User Guide

Öko 2000

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page

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
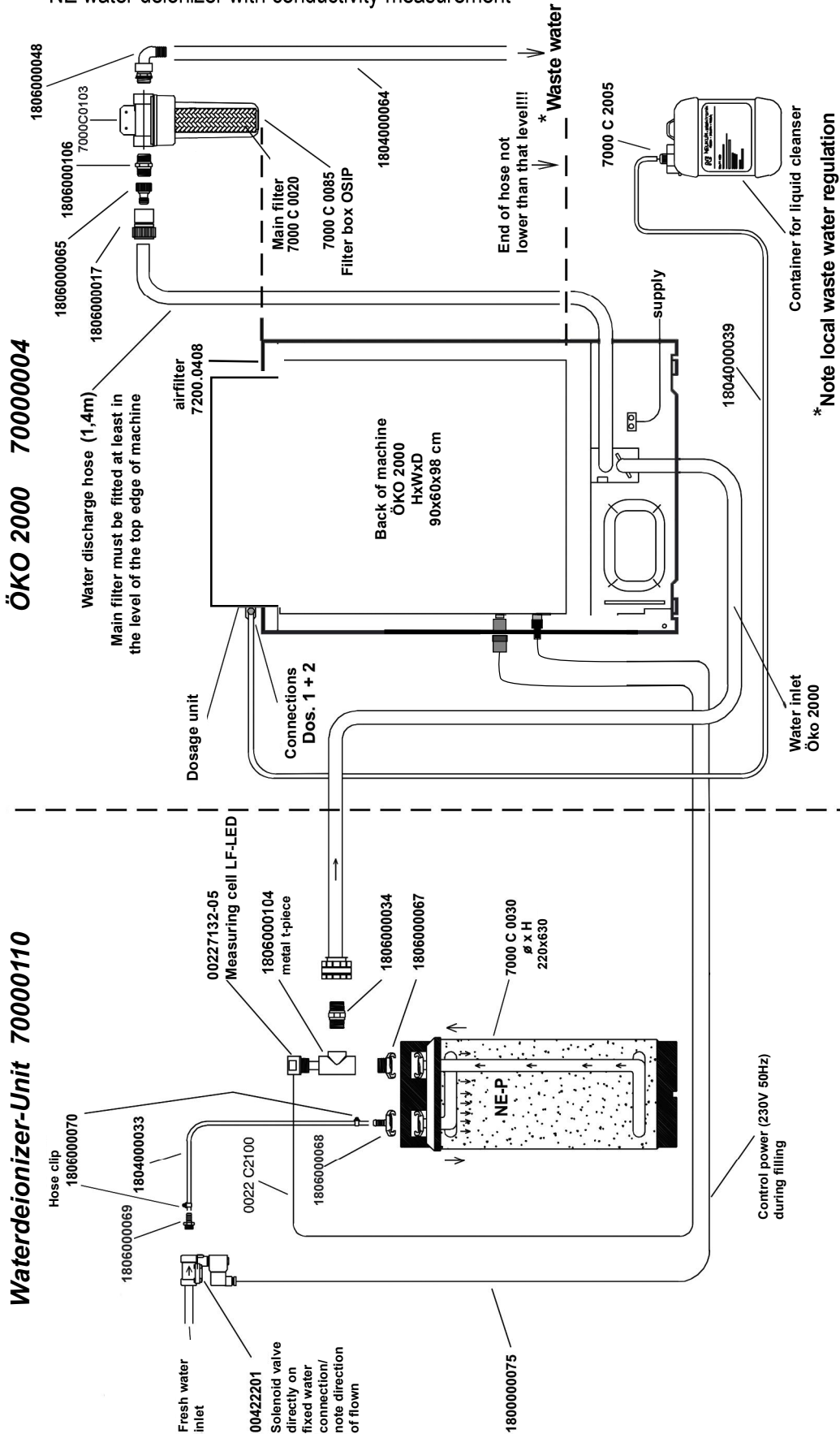with the external solenoid valve.

Now we wish you success at cleaning of your products.

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

IMO GmbH

2. Schedule of connection Öko 2000

NE water deionizer with conductivity measurement

ÖKO 2000   70000004

* Waste water

1806000048

7000C0103

1806000106

1806000065

1806000017

1804000064

Main filter
7000 C 0020

7000 C 0085
Filter box OSIP

End of hose not
lower than that level!!!

7000 C 2005

Container for liquid cleanser

*Note local waste water regulation

supply

1804000039

Water discharge hose (1,4m)

Main filter must be fitted at least in
the level of the top edge of machine

airfilter
7200.0408

Back of machine
ÖKO 2000
HxWxD
90x60x98 cm

Dosage unit

Connections
Dos. 1 + 2

Water inlet
Öko 2000

Waterdeionizer-Unit 70000110

00227132-05
Measuring cell LF-LED

1806000104
metal t-piece

1806000034

1806000067

7000 C 0030
ø x H
220x630

Hose clip
1806000070

1804000033

1806000069

0022 C2100

1806000068

NE-P

Control power (230V 50Hz)
during filling

Fresh water
inlet

00422201
Solenoid valve
directly on
fixed water
connection/
note direction
of flown

1800000075

IMO GmbH   Gässlesweg 6   D-75334 Straubenhardt   Tel.: 07082 49180   Fax: 60436   www.imo-ag.com   info@imo-ag.com   5

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.

End of waste water hose

min. 300 mm

Alternative

End of waste water hose

min. 300 mm
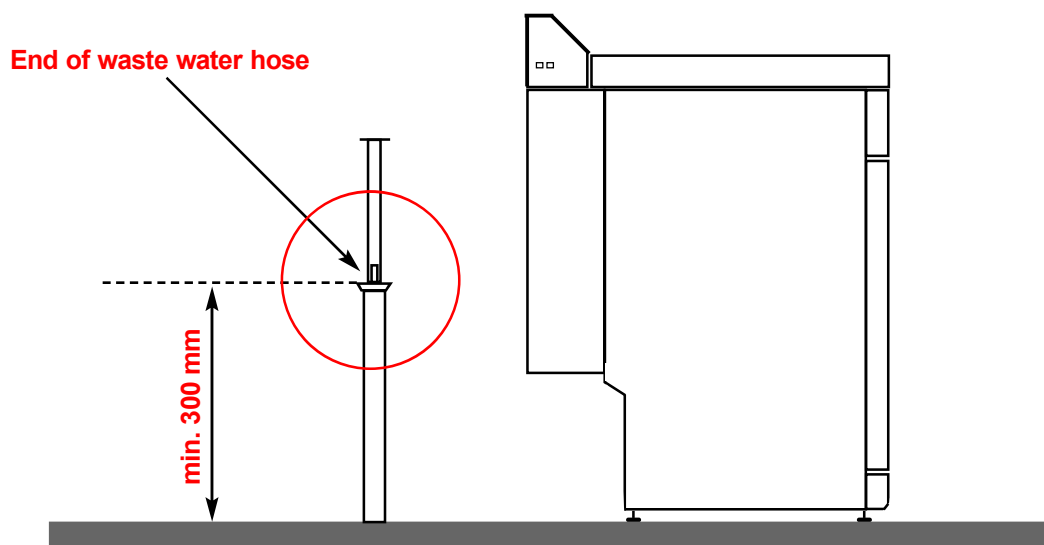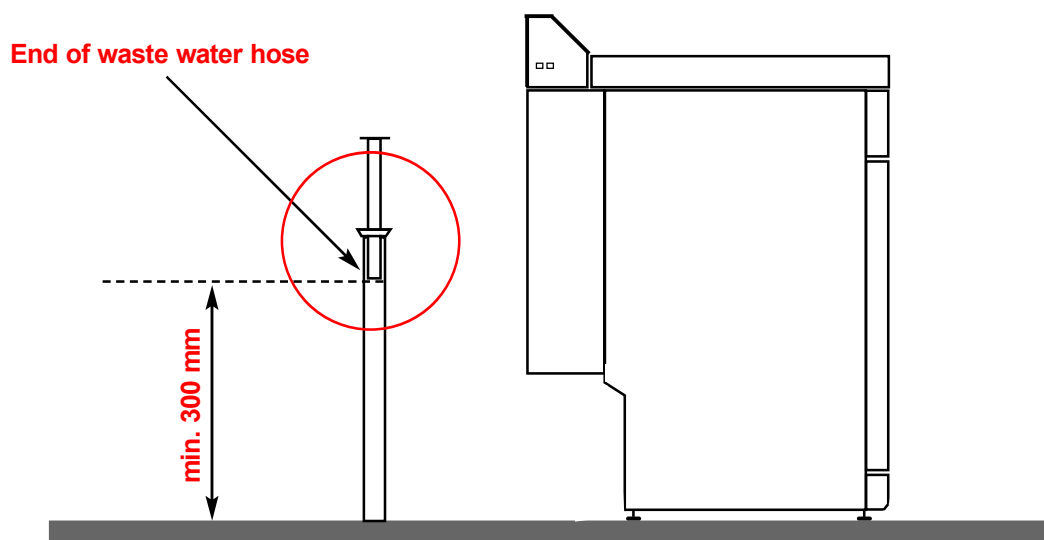
3. Starting up

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.

fresh water   to Öko 2000
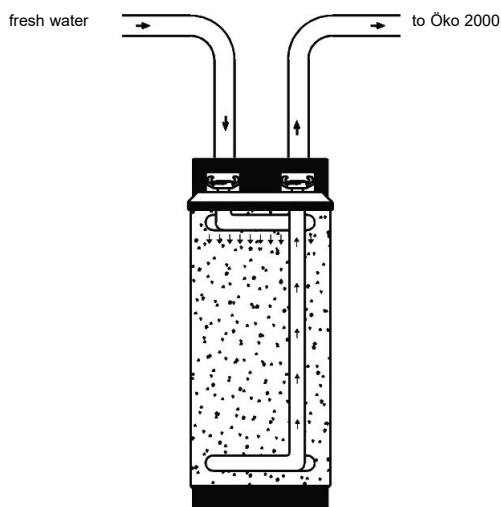
Normal operation

3.4 Cleaning agent dosage

<u>Liquid components</u> are dosed automatically while cleaning from the
built in dosing pump, arranged by chosen program.
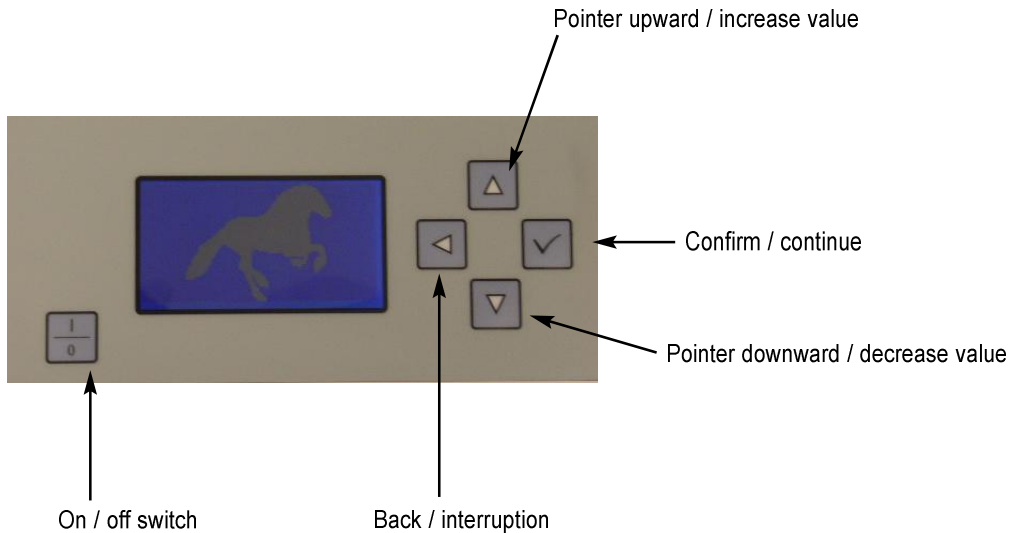Please program the required quantity of dosage.

(Activator can be also placed into the washing space before
starting the cleaning process).

<u>Powder:</u>
Place the powder at the position indicated before start of the cleaning process
or after invitation of the equipment directly in the internal space.

3.5 Operating Controll Front Panel

Pointer upward / increase value

Confirm / continue

Pointer downward / decrease value

On / off switch

Back / interruption

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

Program 1:

For cleaning pcb-boards generally, also to eliminate "no clean"-flux,
with drying afterwards.

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 hardly dirty laundry, f.e to decrease and dedusty and afterwards drying.

Cleaner: Component B2

Program 4:

Only drying

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.

4. Operating summary

Function of keys

On/Off switch

[I/0]   To increase value / use pointer up
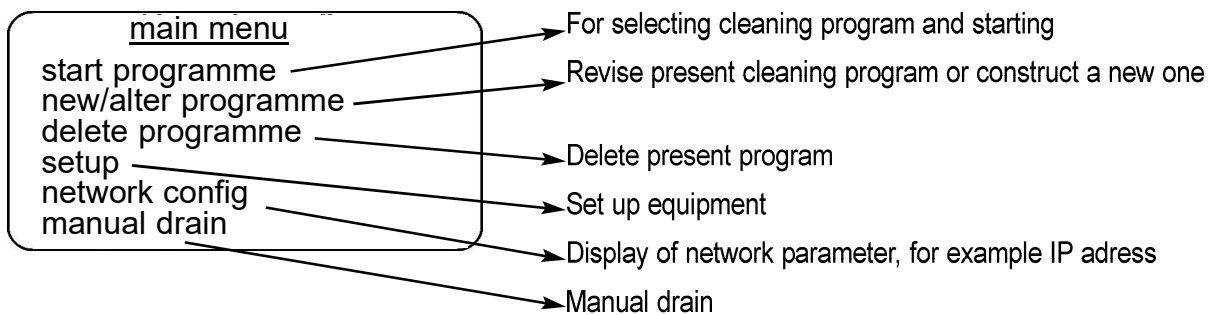
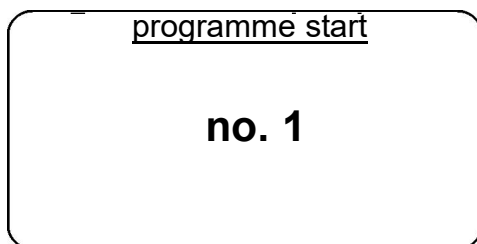[▲]   To decrease value/ use pointer down

[▼]   Interruption / return to menue item

[◄]   Confirmation / select menue item

[✔]

4.1 Main menue

```
      main menu
  start programme
  new/alter programme
  delete programme
  setup
  network config
  manual drain
```

For selecting cleaning program and starting

Revise present cleaning program or construct a new one

Delete present program

Set up equipment

Display of network parameter, for example IP adress

Manual drain

4.2 Start Program

```
   programme start


      no. 1
```

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

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 /
to alter existing program

Use ✔ for editing mode

Attention: Numbers of program 1-20 possible.

o

```
  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':

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

```
  programme no. 2

 ►step No.:        01
  type:            cleaning
  temperature:     30°C
  duration:        5min
  detergent:       ==>
```

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 ✔

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

```
  programme no. 2

 ►DOS1:            component A
  quantity:        3,0%

  add.
  detergent powder: no
```

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.

```
┌─────────────────────────────┐
│ 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.

4.4 Programme delete

```
    programme delete

    no.1
    no.2
 ▶  no.5
    no.7
    no.8
    no.9
```

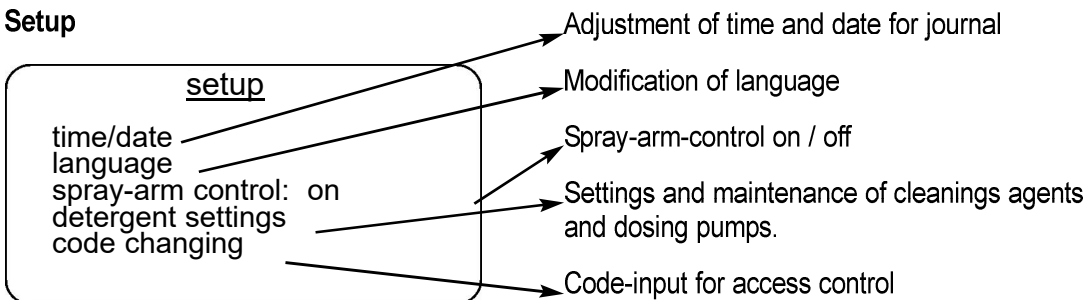Select ▲ and ▼ to choose program from settled list of cleaning program and ✔ confirm.

```
    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
```

Adjustment of time and date for journal

Modification of language

Spray-arm-control on / off

Settings and maintenance of cleanings agents and dosing pumps.

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

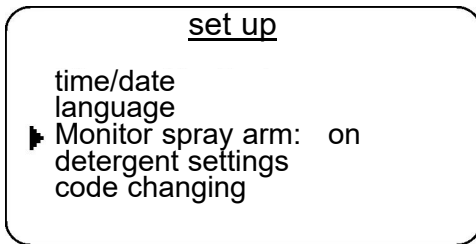Select ▲ / ▼ to change input (day/month/year resp.h/min). Enter ✔ to go on.

4.5.2 change Language

```
          language
 ▶deutsch
   english
```

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

4.5.3 Monitor spray arm on / off

```
              set up

    time/date
    language
  ▸ Monitor spray arm:   on
    detergent settings
    code changing
```

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

```
             detergent

  ▸ list of detergent
    assign detergent
    suck detergent
    pump correction
```
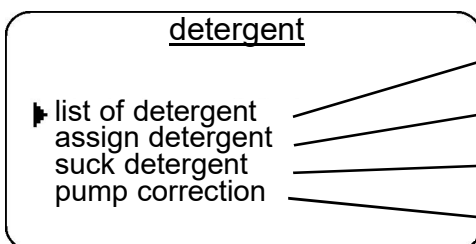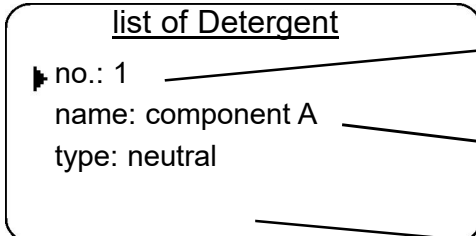
Create or change register of detergents

Assign detergent from register to a dosing pump

Aspirate detergent manual

Indicate power off pump

4.5.4.1 List of detergent setting / altered

```
          list of Detergent

  ▸ no.: 1
    name: component A
    type: neutral
```

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.

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


▶DOS1:      150ml/min
  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

4.6 Network settings


```
              Network
▶ MAC: 54:10:EC:CC:CF:5E
  IP:    100.   0.   0.130
  Mask: 255.255.255.   0
  DNS1:   3.   0.   4. 87
  DNS2:   0.   0.   0.   0
  Gway: 100.   0.   0. 88
```

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 23).

5. Program flow

5.1 Step of cleaning

```
      programme no. 2

  1:  [tap icon]      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:  [shower icon]    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:  [shower icon]      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:  [drain icon]      cleaning

  temp.:          --°C / 50°C
  duration:      --min / 20min
  DOS1: component A 0,5%
```

End of cleaning step, water is drained.

5.2 Step of rinsing

```
  programme no. 2

2:  [faucet icon]       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:  [shower icon]       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:  [shower icon]       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:  [drain icon]        rinsing



temp.:      --°C / 40°C
duration: --min./ 10min.
Ec-value: --µS / 30µS
```

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

5.3 Step of drying

```
       programme no. 2
   3: ⊚⊐≼      drying

   temp.:        58°C / 90°C
   humidity:     ████████
   duration:     ---min./30min.
```

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

```
       programme no. 2
   3: ⊚⊐≼      drying

   temp.:        90°C / 90°C
   humidity:     █████▢
   duration:     ---min./30min.
```
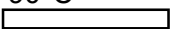
Drying step runs:
After reaching of the target temperature beam of humidity get shorter by proceeding of dryness..
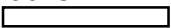
```
       programme no. 2
   3: ⊚⊐≼      drying

   temp.:        90°C / 90°C
   humidity:     ▢▢▢▢
   duration:     12min./ 30min.
```

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.

```
       programme no. 2
   3: ⊚⊐≼      drying

   temp.:        54°C / 90°C
   humidity:     ▢▢▢▢
   duration      30min./ 30min.
```

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

5.4 End of program

```
   Programm Nr. 2:
   programme
   finished
   LF-Wert: ---µS / 30µS
```

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.

5.5 Example of program

```
programme no. 2

▶step no.:           01
  type:             cleaning
  temperature:      60°C
  duration:         15min.
  cleaner           ===>
```
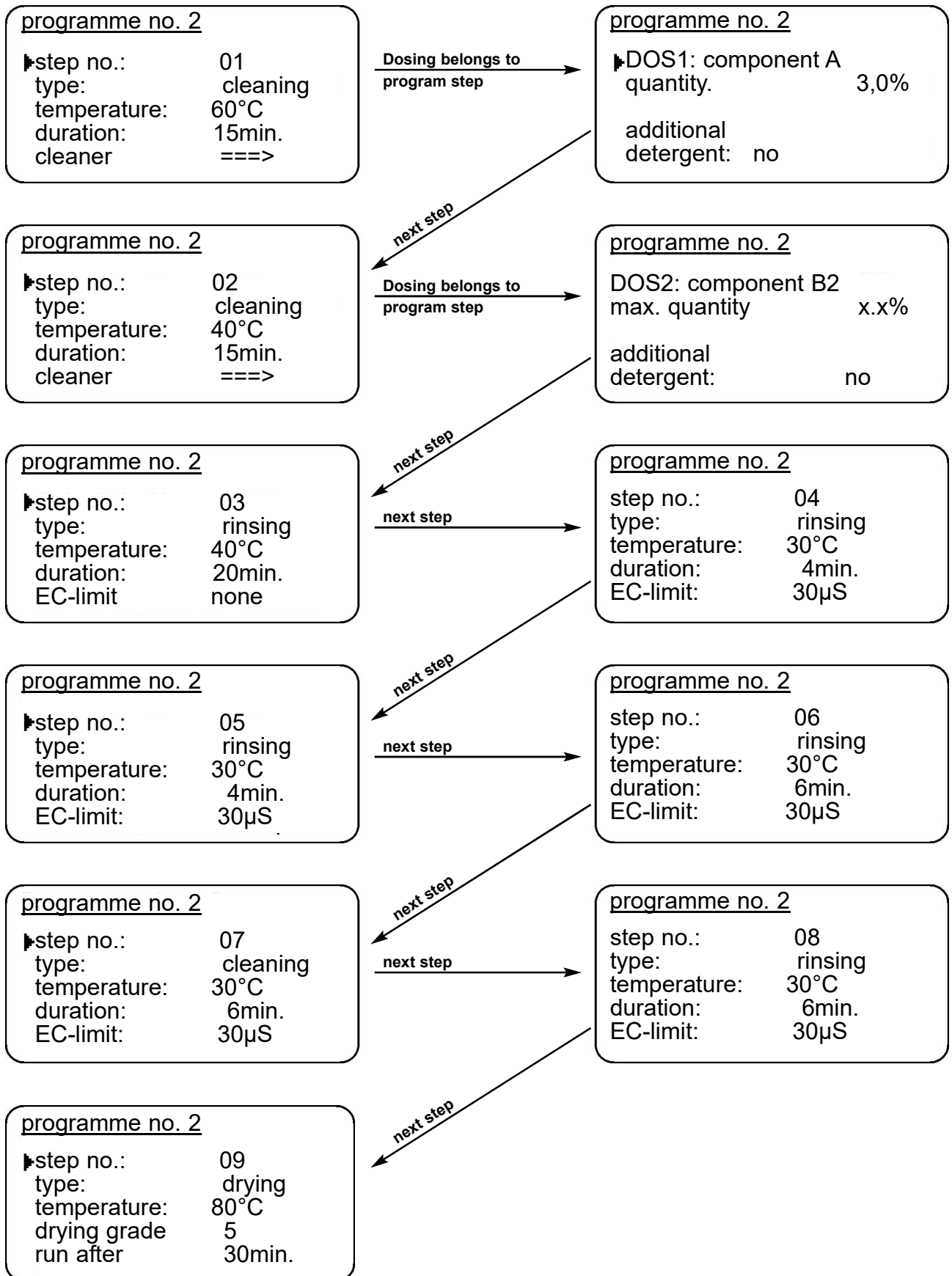
Dosing belongs to program step →

```
programme no. 2

▶DOS1: component A
  quantity.            3,0%

  additional
  detergent:   no
```

next step

```
programme no. 2

▶step no.:           02
  type:             cleaning
  temperature:      40°C
  duration:         15min.
  cleaner           ===>
```

Dosing belongs to program step →

```
programme no. 2

DOS2: component B2
max. quantity           x.x%

additional
detergent:              no
```

next step

```
programme no. 2

▶step no.:           03
  type:             rinsing
  temperature:      40°C
  duration:         20min.
  EC-limit          none
```

next step →

```
programme no. 2

step no.:            04
type:               rinsing
temperature:        30°C
duration:            4min.
EC-limit:           30µS
```

next step

```
programme no. 2

▶step no.:           05
  type:             rinsing
  temperature:      30°C
  duration:          4min.
  EC-limit:         30µS
```

next step →

```
programme no. 2

step no.:            06
type:               rinsing
temperature:        30°C
duration:            6min.
EC-limit:           30µS
```

next step

```
programme no. 2

▶step no.:           07
  type:             cleaning
  temperature:      30°C
  duration:          6min.
  EC-limit:         30µS
```

next step →

```
programme no. 2

step no.:            08
type:               rinsing
temperature:        30°C
duration:            6min.
EC-limit:           30µS
```

next step

```
programme no. 2

▶step no.:           09
  type:             drying
  temperature:      80°C
  drying grade      5
  run after         30min.
```

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 spare cotton filter
For filtering particle the suds and rinsing water will be laded through the spare cotton filter.

The spare cotton filter is to change, if the suds is not pumped up in the provided time.
(Look at the filter box). **spare cotton filter (art.-no.: 7200C0020).**
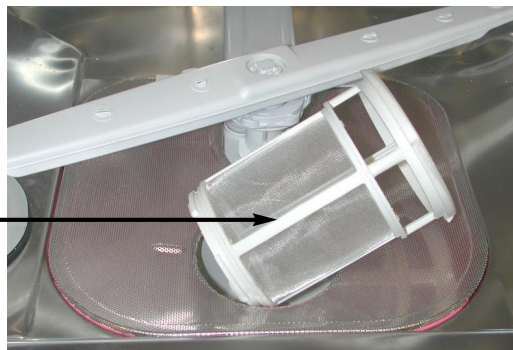
5.6.3 Changing of airfilter
The required air for dryness will be sucked by an **airfilter (art.-no.: 7200.0408).**
This filter shall be controlled regularly of contamination and has to be replaced if required.

5.6.4 Cleaning of dirt trap
Dirt trap should be cleaned of accumulated
cutting four times a year.

**Dirt trap** →

5.6.5 Cleaning of screen insert
In regularly intervalls (about four times a year)
the screen insert is to remove from washing
space (by turning of the plastic insert) and the
space below is to clean with an industry-sucker
from residues of tin solder.

Wash out **filter map** from rest of tin-solder in a
bucket with water. Change filter map if
necessary.

Filter map: Art.-No.: 7000C2012
Sprayarm bottom: Art.-No.: 140038
Sprayarm top: Art.-No.: 140039
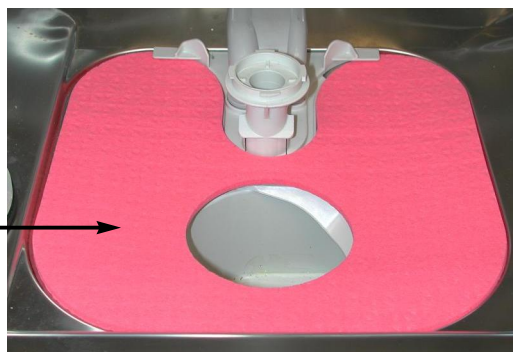
5.6.6 Changing of sprayarms
To get an optimal spraying of wash-load,
we advise to change both sprayarms after
200 washing runs.

5.6.7 Exchange of the dosing hoses

The dosing hose in the dosing pump head
is subject of a natural wear-and-tear.
Your will find the dosing pump heads under
the cover at the control panel.
After having disassembled the cover,
you can unlock the dosing heads and
remove them from the engine shaft.
Now you can pull off the hose from the
dosing head and cut the used part.
You can pull out the hose for several times
in the cut length and insert it into the dosing head again.
In any case it is very important to clean the inner side
of the dosing head, the wheels and the engine shaft thoroughly,
for example with methylated spirit before inserting the new hose.
If the dosing hose gets too short, it can be supplied by the metre.

Art.no 1804.0000.16

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 firmware 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.

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 bottom 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 bottom 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

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 bottom	- 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 bottom	- 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	- Wareout of spray arm; particle in spray arm-hub - Spray arm got caught in down-hanging cables - Water circulation is obstructed - Waste of water because end of effluent hose is ending too deep (see fault repair S15)	- Check if the spray arms are easy to rotate - Check filters for impurity if necessary clean them - Secure correct detergent dosing quantity - Don't stack the cleaning goods to closely - Use other 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	- Connect new detergent can - Eliminate buckle - Eliminate blockage or replace hose

Message	Causes	Solution
S15 Loose of water	- Waste water hose at the machine and end of hose after the sewage water filter system were mounted too deep or they are not aerated. - Drawing parts with cleaning goods - Dirt trap / screen insert soiled - Water indicator defect	- End of hose has to end above the installation surface of the machine in order to avoid a suction effect. Aerate the sewage system in order to avoid negative pressure. - Bring in cleaning goods so, that water can run off well from parts - Clean dirt trap / screen insert - If error repeats, please contact us
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

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 - Spare cotton filter 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

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.

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 system 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 comprehensive 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 level	approx. 55db (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 235mm / at the bottom max.: 405mm x 190mm
circuit board size (by dismantled top spraying level and by using bottom basket)	max.: 405mm x 503mm
internal space dimensions H x W x D	50,8 x 53 x 50 cm
overall dimensions H x W x D	90 x 60 x 98 cm
weight	approx. 80kg