleaning process will be started. Now on the display is the current temperature in the inner container indicated on the display of the front panel.

j) Make sure that the basin with demineralised water are filled enough by units which are connected to a external pump for the supply of demineralised water.

k) Through an conscious application of the times pause-times (about 15 minutes) between the single rinsing cycles, becomes the rinsing water on the one hand a better exploits and contributes therefore consequently to a responsible dealing with the resources. On the other hand the cleaning-effect of the pipette washing machine will be improved because of the cleaning effect of the water into the soiled pipettes is increased.

1) Install a short-instruction list nearby the unit. Keep the operating instructions always in the immediate vicinity of the unit.

4.3 Starting the cleaning procedure

I) Checking the saved parameters of a cleaning program

a) Press the *„Stop"-* key about to reset activated cleaning parameters.
b) Open water taps and check connections for tightness. Turn on the main switch.

- The green lamp in switch will light up

2) In the display the corresponding parameters of the cleaning program are indicated.

- The key *"Wasserstand"* is for regulation of water level. (Height 45 cm or 63 cm). By depressing of the button the water level is changed between low and high. The activated water level is indicated by the respective LED.

  high water level = shining up of the LED „hoch"

  low water level = shining up of the LED „niedrig"

- The function *"Ncutralisieren"* is not activated for cleaning units which are manufactured for using only fluid detergent.

- The temperature of the cleaning lye is the user indicated in the display *"Kochtemp./Isttemp.°C"* of the front panel. During the heating of the lye the current temperature of the cleaning lye is indicated on the display. The whole heating of the cleaning lye takes about 2 hours and is fixed programmed in the microchip from the unit.

- The quantity of fluid detergent which should dosage in the inner container is indicated in the display *"Reinigungsmittel ml"* of the front panel.

3) Starting the cleaning-process through an operating the green *„Start"* - key. The container now will be filled with demineralised water (W2).

   If the water level reached the appointed water-height of about 45 cm or 65 cm the water inlet will be interrupted. At this position a singular control of the water level should be executed from time to time. Make sure that the low water level after the filling of the container is about 45 cm above the container bottom. Control the high water level and make sure that the high water level after filling the unit is approx. 6 - 10 cm below the upper rim in the marked area of the container.

4) The pipette washing machine type PSD can run with an automatically dosage of fluid detergent an manually dosage and also without dosage of any detergent.

So that the efficient of the pipette washing machine in the case of an manually detergent addition (fluid or powdery) will be guaranteed it is strictly forbidden for the user to give the detergent in the container when there is no water in. The manually dosage,of the detergent have to occur after the end of the first filling up of the inner container with water.

The plenty of the detergent is into the subsequent program-point after the input of the cleaning leach temperature and the cook-duration, to alter step-wisely through 5 ml gradations. The programming of the detergent-addition takes place analogue the before explained instruction.

Is in the program-point of the detergent quantity 0 ml entered, the cleaning program will be executed without any addition of liquid detergent. An operating without any detergents can led to a impairment of the cleaning-quality.

All chosen cleaning parameters are indicated the user of the PSD in the front panel of the unit. So the user have the possibiliy to see the running off the cleaning procedure. All cleaning parameters have to be chosen before starting the cleaning process according to soiling and length of pipettes to be cleaned.

During running off the cleaning program only the ***„Stop"-*** key is activated. During the running program a use of keys on the front panel is ignored by the control of the pipette washer. Only by depressing the ***"Stop"*** - key the running program can be stopped.

Operating the ***"Stop"*** - key causes the program to stop immediately. The LED of the
respective program cycle goes out. After depressing the ***"Stop"-*** key once again the container, if filled with water will be emptied by a pump. All other settings remain activated but can be altered before a new start of the program.

After the end of the program the selected volumes for dosage quantity, temperature of the cleaning lye and water level remain stored. Starting a new program these volumes have to be altered or once again to be confirmed.

5 Operating the pipette washer

5.1 Starting position

Before every rinsing operation check the following points.

- Tum the main switch off. The green lamp in switch will light up.
- Is the tank sufficiently filled with cleaning - resp. buffer solution ?
- Open the water taps and check connections for tightness.

After completion of the successful starting (see chapter 4), the cleaning of the pipettes can begin according to soiling and length of pipettes to be cleaned.

Adjust the request program parameters, like:

- Water level (low high)
  - with low water level the level should be approx. 46 cm above the container bottom.
  - with high water level make sure that the water level after filling is approx. 8-15 cm below the upper rim of the container.
- Drying or non drying of the pipettes
- Amount of automatically dosage of fluid detergent (recommended quantity between 70 - and max. 250 ml). By an PSD without an activated automatically dosage the user have to give the detergent manually in the container.
- Chose the temperature of the cleaning lye.
  The temperature of the cleaning lye could be chosen variable between 30°C – 95°C.

After the filling with demineralised water (W2) and the automatically dosage of fluid detergent the cleaning leach is heated. With operating heating the switching of the heating protector is audible.

Make sure that during the emptying procedure the container should be completely empty after approx. 2 minute but at least after 3 min. If this should not be the case, the drain hoses have to be inspected for kinks, blockage etc..

5.2 Insertion of the pipettes

Pipettes fundamentally must stand with their pointed part on top in the boxes delivered with the unit. Open the cover of the pipette washer and put the containers with their handle grips upward into the rinsing container of the unit.

Furthermore they should have free passages and be free from solid in water insoluble blockages. To the filling of the pipette washing machine you give the pipettes into the containers of it. Open the cover of the pipette washer and put the containers with their handle grips upward into the rinsing container of the unit.

Are there many pipettes in the boxes they unit are allowed to fill only with 8 boxes instead of 9. Therefore it will be better for the cleaning result to fill the boxes only loosely with pipettes so that the necessary spaces for air circulation for the cleaning remain preserved.

> *Make sure that the heat can distribute unhindered in the inner container. Fill the container only loosely with pipettes so that the necessary spaces for air circulation for the cleaning remain preserved. Make sure, that the heat con distribute unhindered in the internal container.*

The principle of the cleaning process requires that the warmed up air of the heating unit could rise unobstructed between the pipettes and the containers too. A heat built up in the containers has definitely to be avoided.

This is absolutely necessary that the cleaning and drying of the pipettes is optimal and the pipettes do not become damaged (cracks at the mouthpieces of the pipettes).

Containers which are filled very densely can lead to a restricted cleaning-result because of the tight Situated pipettes the cleaning leach could not act effective into the contamination' s.

5.2.1 Insertion of Pasteurpipettes

To prevent the Pasteurpipettes to swim up, these pipettes have to be cleaned in a special container with a sieve cover. These special containers can be ordered normally as special accessories.

5.3 Filling in of water

Before starting the cleaning process the user have to choose the waterlevel by an operation of the ***"Wasserstand" -*** key (high of the waterlevel 45 cm or 65 cm). After choosing the other parameters of the cleaning process the cleaning sequence is started by an operation of the ***"Start"*** - key. The empty container of the unit is now filled with demineralised water (W2). The choice of the cleaning parameters are depending on the pollution of the pipettes or the runtime of the cleaning program itself. Then press the green „***Start"*** - key.

In case the line water pressure drops below 0,5 bar the water supply is interrupted. If the water line pressure is sufficient again the program starts again at that point it was interrupted. This makes sure that the cleaning affect is always from the same quality regardless of regardless water pressure.

5.3.1 Measuring out of the liquid or powdered detergent

The PSD is normally working with an automatically dosage of the liquid detergent. Beyond this also a manual addition of the detergent fluid or powdery is possible too.
This is especially interesting for the kind of users who also want to run from time to time a cleaning program with an manually addition of the cleaning powder.

The amount of detergent should be according to the degree of soiling of the pipettes between 50 g and max. 100 g per filling.

By an application of powdered detergent *in an PSD the automatically*
dosage of the liquid detergent should be deactivated to avoid interactions between the single cleaners

As described before a PSD can also be run without an automatically dosage of fluid detergent. In this case the cleaning agent has to be added manually after the end of the first filling with water (demineralised water) so that a satisfactorily cleaning effect will be reached. The dosage can ensued with powdered as well as with fluid detergent. The amount of detergent should be according to the degree of soiling of the pipettes between 50 and max. 100 ml or g per filling.

Too much or wrong detergent can lead to a boil-over of the cleaning leach. when handling the cleaning agents always observe the safety notices given under *3.2 Avoiding of injuries.* The combination of powdered detergent and water with a high content of dissolved salts like f. x. magnesium or calcium carbonates in it can lead to an impairment of the cleaning result. In these cases we advise the activation of the automatic dosage with the liquid detergent.

The dosage of the liquid detergent should amount between 70 ml - 250 ml. With an average amount of about 40 litres water in the container a concentration of approx. 0,25% is reached when about 100 ml are added. This concentration is completely satisfactory with respect to the amount of cleaning agent. The concentration of the detergent in the cleaning lye should not exceed 1 % at all.

> Check in regtilar intervals the remaining quantity of the cleaning resp. in the stock container.

The cleaning effect of the washer is so effective, that using a too high concentration of detergent leach poor colour deposits can be removed from the graduations of the pipettes. Therefore it is advisable to use no pipettes with colour deposits but those with considerable longer lasting brown diffused-in graduations. In general it can be said that the durability of the brown graduations is as long as the tenability of the pipette.

Manufacturers of pipettes with brown graduations are listed in the appendix.

5.4 Selecting process parameters

The most important parameters of the cleaning process could be programmed before starting the cleaning process independent of the other program parameters which are fixed in the microchip of the PSD. The fixed programmed program parameters represents values which are proven since years.

Between the individual rinsing cycles, the water can in the so called rinsing pauses more effectively affect the loosened dirt particles from the pipettes and also reliably remove rests of the cleaning a gent from the pipettes and from the rinsing container. with the time the pipettes especially their tips, remain in the rinsing water the cleaning effect is increased because of the longer time, and also the amount of rinsing water is considerable reduced because the amount of necessary rinsing cycles is reduced to a minimum. After pumping out of the last content of the container the container is heated to dry the pipettes.

By an insufficient water-pressure (lower than 0.5 bar) the cleaning process is interrupted as long as the required water-pressure has guaranteed again. In order to this the cleaning result is independent of the water-pressure always constant. This is especially interesting for users who get their water demand, especially the demineralised water only out of supply containers and not out of a pipe system which stands constant under pressure.

The heating time of the cleaning lye takes about 2 hours. This fixed programmed value leads to the effect that by an low programmed temperature of the cleaning lye the pipettes are longer effectively affect the loosened dirt particles from the pipettes as by an higher value for the cleaning lye. After the filling with water the cleaning leach is heated. With operating heating the switching of the heating protector is audible.

The rinsing cycle of the cleaning process is divided up in demineralised water (W2) and normal household water (W1).

- 6 rising cycles with normal household water (W1)
- 3 rinsing cycles with demineralised water (W2)

  Between the rinsing cycles the water can, in the so called rinsing pauses of about 15 minutes during each cycle, more effectively affect the loosened dirt particles from the pipettes and also reliably remove rests of the cleaning agent from the pipettes and from the inner container of the unit.

The drying temperature is progammed as a fixed value of about 125°C in the microchip of the unit. The drying period, also programmed a fixed value in the microchip, takes about 2.5 hours. This guarantees generally that also among others narrow pipettes can not be dried completely.

If against expectations condensed water vapour is produced in the inner container after finishing of the cleaning process, the integrated pump (WSP) should be checked on their unrestricted function. The function of the pump will be restricted if their are a pieces of broken glass into the inner container.

Are their many pipettes to bring into process, so like mentioned before, to receive perfectly cleaned and dried pipettes a space for air circulation must be kept free. In this case the user should keep free the space of the average box for the required air circulation. Othervise a arsing heat pile-up on the heating unit can lead to rips on the mouthpieces of the pipettes. Furthermore the pipettes should be checked that they have flee passages and be free from solid in water insoluble blockages.

Instructions for units which are connected to a normal household water supply'.

- After the dosage of the neutralising agent and the water supply the addition of the powdered cleaning agent is done manually. For this use a vessel which could be delivered with the unit. According to the degree of soiling of the pipettes fill approx. 50 - 100 g cleaning agent into the cleaning container. Too much or wrong detergent can lead to a boil-over of the cleaning leach. When handling the cleaning agents always observe the safety notices given under *3.2 Avoiding of injuries.*

  By units which are connected to a normal household water supply the adding of the powdery detergent must only be done manually after finishing the first filling of the inner container with water. So a satisfactorily cleaning effect will be reached generally.

NOTE

Please observe that in no case neutralising agent may be filled into a supply container which is marked with cleaning agent and vice versa. A *chemical combination of neutralising- and cleaning agents can heavily disturb the function of the pipette washer or lead to health defects.*

The manufacturer cannot be made liable for damages to persons or objects which are due to disregarding the above mentioned comment.

5.5 Washing of heavily soiled pipettes

Pipettes soiled with silicon cannot be cleaned optimally with common cleaning agents. In every case these pipettes have to be treated separately. Only one pipette soiled with silicone can heavily reduce the quality of the complete cleaning process.

In case one or more silicone soiled pipettes inadvertently have been cleaned and therefore the quality of cleaning is not sufficient, please proceed as follows.

1. Increase the quantity of the cleaning agent approx. by five and clean the pipettes in this way 2 to 3 times. Pipettes with brown graduation get through this procedure without problems.

2. In case the procedure described under 1. above is not successful the pipettes shall be freed from the silicone cover as follows:

   a) Cleaning with solvents, f. x.

      - Chloride hydrocarbons
      - Toluene or benzene

Let the solvent react for several hours then rinse pipettes several times with fresh solvent again.

   b) Cleaning with cleaning agents which are strong alkali. Repeat the cleaning procedure several times using plenty cleaning agent.

c) Cleaning in a potash bath (10% potash leach - ethanol or methanol)

Leae the pipettes in the bath for several hours then rinse with fresh solution
place pipettes in the bath again and so on.

5.5.1 Pipettes with highly concentrated protein residues
(f. x. dairy farming)

Here one has to pay attention that the used pipettes immediately are soaked in a mild solution of rinsing agent, to prevent the protein residues from drying on.

5.5.2 Pipettes for use in cell cultures

It should be taken care, that exclusively Helimatic Cleaner alcaline is used. Additionally cleaning program No. 1 should be selected to get an optimal effect of the water in the rinsing pauses. Not the frequent water change but the length of time the glass surface is in the rinsing water is decisive for the quality of the pipette cleaning. So spreading of traces of rinsing agent can be excluded.

5.5.3 Pipettes with oil or grease containing residues
(lubricant or food industries)

Pipettes containing mineraloil or lubricant residues in every case shall be soaked, before the main cleaning process, in a strong detergent solution or in extreme cases in benzene or similar cleaning agents. With grease residues normally the soaking of pipettes in a detergent solution is satisfactory.

6. Technical description

6.1 General notes

The connection of the pipette washer to the water supply is done with the water hose supplied with the unit. The water supply of the unit is ensured by a solenoid valve, which needs a waterpressure of 0,5 to 6 bar. The sucking out of the remaining water is done by a pump integrated in the unit. The function of this evacuation process can be noticed by the electric motor of the pump and the coming out of water through the drain hose.

During the complete rinsing program, the water taps have to be open

All units are equipped with a temperature limiter which avoids a temperature rise over 150 Cels.

6.2 Signal indication

The LED's lighting up in the keyboard show the respective program parameters f. x. dose quantity or water level.

This enables the operators to inform themselves at every time about the status of the washing program.

6.3 Water filling level

The maximum water level is set by the manufacturer to a distance of approx. 14 cm from the rim of the rinsing container. Should the water level f. x. by ageing of the pressure diaphragm, raise critically i. e. the minimum distance to the container rim is fallen below 5 cm, a readjustment of the pressure diaphragm is necessary.

NOTE

The readjustment should only be done after telephoning with one of the service technicians of the manufacturer.

The manufacturer cannot be made liable for damages to persons or objects which develop from disregarding the notice above.

6.4 Supplementary pump for completely desalinated water

In case the water pressure at hand is lower than 0,5 bar. H. HÖLZEL GmbH offers a supplementary pump which ensures on optimal function of the pipette washer even if the water pressure is very low. This is as a rule the case if the demineralised water is available only in supply containers and not in pipe systems under pressure.

6.5 Fault diagnosis

For the inspection of the first set up and also with a general check it should be proceeded exactly according to the notes given in chapter 4 P*utting the pipette washer into operation.* Possible putting up faults or functional troubles arising later as a rule can so quickly be discerned and localised. For this reason it is then mostly without problems to give hints for a successful remedy of faults or to propose or start an eventually necessary repair.

7 *Appendix*

7.1 Operating instructions in short for type PSD

It is advisable to keep the sequence of the following steps to maintain an undisturbed operation.

I. Open water connections and do not close them during the whole cleaning cycle.

2. Turn on main switch.

3. Insert the baskets with pipettes (pointed end up) into the rinsing container. (Pasteurpipettes have to be cleaned in the special containers with sieve covers) and close the cover The baskets should not be filled too densely with pipettes to avoid a reduction of the cleaning- and drying process. Pipettes with silicone soiling have to be removed and in every case be cleaned separately.

4. Before starting the cleaning process select the required parameters of the cleaning program:

- water level
- drying or non drying of the pipettes after the cleaning process
- quantity of the fluid detergent which should dosage
- temperature of the cleaning lye

5. Press the green ***„Start"*** button to running off the cleaning process to sign the unit the successful occurrence.

7.2 Technical data

operating voltage	220/230	Volts AC
current	12	A
power consumption	2,44	kWh
energy consumption	ca.7 (4,9)	kWh
fusing	16	(slow blow)
max. incoming water temperature	60	°C
water level max.	63 (48)	cm
water pressure min-max	0,5 - 6	bar
water quantity in container	45 (30)	1
water consumption		
normal household water W1	ca. 270(180) max.	
demineralisedwater W2	ca.130(90)max.	1
max. incoming water temperature	60	°C
detergent consumption	70 - 250	ml
cleaning temperature	ca. 30 – 95	°C
cleaning(heating)time	ca.120	min
rinsing program for two sorts of water		
normal household water (Wl)	ca. 150	min.
demineralised water (\\'2)	ca. 60	min
	ca. 210	min.

drying temperature	ca. 125	°C
drying time	ca. 150	min.
cleaning process:	ca.480	mm.

quantity of baskets max.	9	piece
dimensions of the baskets	80 x 80 x 330	3 piece
	80 x 80 x 415	6piece

Depth	ca. 530	mm
Width	ca. 320	mm
Height	ca. 920	mm
Weight	ca. 50	kg
Material	1.4301	

The given values for water quantity and water consumption are maximum values without pipettes in the washer. The water consumption is reduced according to the water displacement of the pipettes. The power consumption given corresponds with the power consumption at full cooking time and maximum drying power.

Manufacturers of diffused-in pipettes with brown undestroyable and absolutely permanent graduation (As far as known to us at this time):

K. Hecht 97647 Sondheim
Marienfeld 97980 Bad Mergentheim
Scherf-Präzision, 97645 Ostheim/Urspringen
D. Erhardt, 63225 Langen

7.2.1 Loading capacity of pipette washer

The given values are empirical and refer to max. 9 baskets.

graduated measuring pipettes

volume [ml]	0,1	1,0	2,0	5,0	10,0	25,0	50,0
approx. Ø	6,0	6,4	7,0	8,0	11,0	130	150
length	250	360	360	360	360	450	500
piece basket	180	164	149	97	58	38	30
piece/unit	1400	1300	1150	750	450	300	230

full pipettes

volume [ml]	0,5	1,0	2,0	3,0	5,0	l0,0	20,0	25,0	100
approx. Ø	4,0	5,0	8,0	9,0	10,0	13,0	l8,0	2l,0	25,0
length	280	320	330	350	390	450	520	530	580
piece/basket	420	258	105	84	63	39	18	15	7
piece/unit	3000	2000	800	650	500	300	160	130	50

The given values for the loading capacity of the PSD are empirical and can deviate slightly from the real values obtainable.