User Guide

Öko 2000

IMO GmbH Gässlesweg 6 D-75334 Straubenhardt Tel.: 070 82 491 80 Fax: 604 36 www.imo-ag.com info@imo-ag.com

Contents

page

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Continuation Contents

page

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Dear Customer,

we are glad because of your interest in our products.
Thank you for the confidence you have shown us.

Please attend technical safety instructions on this page, before startup of your new cleaning machine for circuit boards Öko 2000.

1. Safety Instructions

The washing machine ÖKO 2000 must only be connected to a supply protected by a fuse rated not more than 16A! Please see for the power supply voltage at the type label on the machine.

The installation of the machine should be arranged from employees, who are familiar with installation of such or similar machines. Our technicians will like to help you.

Please only use cleanser, which you have bought at our company.
Our cleansers are coordinated especially at the cleaning requirements of that cleaning machine for circuit boards. If you anyway should want to use an other cleanser, please obtain an O.K. from our technicians. If you use external cleanser and you didn't get O.K. from us, you will loose guarantee for your machine, because such cleanser can destroy the machine.

Please make sure, if your laundry is suitable for such cleaning processes. We assume no liability for damages because of process, material and temperature compability on cleaned circuit boards and components.

You can't clean glas-tube fuses! Those components please fit after cleaning process.

Please regulary check the boarder of the bottom metal filter for traces of rust. These may be caused by pieces of iron and may lead to contact corrosion on the stainless steel.

If you do not dry after cleaning process, you have got to start every day after work a separat drying process. So your can avoid damages of corrosion (rust) at the drying turbine.

The opened door to charge only with max. 25 kg (with extended grate and laundry)
Don't use as work disk or seating. Don't stand on it, there is danger of tilting!

To avoid water damage, the cleaning machine can be put into operation only in connection with the external solenoid valve.

Now we wish you success at cleaning of your products.

If you have questions, you can get in contact with us anytime.

IMO GmbH

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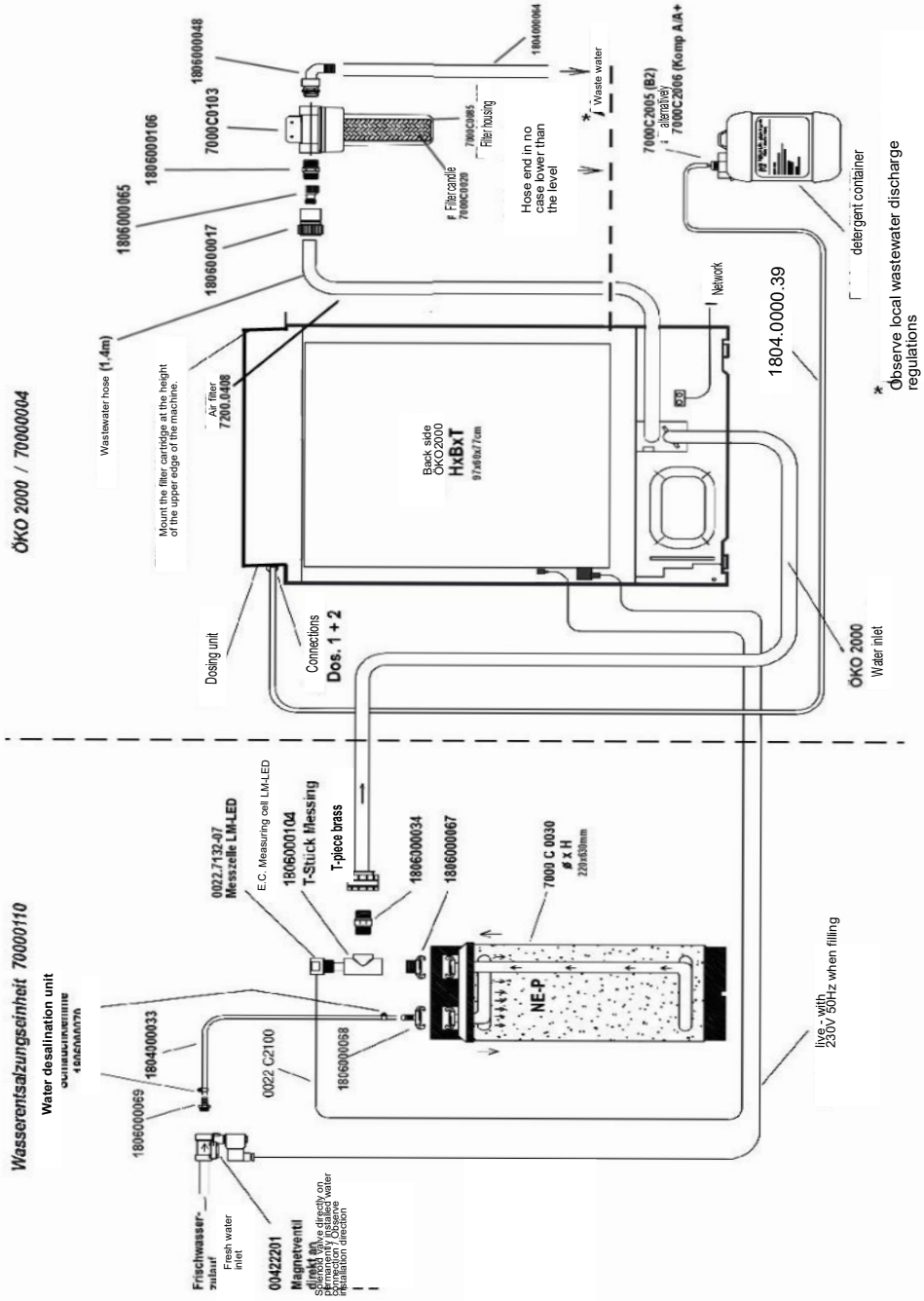
2.Schedule of connection Öko 2000

NE water deionizer with conductivity measurement



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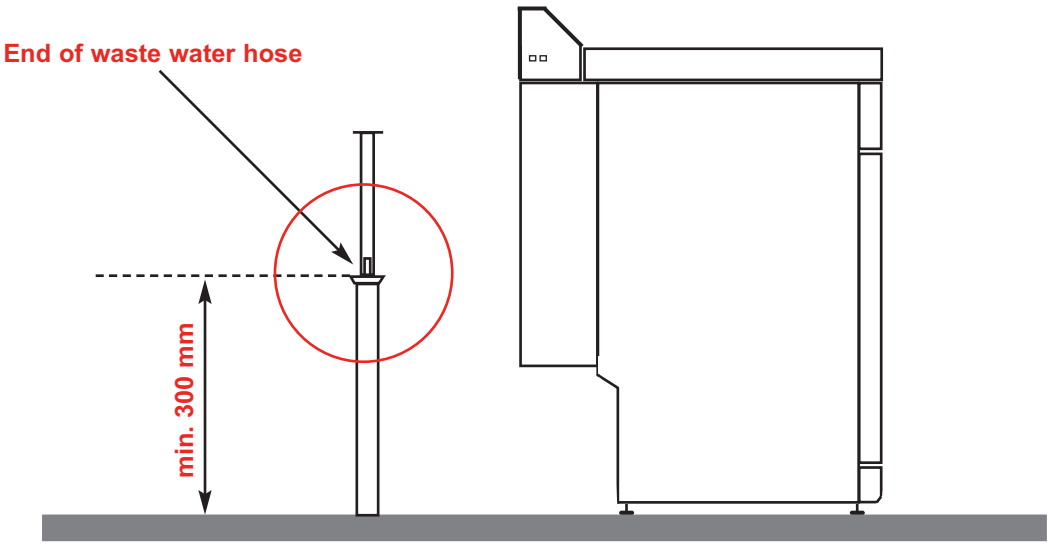
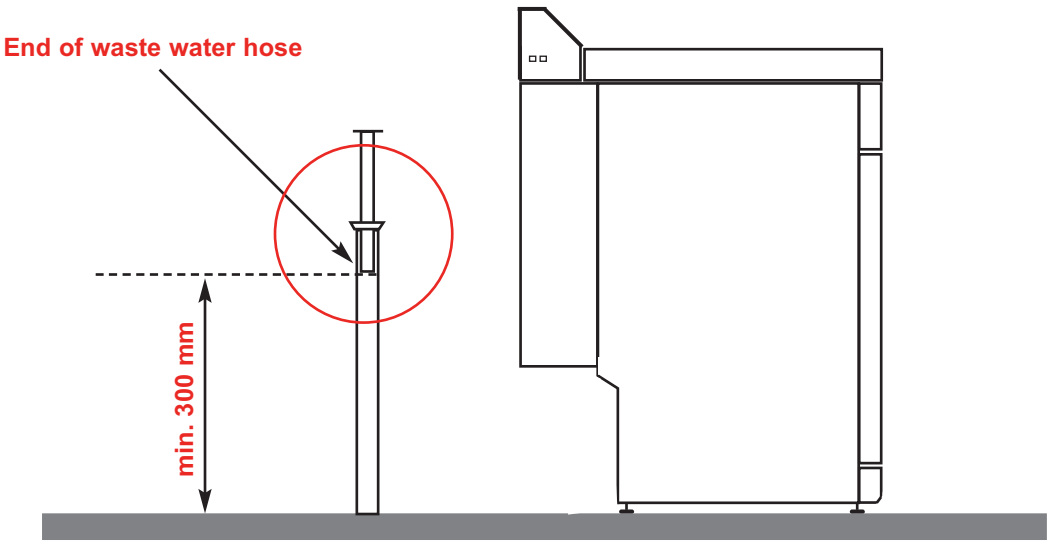
2.1 Schedule of connection of effluent hose

For to avoid an uncontrolled drain of water out of the cleaning system, the open, and thereby aerated end of waste water hose has to be mounted after the waste water filter at least 30 cm above the installation surface of the ÖKO 2000.

If the hose ends lower, it may be possible that because of the vacuum lifting effect, the water drains out of the machine.



Alternative



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3. Starting up

3.1 Connecting up the circuit board washing machine

The circuit board washing machine ÖKO2000 must be set up in a horizontal position.

Water supply: Connect up according to the connection diagram page 5.
The water pressure should be at least 2 bar and not more than 8 bar.
The machine must not be connected to a no-pressure water heater.

Drain: Connect up according to the connection diagram page 5.
The local waste water regulations have to be observed!

Elect. connection: The washing machine must only be connected to a 220V - 230V AC supply though a correctly installed mains socket.

3.2 Installation of the filter unit

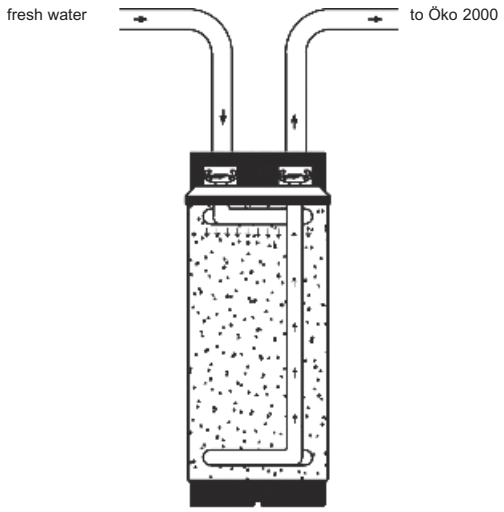
The supplied filter unit has to be mounted on the wall **at or above the top of the machine** (see connection diagram).

3.3 Removing the air from the deioniser cartridge

Please notice, that by starting up of a new deioniser cartridge the air inside removes by itself. This can cause error messages, which you have to disregard.
The program interrupts and is to start again. This procedure is to retry till the cleaning progam runs through (normal case 5-10 times).

For a faster deaeration a temporary operation with reverse flow direction is possible. Therefore, the connections „inlet“ and „outlet“ have to be changed.
After some filling operations of the system, the connections have to be mounted at the right positions again.

The remaining air can be removed at the vent valve in the cover.



Normal operation

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3.4 Cleaning agent dosage

Liquid components

Liquid components are dosed automatically during cleaning via the built-in dosing pumps, as programmed, automatically during the cleaning process.
(Activator AT can also be added manually to the washroom before the cleaning process).

Powder:

Dispense powdered cleaning agent, as shown, onto the inside of the open front flap before starting the cleaning process, or when prompted by the equipment.

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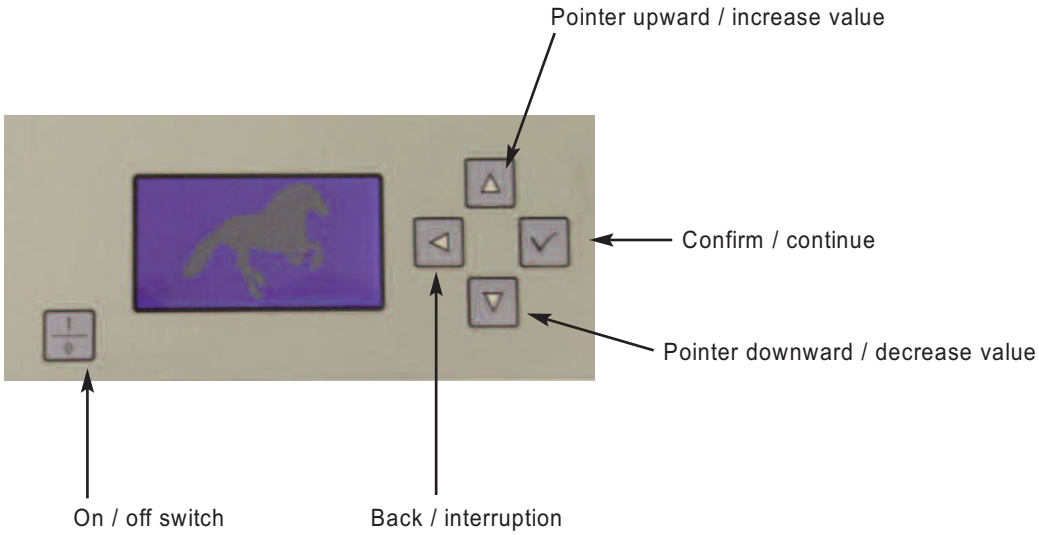
3.5 Operating Controll Front Panel



Following washing programs are setted ex work, but can be altered if required:

Program 1:
For cleaning printed circuit boards in general, also suitable for removing of "no clean" flux residues.
With subsequent drying.

Cleaner: Component A+ and Mix 3

Program 2:

For cleaning pcb-boards with only colophony flux and drying afterwards.

Cleaner: Mix 3, ca. 40gr

Program 3:
For cleaning lightly soiled objects, e.g. degreasing and dust removal with subsequent drying.

Cleaner: Mix 3

Program 4:

Only drying

3.5.1 Removing the upper support grid

For large items to be washed, the upper support grate with spray arm can simply be removed. Then the entire interior height is available for cleaning.
To remove the upper support grate, pull it out as far as it will go, then lift slightly and upwards at an angle. It is inserted in the opposite direction.
The water supply to the upper spray arm is automatically closed by a ball valve during removal. This means that the complete spraying capacity is available at the lower spray arm.

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3.6 Cleaning

1. Preparation

- Open the front door
- Dosage of the cleaning agent (see item 3.4)
- Place the frames carrying the circuit boards into the washing space

2. Cleaning

- Close the front door
- Switch on ÖKO 2000
- Select “start program” and confirm
- Use pointer up / pointer down to select the required program
- Confirm the required program with “ENTER”
- Machine begins to run; the program sections are indicate on the display
- Finish message after the end of the cleaning program

3. Removing the washed load

- Switch off the machine
- Open the front door
- Remove the wash frames with the circuit boards from the wash space

  Warning: washed load is hot!
- Close the front door

Please note:
The machine works only when the front door is closed properly. To open the front door immediately interrupts the program sequence. This is indicated by flashing on display. During the heating-up phase the display shows the elapsed time of cleaning or rinsing as follows: ‘--’ . After the temperature has reached its debit, the programed time starts. The elapsed time is shown on the display.

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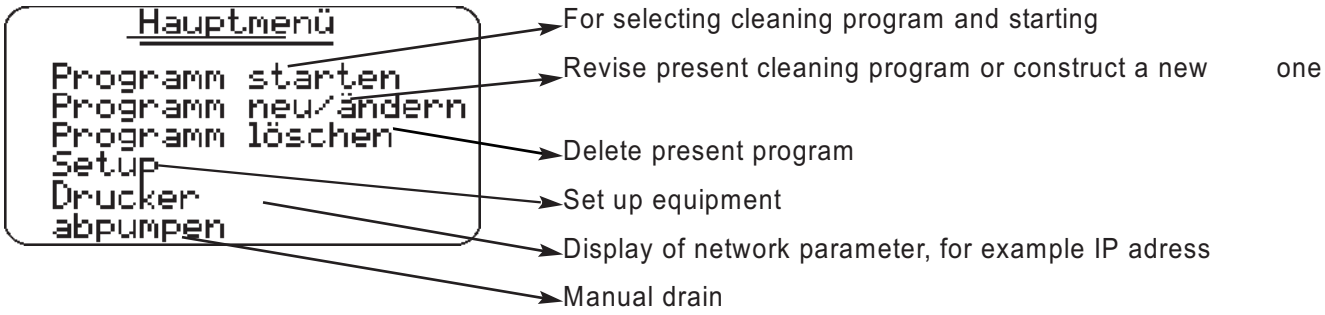
4. Operating summary

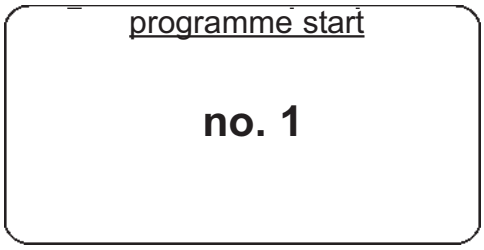
Function of keys

- On/Off switch
- To increase value / use pointer up
- To decrease value/ use pointer down
- Interruption / return to menue item
- Confirmation / select menue item

4.1 Main menue



4.2 Start Program



Select ▲ or ▼ to choose stored programs and press ✔ to start.

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4.3 Program new / alter

```
programme new / alter
no. 2    engaged
no. 3    engaged
▶no. 4   empty
no. 5    empty
no. 6    empty
no. 7    empty
```

Present cleaning program:
Can be altered

Empty storage space:
Inclusion of a new cleaning program is possible

Press ▲ / ▼ to select number of new program / or to alter existing program

Use ✔ for editing mode

Attention: Numbers of program 1-20 possible.

```
programme nr. 4
▶step no.:    01
 type:        empty
```

By selecting ✔ and using ▲ / ▼ several pages can leaf through.
Attention: If the actually step is emtpy, it can't be paged down.

Type of programm step: can be altered by selecting ✔

Attention: possible types of programm:
cleaning **rinsing** **drying** **empty(cleared)**

Type of program step 'cleaning':

```
programme no. 2
▶step No.:    01
 type:        cleaning
 temperature: 30°C
 duration:    5min
 detergent:   ==>
```

Required water temperature in the range of 20°C up to 70°C.

Current time in the range of 5 up to 40 minutes, after the required temperature of water and required dosage of detergent.

Select for detergent with ✔

```
programme no. 2
▶DOS1:        component A
 quantity:    3,0%

 add.
 detergent powder: no
```

Chose of dosage pump for program step (DOS1 or DOS2).
The assigned detergent is shown on display (see page 15).

Quantity of dosed cleaner in proportion to filled quantity of water (not with foaming or defoaming detergent; see page 20).

Addition of cleaning powder: yes / no switched by ✔.
If ' yes' is adjusted, program stops and gives message for manual dosage of cleaning powder.

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programme no. 2

▶step no.: 02
type: rinsing

temperature: 30°C
duration: 2min
ec-limit: 40µS

Step of program 'rinsing'

Required temperature of water between 20 and 70°C

Running time between 2 and 20 minutes after heating water of required temperature.

EC-limit between 10 and 200µS or 'without'
(Measurement for conductivity for this step of rinsing)

Indication: If a conductivity limit is indicated, so it will be assinged the same ec-limit to all following rinsing processes.
If a preceding rinsing process exists with an ec-limit , then this can't be changed in the current rinsing process.

programme no. 2

▶step no.: 03
type: drying

temperature: 90°C
drying grade: 5
run after: 10min

Step of program 'drying'

Required air-temperature at the air outlet of blower range between 50 and 100°C.

Required drying level of the warm air within the range of stage 1 to 8. At stage 8 you get a drying with the lowest rest of humidity.

Time within the range of 0 to 600 minutes, in which after reaching dry level of air drying continues, for example for drawing parts such as socket contacts drying completely.

Indication: After step of 'drying' no further step program possible.

Rules of program-construction:

- No further step of program after 'drying' possible.
- Between two program steps no empty (deleted) program step may be.
- After rinsing with EC-limit no cleaning step can follow. In the reversal conclusion also EC-limit can not be assigned to a rinsing step before a cleaning step.
- If an EC-limit is assigned to a rinsing step, all following rinsing steps have the same EC-limit, (the cleaning is adequate).
- If an EC-limit of a rinsing step is abode, so each further rinsing step will be overleaped, because enough cleaning is reached.
- Maximal 10 program steps are possible.

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4.4 Programme delete

programme delete

no.1
no.2
▶ no.5
no.7
no.8
no.9

Select ▲ and ▼ to choose program from settled list of cleaning program and ✔ confirm.

programme delete

shall programme no.5
be deleted?

▶ Yes
No

Select "YES" to confirm cancellation.

4.5 Setup

setup

time/date
language
spray-arm control: on
detergent settings
code changing

- time/date → Adjustment of time and date for journal
- language → Modification of language
- spray-arm control → Spray-arm-control on / off
- detergent settings → Settings and maintenance of cleanings agents and dosing pumps.
- code changing → Code-input for access control

4.5.1 Date / time setting

date/time

▶ date: 16.06.2004
time: 10:59

Select ▲ / ▼ and ✔ to choose time respect. date

Select ▲ / ▼ to change input (day/month/year resp.h/min).
Enter ✔ to go on.

4.5.2 change Language

language

▶ deutsch
english

Select ▲ and ▼ for the required language and use ✔ to confirm.

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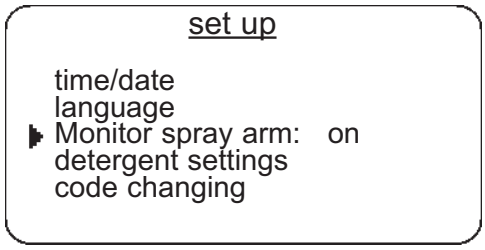
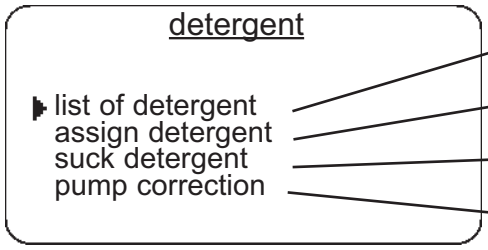
4.5.3 Monitor spray arm on / off



Select ▲ / ▼ to choose “spray-arm control” and enter ✔ to shift.

Indication: Monitor spray arm should be regularly be activate, otherwise the regulation of foam and resp. regocnition-blockade of the lower spray arm don’t work.
Cleaner programs which use foaming resp. defoaming can not be started, if the monitor spray arm is switched off.

4.5.4 Detergent



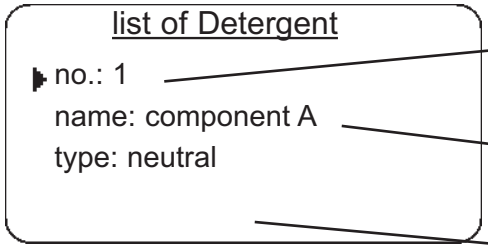
Create or change register of detergents

Assign detergent from register to a dosing pump

Aspirate detergent manual

Indicate power off pump

4.5.4.1 List of detergent setting / altered



Enter ▲ / ▼ to leaf through the memory and select ✔ to choose an input.

Enter ▲ / ▼ to alter numbers and letters. Select ✔ for the next input.

Kind of detergents in respect of his attributes will be tuned here. Possible settings are:

foaming:detergent produce foam, therefor it must be dosed gradually during the cleaning process until a little “foam-carpet” is formed.

defoaming:detergent is for counteract foaming.
(f.e. A foaming cleaner is used at the same time)
During the cleaning process detergent will be dosed if necessary.

neutral:detergent has no attributes as below. It will be dosed proportional to the filled quantity of water.This proportion will be setted by construction of the cleaning program.

empty:register contains no detergent.

Indication: If the cleaner will be used in other cleaning program, the modification interferes in the concerned program.

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4.5.4.2 Assign detergents to dosing pump

```
assign detergents
▶DOS1: no.: 2
       component B2
 DOS2: no.: 1
       component A
```

Select ▲ / ▼ and press ✔ to choose the required dosing pump.

Afterwards press ▲ / ▼ , leaf the register of the available detergents and choose with ✔

Indication: The same detergent can't be assigned to both dosing pumps.

4.5.4.3 Suck detergents

```
asorb detergents
▶Dosage 1
 Dosage 2
```

Select ▲ / ▼ to choose the required dosing pump and affirm ✔ .

The appropiate dosing pump is pumping as long as the ✔ -key is pressed.

This function is need to flow the dosing tubes f.e. after replacement of a used up detergent box.

4.5.4.4 Alter pumpfactor

```
pump correction
▶ DOS DOS1:    150ml/min
  DOS DOS2:    150ml/min
```

Input of pump-capacity per dosing pump.

To aquire the quantity, pump up the water one minute by suction-function and measure quantity of water.

The pump capacity should be checked once a year and by supply corrected.

Indication: Not the capacity of dosing pump will be altered, the capacity of dosing pump will be advertised to the control of the equipment.
Used dosing hoses may be replaced.
Please find more information on chapter 5.6.7

4.5.5 Alter Code

```
alter code

code number: 0000
```

By using a code-number you can make an access restriction of the equipment. Code-no. 0000 this function is switched off.

The following fuction will be protected with the code-number:

programme new/alter

programme delete

changing of code

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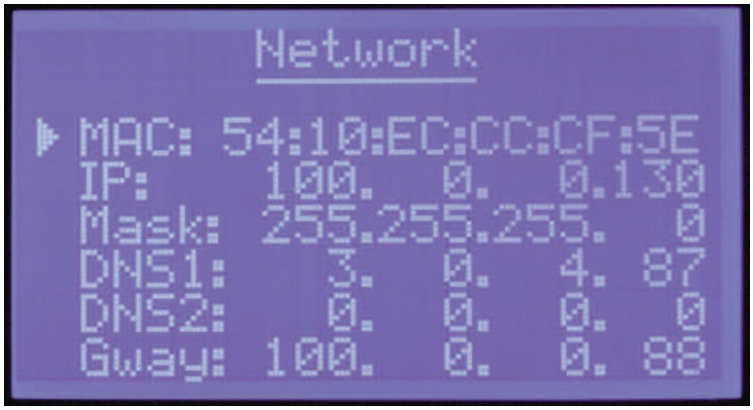
4.6 Network settings



After connecting the system with the companys network, ÖKO2000 obtains an IP adress over the DHCP-System.

This adress and additional network parameters are shown here.

Some more information to the network connection you will find at point 6 (page 24).

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5. Program flow

5.1 Step of cleaning

programme no. 2
1: cleaning
water: 0,7 litre
temp.: 20°C / 50°C
duration: --min / 20min
DOS1: component A 0,5%

Water will be filled.
The filled-in quantity of water is shown.

programme no. 2
1: cleaning
temp.: 20°C / 50°C
duration: --min / 20min
DOS1: component A 0,5%

Water will be heated and detergents are dosed.
The updated water temperature and the target temperature are shown.

programme no. 2
1: cleaning
temp.: 50°C / 50°C
duration: 14min / 20min
DOS1: component A 0,5%

Water will be circulated, time of cleaning runs.
The exhausted time and the target duration is shown.

programme no. 2
1: cleaning
temp.: --°C / 50°C
duration: --min / 20min
DOS1: component A 0,5%

End of cleaning step, water is drained.

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5.2 Step of rinsing

programme no. 2
2: rinsing
water: 0,7 litre
temp.: 20°C / 40° C
duration: ---min./ 10 min.
Ec-value: ---µS / 30µS

Water is filled:
The filled-in quantity of water is shown.

programme no. 2
2: rinsing
temp: 23°C / 40° C
duration: --min./ 10min.
Ec-value: --µS / 30µS

Water is heated.
The actually temperatur of water and the target temperature is shown.

programme no. 2
2: rinsing
temp.: 40°C / 40°C
duration: 8 min./ 10 min.
Ec-value: --µS / 30µS

Water is be circulated, rinsing time runs.
The exhaused time and the target duration are indicated.

programme no. 2
2: rinsing
temp.: --°C / 40°C
duration: --min./ 10 min.
Ec-value: 13µs / 30µS

Conductivity of water is measured:
If there is no limit quoted, this part is dropped.

If the value of measure is smaller than the desired adjusted value, all following rinsing-steps been void. If the value of measure is higher than the desired adjusted value, the next rinsing step goes on.

If there is no further rinsing step programmd, an error message is issued. The rinsing program must be repeated, because an inadequate result is to apprehend.

programme no. 2
2: rinsing
temp.: --°C / 40°C
duration: --min./ 10min.
Ec-value: --µS / 30µS

End of rinsing step, water is drained / pumped out.

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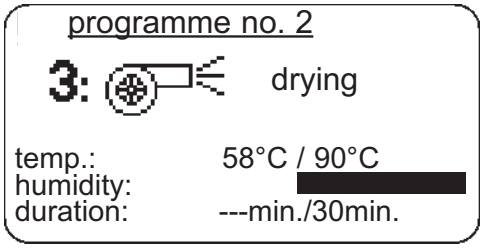
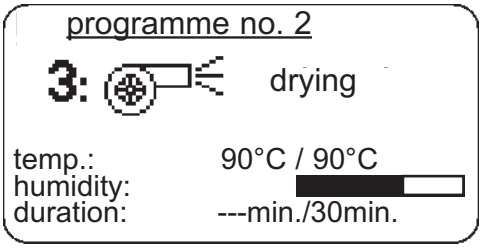
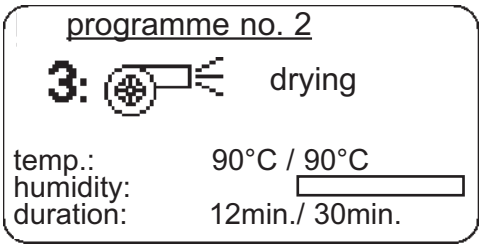
5.3 Step of drying



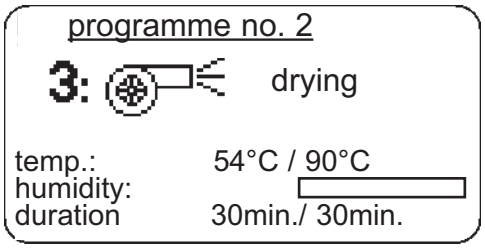
Air is heated:
The updated air temperature and the target temperature is indicated.



Drying step runs:
After reaching of the target temperature beam of humidity get shorter by proceeding of dryness..



Required dryness is reached, afterward drying runs.
In case of an after drying time appointed (duration higher than 0) this time runs with reduced capacity of turbine.
The exhausted time and the adjusted duration are indicate.



Phase of cooling down:
The internal space is cooling down to 50°C.
Turbine runs with reduced capacity.

5.4 End of program

End of program.

Provided, that report is activate in Setup, it will be printed.

By opening the door or entering of -key the equipment switched of.

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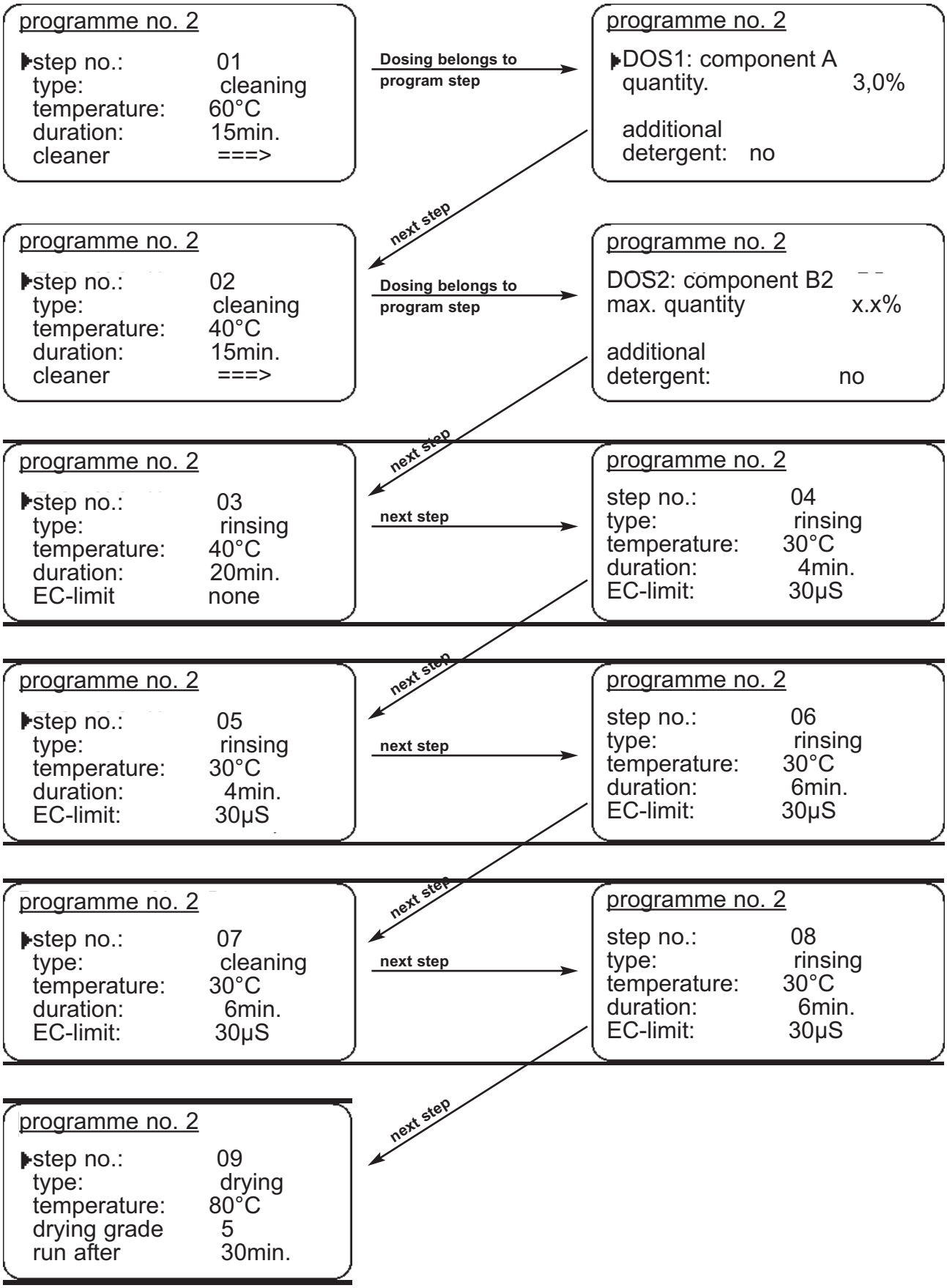
5.5 Example of program



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5.6 Indication and maintenance

5.6.1 Foaming

ATTENTION: Heavy foaming effects an inadequately cleaning!

If a heavy foaming occurs by washing, don´t hesistate to contact us.

Heavy foaming will be recognized as follows:

Optical, after opening the door foam runs out of the machine, or a “foaming-carpet” is visible.
Acustical, unbalancedurch run (strobe idling) of the circulation pump.

5.6.2 Changing of waste water filter

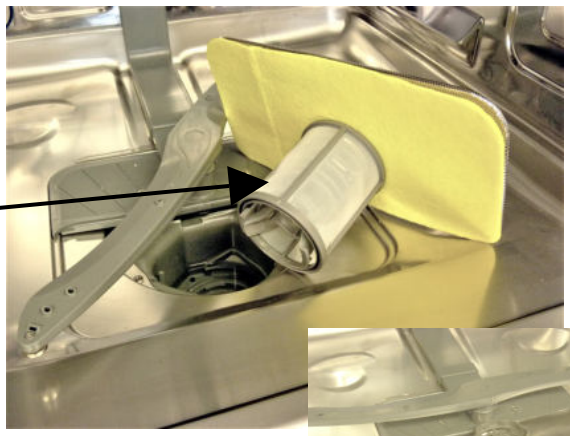
The wash liquor and the rinse water are passed
over the filter cartridge to filter out solid particles.
The filter cartridge must be replaced if the wastewater is not completely pumped out within the specified time.
This is indicated by the machine.
To replace the filter cartridge, the union nut can be opened and the filter housing removed downwards.
Some water will run out; if necessary, place a bucket underneath.
If necessary, place a bucket underneath.
The pumping out can be observed through the transparent filter housing.
Filter cartridge (Art. No.: 7000C0020).

5.6.3 Changing of airfilter

The air required for drying is drawn in via an **airfilter (Art. No.: 7200.0408).**
This filter must be checked for dirt at regular intervals and
replaced if necessary. The unit reminds you to check the filter at regular intervals by
a message on the display, to check the filter.

5.6.4 Cleaning the dirt trap

Clean the strainer regularly, at least
monthly, from dirt and especially from
accumulated metal chips.
The strainer, together with the
the strainer insert, by turning it counterclockwise
at the upper plastic rim.



Dirt trap

5.6.5 Cleaning the sieve insert

At regular intervals (approx. 4 x per year)
the sieve insert in the washroom must be removed
(by turning the plastic insert)
and the room located underneath with a
industrial vacuum cleaner from solder residues
to clean.

The filter mat can be removed after the strainer has been removed
from the strainer insert.
To remove the strainer, between its retaining hooks, slightly oval.
The filter mat can be washed in a bucket of water.
When worn, replace the filter mat.

Filter mat: Art. no.: 7000C2016

5.6.6 Replacing the spray arms

For optimum spraying of the wash ware, we recommend,
to replace both spray arms approx. every 200 washing cycles
Spray arm at the bottom: Art. no.: 1800.88
Spray arm top: Art. no.: 1800.89

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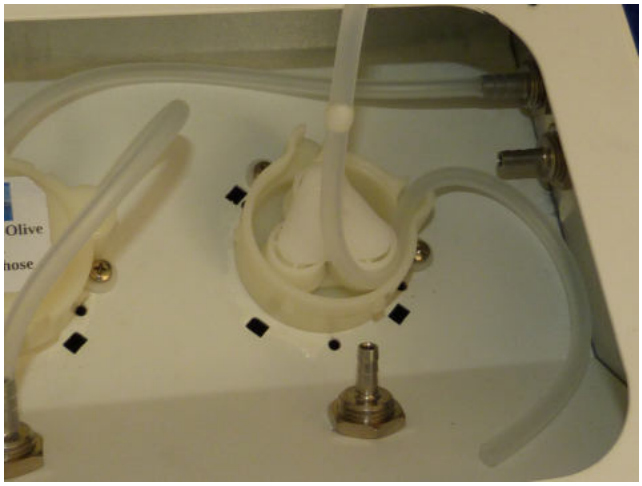
5.6.7 Replacing the dosing hoses

The dosing hose in the dosing pump head
is subject to natural wear.
The dosing pump heads are located under
the cover on the control panel.
After removing the cover plate, access to the dosing heads is free.
Different dosing pumps may be installed.
We recommend that you first replace the hose of one pump
before the second pump is dismantled.

5.6.8 Version with white dosing head



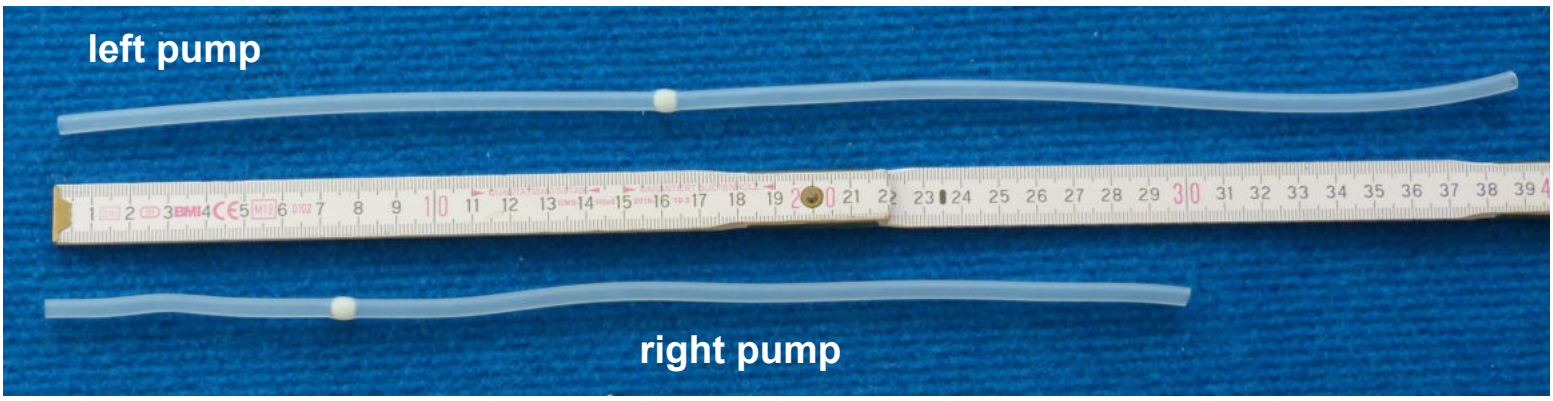
To replace the dosing hose, the dosing pump head
must be opened. To do so, unclip the 4 cover retaining
lugs from their locks, starting with the lug between the hoses,
then one after the other.
If necessary, use a small screwdriver.
The hose replacement can either be carried out on the
installed dosing pump or the pump can be removed
this purpose, using 2 fastening screws.
The connection cables are long enough to remove the pump
out of the pump attachment.
Pull off the old hose from the metal hose nozzle
Remove the hose from the dosing head and remove the
inserted hose olive.

Press the hose olive out of the hose with your fingers.
To make it easier to push the tube olive out, fill some component A+
or methylated spirit into the hose.
The hose olive is later inserted into the new hose, see illustration for position.

The grease in the dosing pump head should remain there to lubricate the mechanics.

Cut the new hose to the required length and insert the hose olive to the correct position.
position, fill a little spirit into the hose for this purpose.Spare hose: Art-No. 1804.0000.24

The hole in the hose olive must be in the direction of flow in the hose, otherwise the flow is blocked.



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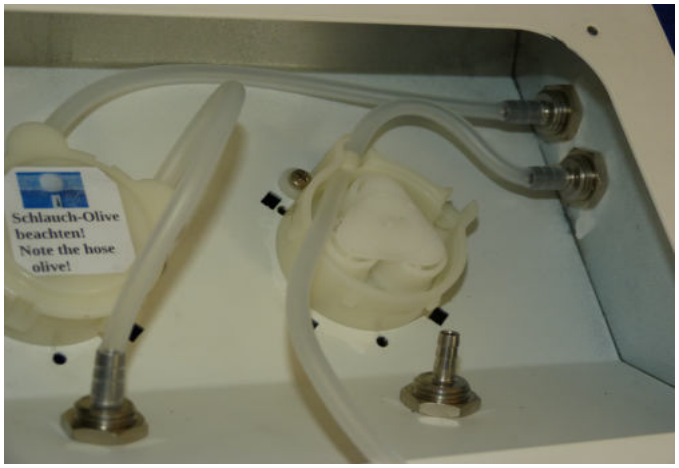
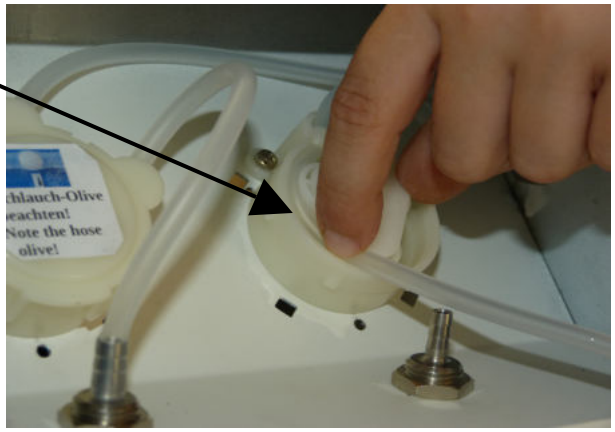
Attach the new hose with the inserted hose olive to the metal connector as shown and insert it into the dosing pump.



Insert the hose into the pump head while turning the rollers counterclockwise and guide the hose into the housing.



Attach the end of the hose to the lower hose connector.

If the pump was removed for hose replacement, reinstall it now.

5.6.9 Version with black dosing head and transparent lid

To change the dosing hose, the dosing pump head must be opened.
To do this, unscrew the 4 Crosshead screws the fastening eyelets of the transparent cover and remove the transparent cover.

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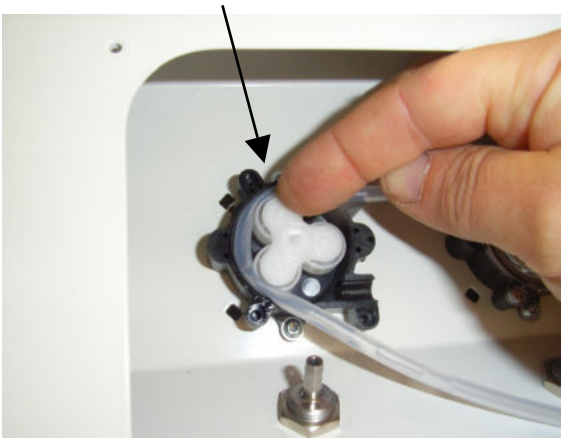
Pull the old hose off the metal hose connector and remove it from the dosing head.
Cut the new hose (Art. No.: 1804.0000.24 Meterware) to the required length.

left pump: 34 cm
right pump: 24 cm

Fit the new piece of hose onto the metal connector on the right side wall and insert it into the pump head with sufficient play in the length, turning the roller counterclockwise and guiding the hose into the housing.



Put on the transparent lid and carefully tighten the screws.
Push the end of the hose onto the lower metal connector in an equal arc.

6. Interfaces / Network connection

On the left side of the control panel there is an USB and RJ45-Ethernet-LAN connector.

The USB connector is provided for prospective firmw are updates.

The LAN connector serves for the connection of the ÖKO 2000 to the company network.
Via a commonly used browser you will have access to serveral information of the system.

After the connection of the system with the company network, the ÖKO 2000 gets an IP adress via the CHCP system.

This IP adress can be shown on the display of the ÖKO 2000. For that, please call the point „network config“.

By entering this IP adress into the adress field of a browser which is connected to this network you will have access on created programs, adjustments of the system and on protocols of the last 20 cleaning cycles.

The protocols are sorted on date and can be spent very easily as pdf.

Adjustments or changes at the program can not be made via the network but have to be done at the system itself.

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7. Error messages

Message	Causes	Solution
A1 Defect of internal lead valve	- Machine-lateral inlet valve is leaky - Inlet hose was extended	- Valve has to be replaced - Use inlet hose in original lenght
A2 Defect of external lead valve	- External inlet valve is leaky - Inlet hose was extended - air inside of the NE-deionizer-unit	- Valve has to be replaced - Use inlet hose in original lenght - Remove NE-deionizer-cartridge (page 6)
A3 Defect of inlet valve or inlet blocked	- Defect of machine-lateral or inlet-lateral inlet valve - Inlet valve isn't connected - Water-inlet locked - Inlet hose buckled	- Valve has to be replaced - Connect electric cable for inlet-lateral valve - Open water tap - Control inlet hose and eliminate the buckle
A4 Defect of dosing	- Defect of control dosing pump - Dosing opening is plugged	- Contact customer service - Unscrew dosing cap and clean under flowing water
S1 Short circuit of NTC water	- Water below the machine - NTC defect - Defect of mainboard	- Look for cause for humidity and eliminate; let machine dry - Contact customer service - Contact customer service - If the error repeats, please contact us
S2 Interruption of NTC water	- NTC defect - Defect of inlet to NTC - Defect of mainboard	- If the error repeats, please contact us
S3/S5 Short circuit of NTC air	- Defect of NTC on the blowing out side/ sucking in side of drying unit - Defect of dryness mainboard	- If the error repeats, please contact us

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Message	Causes	Solution
S4/S6 NTC air break	- Defect of NTC at blowing out/sucking in side of drying machine - Defect of plug or rather feed cable to one of the NTCs - Defect of mainboard drying	- If the error repeats, please contact us
S7 Defect of water indicator	- Level sensor still switches before water indicator - Defect of level sensor - Defect of water indicator - Defect of mainboard	- Check feed cable of water indicator and level sensor - If the error repeats, please contact us
S9 Maximum temperature of water exceeded	- Defect of control for heating water - Defect of NTC water - Defect of mainboard	- If the error repeats, please contact us
S10 Maximum temperature of air exceeded	- Defect of control for heating air - Defect of NTC at blowing out side of drying machine - Defect of plug or rather feed cable to one of the NTCs - Defect of mainboard drying	- If the error repeats, please contact us
S12 Sprayarm blocked	-Water circulation is obstructed -Magnet on lower spray arm defective (rusted / fallen off) -Spray arm worn out; Particles in spray arm hub -spray arm has become caught in cables or similar -water loss due to waste water hose ending to low (see also Troubleshooting S15)	-Check if the spray arms can be turned rotate easily -Check the sieves for contamination and clean if necessary -Correct detergent dosage ensure -Do not stack wash ware too tightly -Use a different flux
S13 Too much foam in machine	- Dosaged too strongly foaming cleaner - See also errors S12	- Use Activator - See also errors S12
S14 Cleaner DOSx is empty	- Detergent can is empty - Dosing hose is buckled - Dosing hose is plugged - Air bubbles in the dosing hose	- Connect new detergent can - Eliminate buckle - Eliminate blockage or replace hose - Deaerate the dosing hose by sucking in sufficient much cleaner to do this (Main menu -> Setup -> Detergent -> Suck in cleaner)

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Message	Causes	Solution
S15 Loose of water	- Waste water hose on machine side and hose end after the waste water filter system is mounted too low or not ventilated - Scooping parts in the wash ware - Dirt trap and/or strainer insert dirty - Water indicator defective - Too much foam during filling	- Hose end must end above the above the machine installation surface in order to avoid a suction effect. Ventilate the waste water system to to prevent negative pressure. - Place the items to be washed in such a way that the water can drain off well from the parts - Clean dirt trap and strainer insert - If the error occurs repeatedly, contact contact us - Dose less cleaner or use activator AT
S16 Discharge of water	- Water circulation leaky - Discharge of water at bottom of machine - Too strong foaming powe	- Switch off the machine, tear net apart and tip it back easy, so that discharged water can run off. -Check machine for discharged water, eliminate leackages, or evite foaming power - Arrange reset, start program new
S17 Released safty of heating for air	- The temperature rise safty device responded - Defect of turbine - Air filter messy	- Pull power plug! Remove rear sewer cover and switch on the temperature safe above at the heater housing - Check, wether turbine starts - Check air filter and possible replace - The air openings and air blow-out ports in machine interior may not be covered by cleaning goods - If error repeats, please contact us
S18 Wrong cleaner: doesn't foam	- Even after longer dosing no foaming can be recognized	- Check if correct detergent is attached according to detergent definiton or dosing pump-allocation
S19 Wrong cleaner: doesn't defoam	- Even after longer dosing foaming doesn't decrease	- Check if correct detergent is attached according to detergent definition or dosing pump-allocation
S20 Ion exchanger is exhausted	- Ion exchanger used up	- Attache new or regenerized ion exchanger patrone
T1 Fill time is overshot	- Water pressure is to less - Water inlet hose is defect - Possibily existing water shunt-off valve is not completely open	- Check water inlet and water pressure - Start program again

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Message	Causes	Solution
T2 Warm-up time of water is overshot	- Heating water defect - Temperature survey water is incorrect	- Take out washload. Start program again without washload. If the error repeats, please contact us.
T3 Warm-up time of air overshot.	- Heating air defect - Temperature survey is incorrect	- Take out washload. Start program again without washload. - If the error repeats, please contact us.
T4 Pumping off time overshot	- Waste water hose plugged - Filter candle used up - Leach pump defect	- Switch off machine - Check waste water hose and spare cotton filter, change them if required - Start program again - If the error repeats, please contact us
T5 Maximum drying time overshot.	- Air discharge openings by washload covered.	- Check location of washload
Close the door	- Front flap is not completely closed	- Close front flap
Program requires spray arm control	- A program foaming or defoaming cleaner is selected, although spray -arm control is switched off.	- Switch on spray arm control or select another program

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8. Function of the connector plugs

External solenoid valve
Over this plug the solenoid valve is supplied with mains voltage when it's needful, before deioniser cartridge. Maximum capacity up to 1A. Without this valve, the machine won't work because of reasons for safety.

External leach pump
Here, you can connect, if necessary, an additional pump, for exalt the discharge head of waste water.
At the plug is mains voltage while draining. Current: max. 1A.

External error message
On this connection mains voltage is present while a breakdown of the machine.
Current: max. 1A. The error message is shown on the display.

External conductivity measurement
Here, your can connect the conductivity measurement of the deioniser cartridge if available.

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9. Technical information

The water is heated in a through-flow heater; as a result there are no inconvenient heater bars Inside the chamber. The water protection syste m and the bottom-pan ensure that leakage of water is virtually impossible. This gives a high degree of protection agains water damage. Very quit operation is achieved through comprehensi ve 6-sided sound insulation.

washing temperature	20°C - 70°C +/-2°C
washing time per washing process	5 - 40 min.
rinsing temperature	20°C - 70°C +/-2°C
rinsing time per rinsing process	2 - 20 min.
temperature / warm air drying (Due to heat losses through radiation and conduction the the chamber temperature is approx. 80% of the slected drying temperature).	50°C - 100°C +/-5°C
duration / extra drying (Wash-only and dry-only programs can be operated)	0 - 600 min.
power supply	230V AC / 50Hz
power consumption	2,4kW
Running noise (Cleaning) Running noise (drying)	approx. 50 dB (A) approx. 65 dB (A)
water consumption per filling	approx. 5-6l deionised water
circuit board size (by using both spraying levels as well as of both baskets)	at the bottom max.: 405mm x 2 60 mm at the bottom max.: 405mm x 230 mm
circuit board size (by dismantled top spraying level and by using bottom basket)	max.: 405mm x 5 55 mm
internal space dimensions	H x W x D 5 6 x 49 x 48 cm
overall dimensions	H x W x D 9 7 x 60 x 77 cm
weight	approx. 80kg

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