

# Electro Steam Humidifiers Series DB4LD - DB45LD

for use with tap water

## Operation And Maintenance Instructions

- Part 1 : For the User (green)
- Part 2 : For the Installer (yellow)
- Part 3 : For the Plumber (blue)
- Part 4 : For the Electrician (red)
- Part 5 : Spare Parts List (white)



**ATTENTION !** All work must be executed by qualified personnel.  
All electrical installations and work on electrical components of this unit must be executed by a qualified electrician.

Switch power off beforehand!

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# HYGROMATIK Electrode Steam Humidifier for use with tap water

## Operation and Maintenance Instructions

### Part 1: For the User

|            |   |              |
|------------|---|--------------|
| <b>1</b>   | <b>Introduction</b>                             | <b>p. 2</b>  |
| 1.1        | Operation Directions                            | p. 2         |
| 1.2        | Typographic Distinctions                        | p. 2         |
| <b>2</b>   | <b>Safety Notes</b>                             | <b>p. 2</b>  |
| 2.1        | General   | p. 2         |
| 2.2        | Operational Safety Notes                        | p. 2         |
| 2.3        | Disposal after Dismantling                      | p. 3         |
| <b>3</b>   | <b>Transportation</b>                           | <b>p. 3</b>  |
| 3.1        | General   | p. 3         |
| 3.2        | Transport Sizes and Weights                     | p. 3         |
| 3.3        | Packing   | p. 3         |
| 3.4        | Interim Storage                                 | p. 3         |
| 3.5        | Check of Completeness and Correctness of Supply | p. 3         |
| <b>4</b>   | <b>Function and Installation</b>                | <b>p. 4</b>  |
| 4.1        | Function  | p. 4         |
| 4.2        | Installation and Procedure                      | p. 5         |
| <b>5</b>   | <b>Technical Data</b>                           | <b>p. 6</b>  |
| <b>6</b>   | <b>Commissioning</b>                            | <b>p. 7</b>  |
| <b>7</b>   | <b>Operation</b>                                | <b>p. 7</b>  |
| 7.1        | Limiting steam generation output                | p. 7         |
| 7.2        | Blow-down                                       | p. 7         |
| <b>8.</b>  | <b>Steam Bath Control LD</b>                    | <b>p. 8</b>  |
| 8.1        | Programming the Steam Bath                      | p. 8         |
| <b>9.</b>  | <b>Faults</b>                                   | <b>p. 9</b>  |
| <b>10.</b> | <b>Servicing</b>                                | <b>p. 11</b> |
| 10.1       | Service Work                                    | p. 11        |
| 10.2       | Cleaning the Steam Cylinder                     | p. 11        |
| 10.3       | Uneven Electrode Wear                           | p. 12        |
| 10.4       | Replacing Electrodes                            | p. 13        |
| 10.5       | Cleaning the Draining System and the Pump       | p. 13        |
| 10.6       | Cleaning the Solenoid Inlet Valve and Strainer  | p. 14        |
| 10.7       | Cable Fitting, Electrode Cables                 | p. 14        |
| 10.8       | Checking Operation                              | p. 14        |
| <b>11.</b> | <b>Dismantling</b>                              | <b>p. 14</b> |

# 1. Introduction

Dear Customer,

The HYGROMATIK-steam generator is our answer to today's technical requirements. It satisfies them by means of its operational safety, its operational comfort and its economic efficiency.

**To be sure to expertly and efficiently run your HYGROMATIK steam generator, please read this operation and maintenance manual.**

Use the steam generator only in good and safe condition, paying attention to all notes in these instructions.

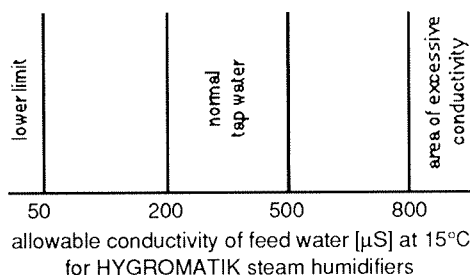
If you still have questions...please turn to us.

| Main office, Germany (0049) |                 |
|-----------------------------|-----------------|
| Tel.:                       | (0)4193/895-0   |
| Technical Hotline:          | (0)4193/895-293 |
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## 1.1 Operation Directions

The HYGROMATIK-steam generator serves the steam production, in the steam bath, by providing steam controlled by temperature.

Be sure to use feed water with conductivity between 50 to 800 µS/cm. Below 100 µS/cm or above 600 µS/cm adjustments might be necessary for optimal operation.



**Attention:** The HYGROMATIK-steam generator produces steam at a temperature of 100 °C. The steam is not to be used as a direct inhalent.

The correct use of the steam generator also includes adherence to our installation, dismantling, remounting, commissioning, operation and maintenance instruction as well as taking correct disposal steps.

Only qualified and authorized personnel may operate the unit. Persons carrying out transport or work of the unit, must have read and understood the corresponding parts of the operation and maintenance manual and especially the chapter "Safety Notes". Additionally, operating personnel must be informed of any possible dan-

gers. You should place a copy of the operation and maintenance manual at the unit's operational location (or near the unit).

## 1.2 Typographic Distinctions

- Enumerations with preceding heading: General enumerations.
- >> Enumerations with preceding arrows: Work or service steps that should or must be followed sequentially.
- Sequential step to be checked.

# 2. Safety Notes

## 2.1 General

By law we must state these safety notes. They serve to protect and prevent accidents.

### Warning notes and Safety symbols

The following safety symbols shown in the text will warn about dangers and danger sources. Get familiar with these symbols.



**Attention:** Not observing this warning can lead to injury or danger to your life and/or damage to the unit.



**Attention, Voltage:** Dangerous electrical current. Not observing this warning can lead to injury or danger to your life.



**Note:** Materials/operational equipment; must be handled and/or disposed of according to the law.



**Note:** Further explanation or cross-references to other sections of the text in this operation and maintenance manual.

## 2.2 Operational Safety notes

### In General

Observe all safety and warning notices which you find about the unit.

If there should be malfunctions, shut down the unit immediately and secure against being restarted. Faults should be removed immediately.

During repair work, guarantee operational safety of the unit by using qualified personnel.

Only use original HYGROMATIK spare-parts.

For the effective operation of this unit refer to the national restricting regulations.

### Accident Prevention Regulations

Observe the accident prevention regulations:

UVV "Elec. installation and elec. equipment" (VBG 4)

or equivalent national codes. In this way you can prevent injury to yourself or others.

### Operation of the Unit

Do not impair the safety of the unit.

Periodically check all protection and warning devices for proper functioning.

Safety equipment is not to be removed or put out of operation.

### Installation, Dismantling, Service and Repair of the Unit

Turn off power, when doing service work or repairs on the unit.

Extensions to the unit or installation of additional equipment is only allowed after obtaining written approval from the manufacturer.

### Electrical Parts

Work on electrical parts must be carried out by qualified electricians.

Turn off the power, when work on electrical parts is carried out.

Immediately turn the unit off when faults occur in the electrical energy supply.

Only use original type fuses of correct rating.

Check electrical equipment of the unit periodically.

Defects, like loose connections or burned cables must be removed immediately.

Test all installed protective devices after installation or repairs (e.g. grounding).

### 2.3 Disposal After Dismantling



**Note:** The operator is responsible for the component parts of the unit being disposed of according to the law.

## 3. Transport

### 3.1 General



**Note:** Carefully transport the steam generator, to prevent damage from careless loading and unloading and unnecessary force (refer to the section "Spare parts and Storage").

### 3.2 Transport Sizes and Weights

| Type        | DB<br>4/6/8LD | DB<br>10/13/17LD | DB<br>23/30LD | DB<br>45LD |
|-------------|---------------|------------------|---------------|------------|
| Height (cm) | 68            | 91               | 91            | 102        |
| Depth (cm)  | 30            | 41               | 41            | 46         |
| Width (cm)  | 54            | 61               | 61            | 61         |
| Weight (kg) | 23            | 38               | 40            | 53         |

### 3.3 Packing



**Note:** Observe the pictograms displayed on the carton.

### 3.4 Interim Storage

During storage, keep unit dry and protected from frost.

### 3.5 Check of Completeness and Correctness of Supply

Upon receipt of the unit, make sure that:

- Type and serial number on the name plate correspond to the order and supply information,
- Equipment is complete and in perfect condition.



**Note:** Immediately file a written claim with your shipping agent in case of transport damage or missing parts.

## 4. Function and Installation

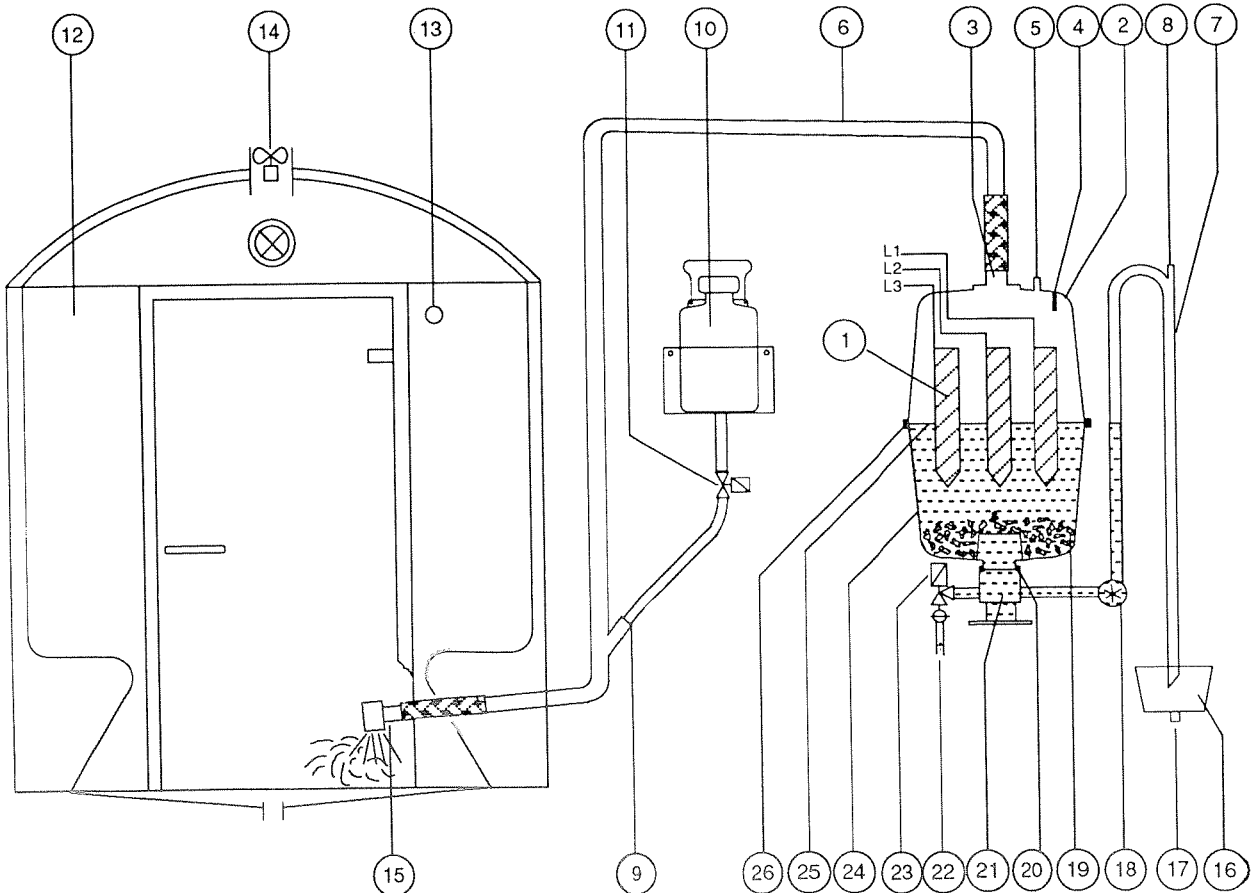
The HYGROMATIK-steam generator supplies the steam bath with the necessary steam for operation. The temperature measured in the steam bath serves to control steam production. The standard setting provides for 100% humidity at 45°C. A fan withdraws steam from the steam bath, to obtain a stable temperature control. The essence injector can inject aromatic scent into the steam bath.

### 4.1 Function

The fact that tap water normally has a certain amount of electrical conductivity is exploited to generate steam. Two or more electrodes in a closed cylinder are directly immersed in tap water and connected to an AC voltage. As a result of the conductivity, current flows through the water between the electrodes. The electrical energy supplied to the water is converted directly into heat without loss.

| Position | Description                  |
|----------|------------------------------|
| 1        | Electrodes                   |
| 2        | Top part of cylinder         |
| 3        | Steam outlet                 |
| 4        | Sensor electrode             |
| 5        | Condensate return (not used) |
| 6        | Steam hose                   |
| 7        | Mechanical safety overflow   |
| 8        | Overflow pipe                |
| 9        | Essence injector             |
| 10       | Essence receptacle           |
| 11       | Solenoid valve               |
| 12       | Steam bath                   |
| 13       | Temperature sensor           |

| Position | Description                |
|----------|----------------------------|
| 14       | Ventilator                 |
| 15       | Steam manifold             |
| 16       | Tundish                    |
| 17       | Drain                      |
| 18       | Blow-down pump             |
| 19       | Scale                      |
| 20       | O-Ring                     |
| 21       | Cylinder base              |
| 22       | Fresh water inlet          |
| 23       | Water inlet solenoid valve |
| 24       | Bottom part of cylinder    |
| 25       | Water level                |
| 26       | Cylinder flange            |



The flow of current is a function of supply voltage, the immersed area of the electrodes, their spacing and the conductivity of the water. The steam output of the humidifier is a function of the power or current consumption. Controlling the current is done by changing the immersed area of the electrodes. At the same time the conductivity is held within a certain range (self-adaptive conductivity control) to achieve good continuous system controllability.

The steam generated has a temperature of about 100 °C and only a low gauge pressure ("non-pressurised steam"). It is demineralised and largely free from bacteria. The minerals remain in the cylinder.

## 4.2 Installation and Procedures

On a humidity request by the temperature sensor in the steam bath (12) the main contactor is operated, the electrodes (1) are supplied with voltage and water is admitted to the steam cylinder (24+2) by a solenoid valve (23). The current begins to flow as soon as the electrodes start to immerse. The control system de-energises the solenoid valve and interrupts the admission of water when the preselected amperage is reached.

After a short heating period the water between the electrodes begins to boil and steam. When the preselected temperature in the steam bath is reached, the controller switches to "sustaining level".

The control system keeps the conductivity within an optimum range by periodically draining some of the water and replenishing with fresh water. The steam generation lowers the water level (25) in the steam cylinder and hence the output will fall. Fresh water is therefore admitted from time to time by the inlet solenoid valve. An inlet limiter provides for continuous filling of the cylinder: 2.5 l/min (DB4-8LD) and 3.5 l/min (DB10-45LD) at water pressures of 1-10 bar

The current consumption of the humidifier is measured and monitored continuously. When starting from cold, under certain circumstances the current may rise to 128% of its rated value at maximum output as a result of the increase in conductivity of the heated water. At this point the electronic overcurrent limiting device cuts in, causing some of the water in the cylinder to be drained. This reduces the immersed area of the electrodes and hence the current consumption.

In the course of time the concentration of scale (19) increases and leads to an increase in the electrical conductivity of the water. Unchecked, the conductivity could reach a level producing short circuit, which could damage the humidifier, or at very least drastically shorten the service life of the electrodes. A reliable periodic blow-down of some of the concentrated water is therefore very important. This process is controlled to keep the conductivity of the water in the cylinder approximately constant. HYGROMATIK uses a heavy duty waste water pump (18) for blowing down.

The proper function of the pump is monitored continuously during operation. The humidifier is switched off in the event of a fault, as it could be damaged if the conductivity of the water were allowed to increase further.

The blow-down loss rate for water with normal quality lies between 7 and 15% of the humidification output. About 1 to 3 litres of hot water are discharged within a short time during each blow-down cycle. If not disengaged on the pcb, the steam cylinder is periodically drained completely.

Scale collects in the space below the electrodes and is removed when the unit is serviced. Some of the smaller pieces, granular material and sludge are removed by the blow-down pump.

The water is led through a mechanical safety overflow. If the steam outlet (3) is blocked, the steam forces the water from the cylinder out of the safety overflow. A vacuum breaker (8) ventilates the outlet, interrupting the water flow and preventing a complete drain of the cylinder. Draining water is caught by a tundish (16) and then taken away to a drain.

A sensor electrode (4) supervises the maximum level of water in the cylinder. If the cylinder is filled to the max. level electrode, filling is interrupted.

The steam cylinder (24+2) is provided with a flange (26) and clamps. The cylinder is therefore easily opened in order to remove scale and sludge that have accumulated, and to replace the electrodes when necessary.

The steam bath control unit takes the actual temperature from the temperature sensor installed in the steam bath. The measured temperature serves to control steam production.

The HYGROMATIK essence injector serves to give the steam bath a pleasant scent. The essence injector is connected to the steam bath control unit of the steam generator.

The essence injector essentially consists of the aromatics receptacle (10) and the solenoid valve (11). This solenoid valve is activated by the steam bath control unit and directs the aromatics into the steam hose to the steam bath. This process takes place in impulses. The duration of such an impulse, i.e. the amount of time the solenoid valve remains open, and the interval, i.e. the time lapse between impulses, are adjustable on the steam bath control unit. Thus, the amount of aromatics can be specified. The aromatics freely flow by gravity into the essence injector (9) and then into the steam hose.

A fan (14) should be installed in the air outlet of the steam bath. It withdraws steam from the steam bath and thereby a stable temperature control is obtained, and therefore a constant temperature in the steam bath.

The fan only operates if the steam generator is on "sustaining temperature level" or when it is too hot in the steam bath. The fan can be switched on/off manually.

The steam generator also includes a terminal to connect a lamp to light the steam bath.

## 5. Technical Data

| HYGROMATIK Steam Generators DBLD   |   |       |       |        |        |        |        |        |        |  |
|------------------------------------|---|-------|-------|--------|--------|--------|--------|--------|--------|--|
| DB-LD Range*<br>(400V/3/N50, 60Hz) | * Other voltages available upon request   |       |       |        |        |        |        |        |        |  |
| Designation                        | DB4LD                                     | DB6LD | DB8LD | DB10LD | DB13LD | DB17LD | DB23LD | DB30LD | DB45LD |  |
| Steam capacity [kg/h]              | 4   | 6     | 8     | 10     | 13     | 17     | 23     | 30     | 45     |  |
| Elec. supply                       |   |       |       |        |        |        |        |        |        |  |
| Elec. power [kW]                   | 3   | 4.5   | 6     | 7.5    | 9.8    | 12.8   | 17.3   | 22.5   | 33.8   |  |
| Current [A]                        | 4.4                                       | 6.5   | 8.7   | 10.8   | 14.1   | 18.4   | 24.9   | 32.5   | 48.8   |  |
| Fuse [A]                           | 3x6                                       | 3x10  | 3x16  | 3x16   | 3x20   | 3x25   | 3x25   | 3x35   | 3x63   |  |
| Humidifier control                 | LD  |       |       |        |        |        |        |        |        |  |
| Control voltage                    | 230V                                      |       |       |        |        |        |        |        |        |  |
| Steam hose [mm]                    | 1x25                                      |       |       |        |        |        | 1x 40  |        | 2x40   |  |
| Condensate hose [mm]               | 1x12                                      |       |       |        |        |        | 1x 12  |        | 2x12   |  |
| Empty weight [kg]                  | 14  | 14    | 14    | 29     | 29     | 29     | 30     | 30     | 41     |  |
| Operational weight [kg]            | 17  | 17    | 17    | 17     | 47     | 47     | 57     | 57     | 88     |  |
| Dimensions: Height [mm]            | 585                                       | 585   | 585   | 815    | 815    | 815    | 815    | 815    | 915    |  |
| Width [mm]                         | 453                                       | 453   | 453   | 530    | 530    | 530    | 530    | 530    | 612    |  |
| Depth [mm]                         | 210                                       | 210   | 210   | 315    | 315    | 315    | 315    | 315    | 377    |  |
| Water Supply                       | 1 to 10 bar incl. fastener for 10 mm pipe |       |       |        |        |        |        |        |        |  |

## 6. Commissioning



**Attention:** This unit should only be serviced by qualified personnel.

### Switch off steam generator

Before the unit is put into operation, it must be clear how it should be switched off.

- >> Switch off the control switch on the unit door.
- >> Close the water feed shutoff valve.

### Switch on steam generator

- >> Open the water feed shutoff valve.
- >> Turn on the control switch on the door.

Then the following functions take place :

- The LED indicating humidification lights
- The steam generator runs the pump for a few seconds. The purpose of this is to check that the system is operating properly and to replace some of the water if restarting.
- The solenoid inlet valve opens and admits water into the cylinder.
- As soon as the electrodes start to become immersed, the current begins to rise from 0 to its rating (as marked on the name plate; the steam output limit is set to 100% in the factory).
- Filling is interrupted as soon as the rated current is reached.
- The rise in temperature causes the electrical conductivity of the water to increase and the current to rise above its rated value. This may lead to the pump draining some of the water in response to the overcurrent.

With water of normal conductivity steam production begins within a few minutes.

### Further Checking:

Once the solenoid valve starts replenishing the water periodically the steam generator operates at constant rated output and the cold start sequence is complete.

- >> Observe the steam generator and if electrode bushings are leaking after 15 to 30 minutes of operation, turn the unit off.



**Attention:** Observe safety regulations governing work carried out with live components!

- >> Stop the leaking by adjusting the electrode nuts.

## 7. Operation



**Attention:** This unit should only be serviced by qualified personnel.



**Note:** Do not tamper with steam production by manipulating the temperature sensor (for example pouring cold water over it or covering it).

Put the unit into operation doing the following:

- >> Turn on water supply
- >> Switch on the control switch in the door of the steam generator.

Now the unit proceeds as mentioned under "6. Commissioning".

### 7.1 Limiting steam generation output

If the temperature control does not function optimally, an adjustment to the output limitation can remedy this. The output of the "Sustaining power" can be adjusted by the potentiometer R9 on the pcb to a value between 20 and 80% of the "heating-up power".

The "sustaining power" serves to maintain continuous steam generation with only low temperature variations in the steam bath. It is dependent on the local conditions of the steam bath. The factory set adjustment is an empirical value, and may not be optimal for every steam bath.

If the steam generator frequently switches off, because the temperature increases even when in "sustaining power":

- >> Set the R9 potentiometer corresponding by lower.

If the steam generator frequently switches back to the heating-up level:

- >> Set the R9 potentiometer corresponding by higher.

### 7.2 Blow-down

Partial blow-down: The control system decides automatically when it is necessary to dilute the concentration in the steam cylinder.

### Manual drain

- >> The cylinder can be drained by pressing the corresponding key on the electronic pcb using a screwdriver.



## 8. Steam Bath Control LD

The steam bath control LD controls the HYGROMATIK steam generator using the temperature in the steam bath. It generates steamoutput in two steps, which can be adjusted separately.

- The **heating-up step** to quickly heat up the steam bath or to balance a large temperature drop.
- The **sustaining step** for continuous steam generation at low temperature variations in the steam bath.

If the control registers a temperature drop it will create a balance by increasing steam production. In the sustaining step a fan can be activated in the steam bath. It can also be switched on or off manually. The following parameters can be read and/or set at the controller:

- Actual temperature at the sensor and preselected cabin temperature.
- The temperature cross-over difference between sustaining and heating-up level.
- Duration and frequency of the essence injection.

An unauthorised or accidental change of the parameters is prevented by the code c3.



### 8.1 Programming the Steam Bath

**Example:** The preselected cabin temperature should be changed from 45° to 48°C.

>> Switch on the steam generator by the main switch (LED "Ist/actual" lights up).

**Note:** The controller turns back automatically to this parameter, if no input follows within 10 seconds. If an input is faulty wait 10 seconds and then start programming again.

Before modifying a parameter select it by pressing the "+" or "-" keys (as the set temperature is to be changed, the LED "Soll/set" should light up).

>> To get to the programming mode (LED of selected parameter is blinking) press "P". The display shows **c...0**

>> Press "+" three times - the display shows **c...3**

>> Press "P".

**45** appears (the old set temperature) and the LED "Soll/set" is blinking. This value can now:

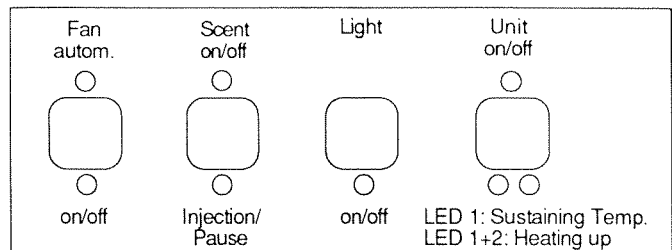
>> be modified with the "+" or "-" key. Press the "+" key until **48** is displayed.

>> The new set value can be confirmed by pressing "P".

Now the preselected cabin temperature (Set) is set at 48°C. The controller switches automatically to the operation level, if no other input follows within 10 seconds.

Modify other parameters in the same way.

#### Display Function



| Parameter | Function   | Display                   | Factory setting   |
|-----------|--|---------------------------|---|
| o ti      | Scent injection  | 00.01-0030 (min. a. sec.) | 00.02 (sec.)  |
| o tp      | Scent pausing  | 0.10-30.00 (min. a. sec.) | 05.00 (min.)  |
| o actual  | Actual temperature at sensor                             | 0.0                       | The sensor is calibrated at the factory. Calibration possible from -4 to 25 K |
| o set     | Preselected cabin temperature                            | 20.0-55.0 [°C]            | 45.0 [°C]   |
| o ΔT      | Temperature cross-over difference 1st to 2nd step        | 0.0-10.0 [K]              | 1.0 [K]   |
| o Δt      | Temperature cross-over difference temperature controller | 0.0-2.0 [K]               | 0.5 [K]   |

## 9. Faults

Immediately switch off the steam generator if a fault occurs.

Faults are only to be remedied by qualified personnel following the proper safety instructions.

| Fault   | Causes  | Remedies  |
|---|---|---|
| LED (red) in the door and on the pcb are on continuously; unit is working                             | <ul style="list-style-type: none"> <li>- The cylinder is filled up to the maximum water level electrode without the rated current or rated steam output being reached. This may happen when starting from cold, when restarting after a full blow-down and when the water conductivity is low or subject to considerable fluctuation.</li> <li>- The cylinder is full of scale, which limits the active immersion depth of the electrodes.</li> <li>- The electrodes are worn.</li> <li>- Phase L3 is missing (external safety fuse is defect)</li> </ul> | <ul style="list-style-type: none"> <li>- As a result of continuing vaporisation gradually increasing the water conductivity, the signal is cancelled after a prolonged operating period and the rated output is restored automatically.</li> <li>- Clean the cylinder.</li> <li>- Replace the electrodes.</li> <li>- Replace safety fuses.</li> </ul> |
| LED (red) in the door and on the pcb flash, unit has switched off.                                    | <ul style="list-style-type: none"> <li>- Blow-down failure. (Operation of the blow-down pump can be checked by pressing the yellow key on the pcb) Blow-down pump is blocked by scale preventing operation</li> <li>- Blow-down pump not receiving electrical power.</li> </ul>   | <ul style="list-style-type: none"> <li>- Clean the blow-down pump.</li> <li>- Clean cylinder</li> <li>- Clean connecting hose</li> <li>- Check cable connections. Check whether relay on the pcb operates (clicks).</li> </ul>  |
| Blow-down pump running, but no water is pumped out.   | <ul style="list-style-type: none"> <li>- Cylinder outlet is blocked.</li> </ul>   | <ul style="list-style-type: none"> <li>- Cylinder must be cleaned.</li> <li>- Check hose and pump</li> </ul>  |
| Solenoid valve continuously open, water is drained without the pump running                           | <ul style="list-style-type: none"> <li>- A part of the steam hose is allowed to sag (the steam forces the water out of the safety overflow). The control system tries to compensate for the reduction in output by admitting water.</li> <li>- The solenoid valve is blocked. (continuously open)</li> </ul>  | <ul style="list-style-type: none"> <li>- Lay steam hose at a constant slope to the steam bath.</li> <li>- Clean or exchange the solenoid valve.</li> </ul>  |
| No steam generation, although the unit is switched on   | <ul style="list-style-type: none"> <li>- The water shut-off valve is not open.</li> <li>- The fan in the steam bath doesn't operate (the actual temperature is not below the set temperature, therefore no steam request).</li> <li>- The safety interlock system has been triggered.</li> <li>- No bridge between the terminals 1 and 2 (in case no safety interlocks are fitted).</li> </ul>  | <ul style="list-style-type: none"> <li>- Open the water inlet.</li> <li>- Turn on the fan.</li> <li>- Seek failed function and remedy.</li> <li>- Place a bridge between 1 and 2.</li> </ul>  |
| Periodic leaking of water out of the outlet hose (most times shortly after the solenoid valve opens). | <ul style="list-style-type: none"> <li>- Incorrect installation of the steam hose (water blocks steam passage).</li> </ul>  | <ul style="list-style-type: none"> <li>- Lay the steam hose at a constant slope to the steam bath.</li> </ul>   |

| Fault   | Causes  | Remedies  |
|---|---|---|
| Water collecting on base plate of steam generator   | <ul style="list-style-type: none"> <li>- The cylinder is incorrectly inserted into the base.</li> <li>- The cylinder was reassembled incorrectly after servicing:               <ul style="list-style-type: none"> <li>- O-ring seal damaged or not replaced.</li> <li>- The flange itself is damaged.</li> <li>- Scales have collected in the flange.</li> <li>- The flange is clamped with insufficient or unevenly spaced clamps.</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- Insert the cylinder correctly with a new O-ring in the cylinder base.</li> <li>- Seek the fault and eliminate.</li> </ul>  |
| Water leaks from the top part of the cylinder.  | <ul style="list-style-type: none"> <li>- Hose clamps for steam or condensate hoses are improperly secured.</li> <li>- The electrodes are improperly secured.</li> </ul>   | <ul style="list-style-type: none"> <li>- Tighten clamps.</li> <li>- Tighten electrode fixing.</li> </ul>  |
| Water flows out of the base plate outlet when the steam generator is blowing down.        | <ul style="list-style-type: none"> <li>- The tundish overflows because it's dirty.</li> <li>- The drain from the tundish has not been made properly.</li> <li>- The connection to the tundish is blocked.</li> </ul>  | <ul style="list-style-type: none"> <li>- Clean tundish.</li> <li>- Correctly install connection.</li> <li>- Clean connection.</li> </ul>  |
| The display shows: <b>UIF</b>   | <ul style="list-style-type: none"> <li>- The temperature sensor is defect.</li> <li>- The cable of the temperature sensor is defect.</li> </ul>   | <ul style="list-style-type: none"> <li>- Exchange temperature sensor.</li> <li>- Exchange the cable.</li> </ul>   |
| None or too little essence injection.   | <ul style="list-style-type: none"> <li>- No essence in the receptacle.</li> <li>- The essence injector is not switched on.</li> <li>- The essence injection time is too short.</li> <li>- The essence injection pause is too long.</li> <li>- The essence solenoid valve is blocked.</li> <li>- The safety fuse or relay for the essence injector are defective.</li> </ul>   | <ul style="list-style-type: none"> <li>- Refill the receptacle.</li> <li>- Switch on the essence injector.</li> <li>- Lengthen the injection time.</li> <li>- Shorten the injection pause.</li> <li>- Clean the solenoid valve.</li> <li>- Replace safety fuse or relay.</li> </ul> |
| Too much essence is injected.   | <ul style="list-style-type: none"> <li>- The essence injection time is too long.</li> <li>- The essence injection pause is too short.</li> <li>- The solenoid valve is continuously open.</li> </ul>  | <ul style="list-style-type: none"> <li>- Shorten the injection time.</li> <li>- Lengthen the essence injection pause.</li> <li>- Clean the solenoid valve.</li> </ul>   |
| The cylinder is drained completely after a blow-down, although the pump has switched off. | <ul style="list-style-type: none"> <li>- The vacuum breaker in the discharge hose is blocked.</li> </ul>  | <ul style="list-style-type: none"> <li>- Clean the vacuum breaker.</li> </ul>   |
| Function of unit disturbed.   | <ul style="list-style-type: none"> <li>- External sources of interference.</li> </ul>   | <ul style="list-style-type: none"> <li>- Turn off main switch and after a short time turn on again.</li> </ul>  |

## 10. Servicing

The HYGROMATIK steam generator is to a great extent maintenance free. Nevertheless, operation faults can occur, which has to do with insufficient or improper servicing.

With proper servicing the unit can achieve a higher life-span so regular service is essential.



**Attention:** Consider when servicing:

- Only qualified and informed personnel should work on unit.
- Pay attention to safety regulations.
- Take unit out of operation for service work and secure against restarting.
- After service work the unit should be rechecked by qualified personnel for operational safety.

The operating characteristics and servicing intervals of the steam generator are mainly dependent on the existing water quality (total hardness, conductivity) and the amount of steam generated since the last service. Different qualities can lengthen or shorten the period. The residues found in the steam cylinder provide an indication of future maintenance intervals. The latest point in time at which a cylinder may be serviced is:

- After a lengthy period of operation indicated by the "Cylinder Full" signal,
- Or by the "Collective Fault"- relay, if fitted. (delayed cylinder full report).

### 10.1 Service work

| Cycle  | Service work  |
|--|---|
| 4 weeks after commissioning<br>(with normal water quality) | <ul style="list-style-type: none"> <li>- Visual inspection of the electrical and mechanical components, cables, connections, etc.</li> <li>- Removal of scales from the cylinder, water outlet hose and drain pump.</li> <li>- Inspection of the electrodes.</li> </ul>     |
| 6 months<br>(with normal water quality)                    | <ul style="list-style-type: none"> <li>- Visual inspection of the electrical and mechanical components, cables, connections, etc.</li> <li>- Removal of scales from the cylinder, water outlet hose and the drain pump.</li> <li>- Inspection of the electrodes.</li> </ul> |

### 10.2 Cleaning the steam cylinder

#### Disassembly

(See also the diagrams on the next page)

- >> Switch on the unit by the main switch.
- >> The water in the cylinder is drained by pressing the yellow key on the electronic pcb using a screw-driver to operate the blow-down pump.
- >> Disconnect the steam generator from the power supply. Main power switch OFF and remove safety fuse F1.
- >> Pull electrode plugs (4) and insulating caps (5) off.
- >> Disconnect steam and condensate hoses (2).
- >> Lift steam cylinder (3) out of the base (9) and the side supports and remove from steam generator.
- >> Release its flange clamps and open the cylinder.

#### Cleaning



**Note:** When cleaning do not use acids or other chemicals.

- >> Remove all scale and sludge from cylinder.
- >> Mechanically remove the deposit from the heating electrodes by knocking them (small amounts that remain are acceptable).
- >> Inspect the inside of the top part of the cylinder for furring and any electrical bridging (black grooves) between the electrodes and their bushings and remove completely by washing.



**Note:** The top part must be replaced if electrical bridges have penetrated deeply into the material.

- >> Clean cylinder strainer (11).
- >> Restore the surface of the level electrode (13) in the top part of the cylinder to bright metal condition.

#### Reassembly

- >> Replace the flange O-ring (12) with original HYGROMATIK solvent-free O-Ring.



**Note:** When joining the cylinder the upper and lower parts must fit firmly on top of one another.

- >> Connect upper and lower parts with clamps.
- >> Remove the O-ring (10) from the cylinder bottom. Insert a new solvent-free HYGROMATIK quality O-Ring into the cylinder base.

- >> Insert the cylinder into the cylinder base (9).
- >> Refit the cylinder into the steam generator (The condensate connection must be in front, the lateral connection must be inserted into the lashes).
- >> Connect the insulating cap (15) and plug (16) to the high level electrode.



**Note:** Plug the plug into the correct electrode. Pay attention to the colored markings.

- >> Connect the insulating caps (5) and the plugs (4) to the electrodes.
- >> Connect the steam hose (2) and tighten the clamp (1) (do not overtighten).
- >> Push in the safety fuse F1.

Switch on the unit and operate for 15 to 30 minutes. Check for any leaks.

### 10.3 Uneven Electrode Wear

Replace badly worn electrodes completely. Check main fuses! If a main fuse has blown the corresponding electrode will not be supplied with power and hence will not wear.

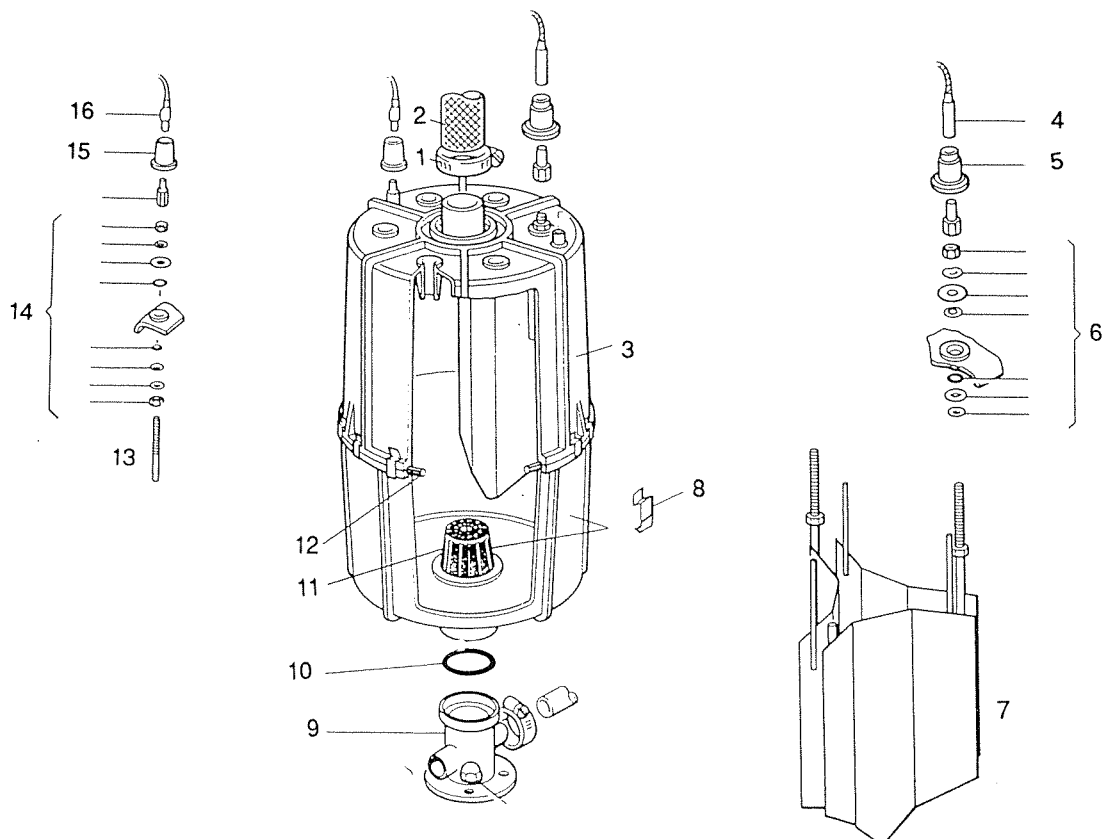
The wearing of electrodes is dependent on:

- The feed water and,
- The generated amount of steam.

The latest point in time at which the electrodes must be changed is indicated by the red LED "cylinder-full" coming on and the rated current not being reached even after cleaning and a prolonged period of operation. As a guide they must still be a third to a half of their original length.

The original lengths of HYGROMATIK stainless steel large-area electrodes are as follows:

| Model       | DB4-8LD | DB10-30LD | DB45LD |
|-------------|---------|-----------|--------|
| Length (mm) | 155     | 235       | 300    |



## 10.4 Replacing electrodes



**Note:** If

- The electrodes must frequently be exchanged,
- Black sludge collects in the cylinder, or
- There is arcing in the cylinder:

this indicates, that the conductivity of the water is too high, or the cylinder is not being drained frequently enough. In this case please turn to HYGROMATIK for advice.

- >> Disassemble the cylinder and open, as written in chapter "Service, cleaning the steam cylinder".
- >> Remove the electrode fitting (6) and take out the old electrodes (7).
- >> Insert the new electrodes and assemble with pin nut, counter nut, plain washers, lock washers and O-rings in the right order.
- >> Tighten the electrode - not too firmly - with the counter nut and lock with pin nut.
- >> Replace flange O-ring and
- >> base O-ring with solvent-free HYGROMATIK parts.
- >> Reassemble the steam cylinder and fit in the steam generator as described in chapter, "Cleaning the steam cylinder".
- >> Switch on the unit and after 15-30 minutes of operation check for leaks.

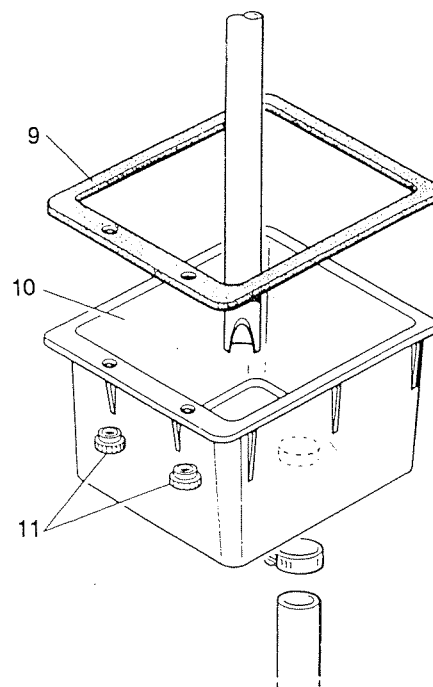
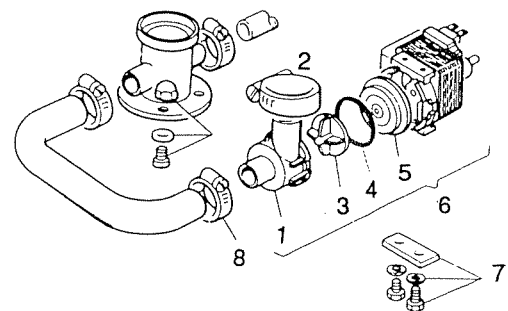
If there is a leakage, switch off the power and observe safety regulations governing work carried out with live components.

- >> If necessary tighten counter nut by a further 1/4 to 1/2 turn and lock nut with contact pin nut.

## 10.5 Cleaning the draining system and the pump

- >> Press the yellow key on the pcb and drain the cylinder.
- >> Switch off the unit and secure against restarting.
- >> Disassemble the cylinder, as written in chapter "Service, cleaning the steam cylinder".
- >> Remove the electric cable from the pump.
- >> Remove the screws (11). Disconnect tundish (10) and clean.

- >> Remove the screws (7) and the pump.
- >> Open the pump (bayonet joint). Observe correct direction and lift locking device.
- >> Remove residues from discharge hoses and pump. Replace pump impeller (3), O-Ring (4), shaft seal (5) or body (1) as necessary if any of these parts are no longer in perfect condition.
- >> Reassemble the pump.
- >> Insert the pump into the unit and tighten with screws (7).
- >> Connect the hoses to the pump (2 + 8).
- >> Connect the electric cable to the pump.
- >> Insert an O-ring of solvent-free HYGROMATIK quality into the cylinder base.
- >> Assemble the cylinder, as written in chapter "Cleaning the steam cylinder".
- >> Insert the tundish, checking that the seal (9) is seated properly and replace if necessary.
- >> Check for any leaks.



## 10.6 Cleaning the solenoid inlet valve and strainer

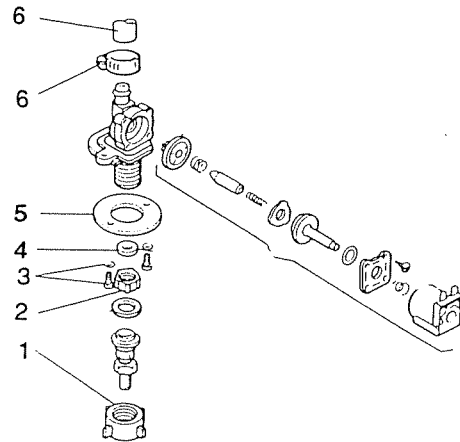
### Disassembly

- >> Press the yellow key on the pcb and drain the cylinder.
- >> Switch off the unit and pull out the safety fuse F1.
- >> Turn off the water supply and turn loose the nut to the fresh water connection (1).
- >> Disassemble the cylinder, as written in chapter "Service, cleaning the steam cylinder".
- >> Release the connecting hose (6) to the cylinder base.
- >> Remove the fitting screws (3) from the solenoid valve.
- >> Pull out the cable plugs.
- >> Remove the solenoid valve.
- >> Replace O-ring if there is a leak between metal plate and plastic body.
- >> Remove strainer (2) in the supply and clean.
- >> Take out the inlet limiter (4) with a pair of small pliers and clean.

### Assembly

- >> Insert the inlet limiter (4) and strainer (2).
- >> Connect the E-cable to the solenoid valve.
- >> Insert the solenoid valve and seal into the unit.
- >> Connect the connection hose to the cylinder.
- >> Firmly tighten the solenoid valve with the screws.
- >> Connect the water supply.
- >> Replace and moisten the O-ring in the cylinder base.
- >> Assemble the cylinder as described in chapter "Steam Cylinder Cleaning".
- >> Open the water supply.
- >> Push in the safety fuse F1.
- >> Check the water supply hose for leaks.

The unit can now be put into operation again.



## 10.7 Cable fitting, electrode cables

- >> Check all fittings to be firmly seated.

Loose cable connections lead to excessive contact resistance and overheating of the contact surface.

## 10.8 Checking Operation

- >> Start the steam generator and operate for a few minutes at maximum output if possible.
- >> Check safety devices.
- >> Check hose connections for any leaks.

## 11. Dismantling

Removing the steam generator, follows the same sequence as installation, only in reverse order.



**Attention:** The dismantling of the unit should only be carried out by qualified personnel. The electrical disconnection should only be done by a qualified electrician.

Pay attention to the "Safety Notes" chapter 2, particularly to those referring to disposal regulations.

# HYGROMATIK Electrode Steam Humidifier for use with tap water

## Operation and Maintenance Instructions

### Part 2: for the installer

|           |                                       |              |
|-----------|---------------------------------------|--------------|
| <b>2.</b> | <b>Mounting instruction</b>           | <b>p. 16</b> |
| 2.1       | Mounting the steam generator          | p. 16        |
| 2.2       | Equipment dimensions DB4-30LD         | p. 17        |
| 2.3       | Equipment dimensions DB45LD           | p. 18        |
| 2.4       | Installing the steam hose             | p. 19        |
| 2.5       | Steam manifold                        | p. 19        |
| 2.6       | Essence injector                      | p. 20        |
| 2.7       | Temperature sensor                    | p. 20        |
| 2.8       | Fan                                   | p. 20        |
| 2.9       | Checking of unit before commissioning | p. 20        |



## 2. Installation Instructions



**Attention:** Installing this unit should only be carried out by qualified personnel. We accept no liability for damages caused by faulty installation.

Observe all safety and warning notices you find on the unit.

Do not connect the unit to electrical power before final installation.

Additional equipment may not be installed inside the unit without prior written consent by HYGROMATIK.

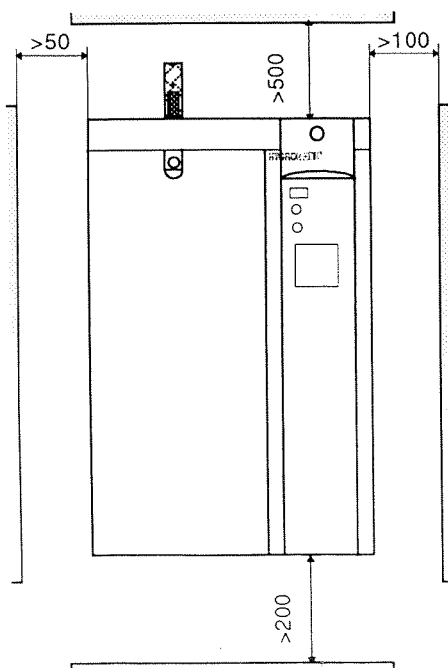
### 2.1 Mounting the Steam Generator



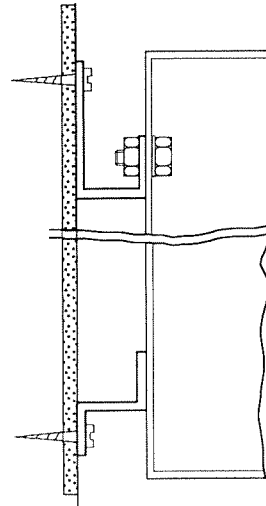
**Note:** Be aware of the following when selecting the installation location of the steam generator:

- Ambient temperature 5 to 40°C.
- Relative humidity below 80%.
- Distances to the walls in compliance with those quoted in the diagrams.
- Steam manifold to be joined to the steam generator using the shortest possible lengths of steam and condensate hoses. Only then can the optimum efficiency be achieved.

#### Wall distances



#### Wall Mounting



#### How to mount the steam generator



**Note:** To function properly the steam generator must be vertically installed.

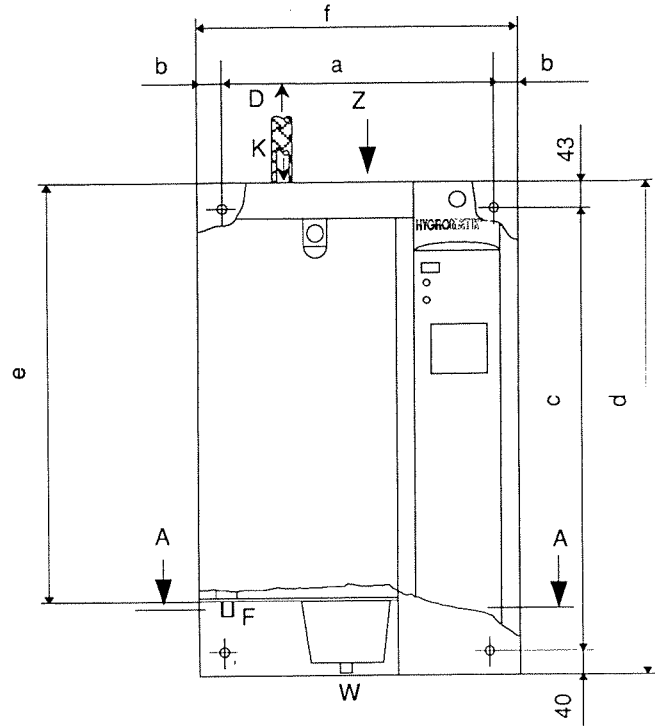
- Position the mounting bracket for the steam generator in the planned location, adjust with a spirit level and fasten.
- Hang the unit onto the bolts of the mounting bracket, tighten bolts and fix the lower mounting brackets to the wall.
- After finishing the mounting remove all transport safety packaging.

## 2.2 Equipment dimensions DB4 - DB30LD

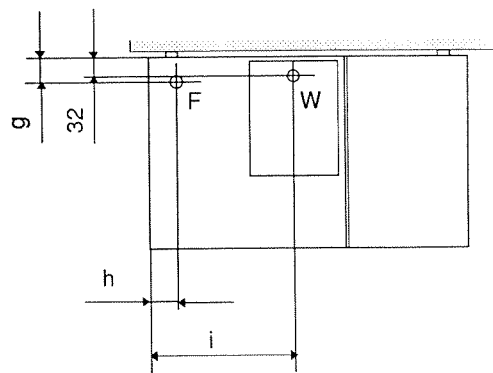
|   | DB4-8<br>[mm] | DB10-30<br>[mm] |
|---|---------------|-----------------|
| a | 373           | 450             |
| b | 40            | 40              |
| c | 502           | 732             |
| d | 585           | 815             |
| e | 450           | 690             |
| f | 453           | 530             |
| g | 40            | 41              |
| h | 45            | 48              |
| i | 180           | 244             |
| m | 108.5         | 155             |
| n | 210           | 315             |
| o | 106           | 159.5           |
| t | 158           | 250.5           |

- D = Steam output
- K = Condensate inlet
- W = Water drain
- F = Water feed
- E1 = Cable entry PG 29
- E2 = Cable entry PG 21
- E3 = Cable entry PG 16
- E4 = Cable entry PG 13
- E5 = Cable entry PG 9

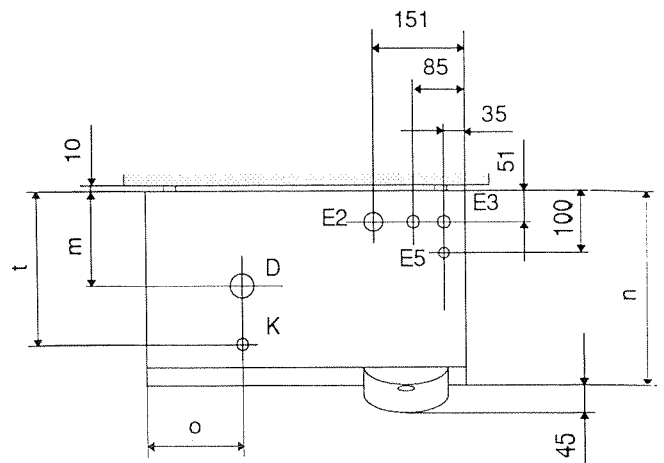
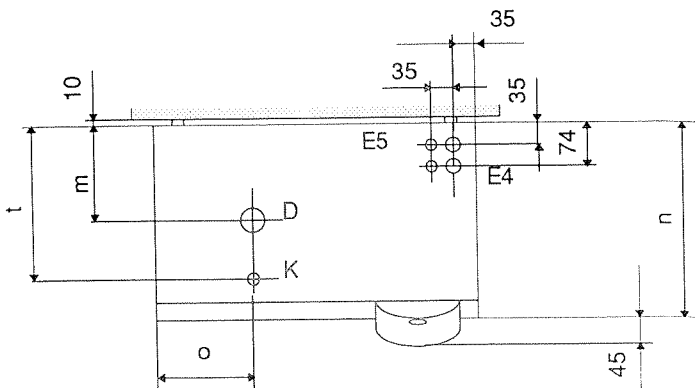
### Front Views



### Sections A - A



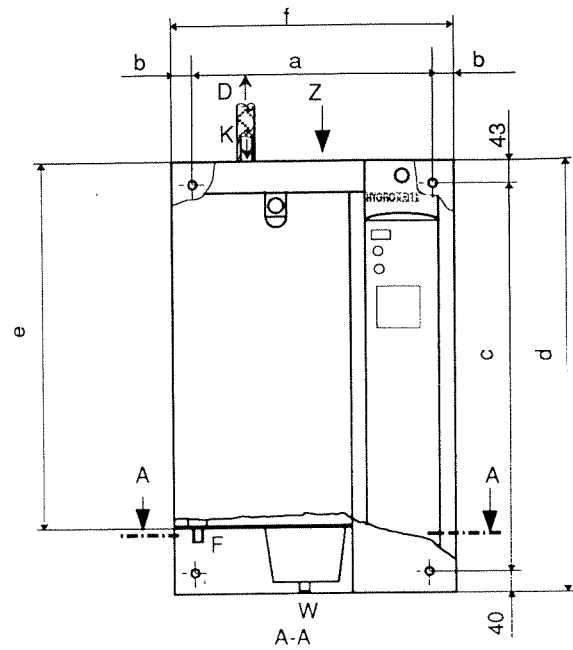
### Plan Views



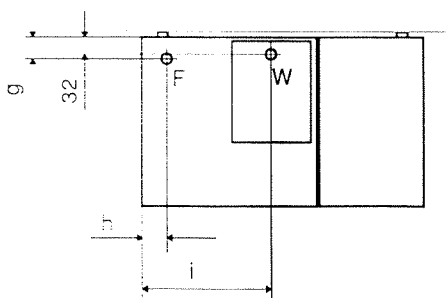
### 2.3 Equipment dimensions DB45LD

|   | DB45<br>[mm] |
|---|--------------|
| a | 530          |
| b | 40           |
| c | 832          |
| d | 915          |
| e | 790          |
| f | 612          |
| g | 41           |
| h | 48           |
| i | 325          |
| m | 186          |
| n | 377          |
| o | 204          |
| r | 17           |
| s | 130          |
| t | 316          |

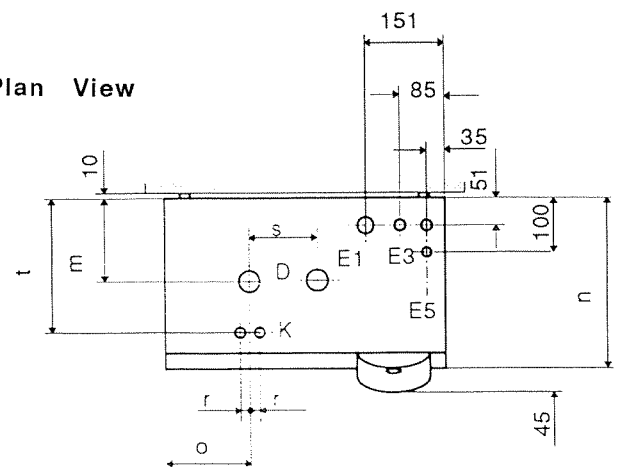
Front View



Section A - A



Plan View



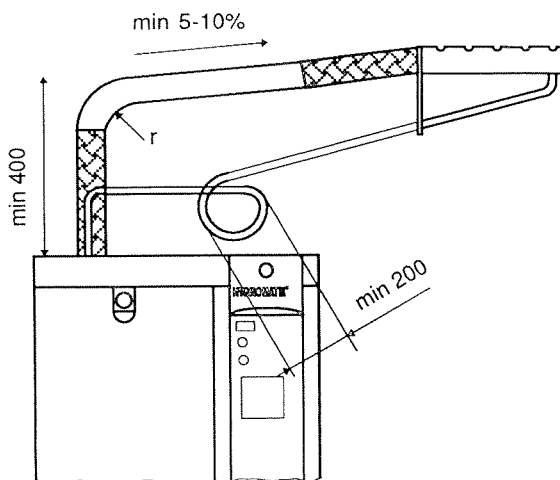
## 2.4 Installing the steam hose



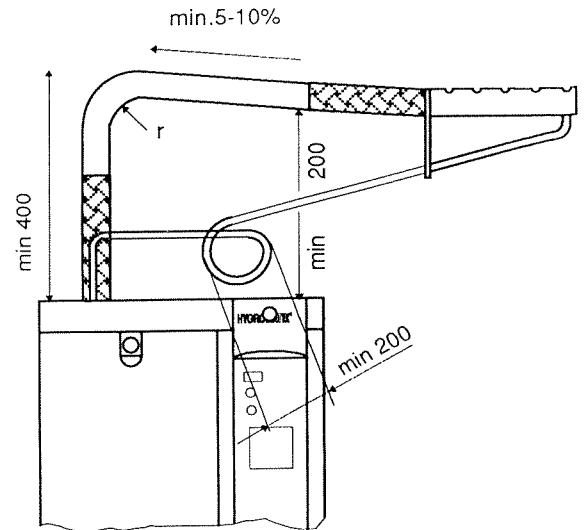
**Note:** By installing the steam hose, please pay attention to the following:

- The diameter of the steam hose must not be smaller than the steam outlet of the HYGROMATIK steam generator. (do not restrict the cross section otherwise the back pressure will increase unnecessary)
- The steam hose must be without sags and kinks and be laid with a continuous slope of 5-10% (otherwise sags will be formed).
- The steam hose should be as short as possible. In case of lengths of over 5 m the hose should be insulated to excess condensation).
- Depending on how the hose is laid, hose clips should be set at intervals of approx. 500 mm.
- Allow for access to the steam hose, so that it can be inspected later.
- In case of straight lengths of several metres, it is recommended to place the steam hose in temperature resistant plastic pipe (40mm dia for hose DN25; 60mm dia for hose DN40) or to use copper pipe.
- Only genuine quality HYGROMATIK hoses are capable of withstanding the operating conditions.
- Allow for minimum bending radii:  
Steam hose DN25:  $R_{min} = 200\text{mm}$   
Steam hose DN40:  $R_{min} = 400\text{mm}$

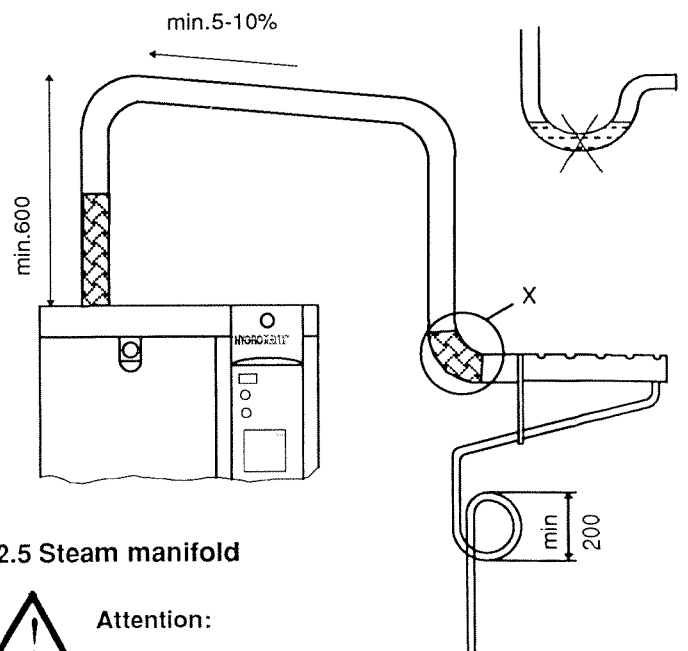
Steam hose with a rising slope:



Steam hose with a falling slope:



Steam hose below 200 mm above the upper edge:



## 2.5 Steam manifold



**Attention:**

- The steam manifold in the steam bath must be installed in a safe location in order to prevent injury or burns when using the steam bath.
- Do not place the steam manifold in the vicinity of the temperature sensor. Otherwise it will malfunction.

If steam manifolds are installed 200 mm or more above the upper edge of the steam generator, install the steam hose with a rising slope, otherwise install with falling slope. Allow for condensate drain.

>> A favourable position for the steam manifold is underneath the sauna bench.

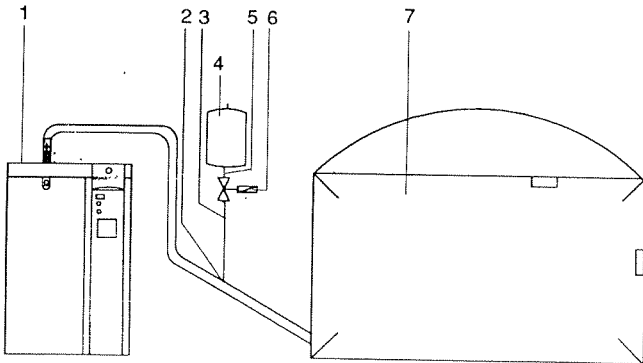
## 2.6 Essence injector

The essence should flow free fall into the steam line. For this a T-piece is necessary available from HYGROMATIK..



### Note:

- Mount the essence injector (2) close to the steam bath (7).
- The essence injector must be arranged such that the essence cannot flow back into the steam generator (1).
- The connecting hose (3) between the solenoid valve (6) and the essence injection (2) must be straight and vertical. It is important that this connection will not be bent and that it is at least 1,5 m in length, so as to provide the essence with the necessary drop height.
- The connecting tube (4) between the essence receptacle (5) and the solenoid valve must be straight and vertical.



### Installation:

- >> Mount the essence injector with its bracket at appropriate location.
- >> Connect the solenoid valve (6) to the receptacle.
- >> Connect the solenoid valve to the essence injection.

## 2.7 Temperature sensor

### Please pay attention:

- Do not install the temperature sensor right next to the steam distributor.
- It must not be possible to push the sensor into the wall or use it as a peg.

Place the temperature sensor above the door, where

- the location is ideal for measuring.
- it is well protected.

## 2.8 Fan

The ventilator in the steam bath should be installed:

- Higher than and
- opposite the air inlet opening.

## 2.9 Checking of unit before commissioning



**Attention:** This unit should only be operated by qualified and properly instructed personnel.



**Note:** When commissioning the fan please pay attention to notes concerning this unit.

Before switching on the steam generator please check the installation using the following list:

- Does the unit hang vertically ?
- Have you kept the distances to the unit within the range ?
- Do the hoses have a slope of 5 to 10% ?
- Is the steam manifold positioned correctly in the steam bath ?
- Is the connection to the essence injector correctly positioned ?
- Is the temperature sensor correctly positioned?
- Is the fan in the steam bath professionally installed ?
- Are all bolts and clamps tightened ?

# HYGROMATIK Electrode Steam Humidifier for use with tap water

## Operation and Maintenance Instructions

### Part 3: for the Plumber

|     |                               |              |
|-----|-------------------------------|--------------|
| 3.  | <b>Water installation</b>     | <b>p. 22</b> |
| 3.1 | Operation with softened water | p. 22        |
| 3.2 | Installation                  | p. 22        |
| 3.3 | Checking before commissioning | p. 23        |

### 3. Water installation



**Attention:** During installation please observe:

- All work must be carried out by qualified personnel.
- Switch off the unit beforehand.
- Observe local regulations of water works or municipalities.
- Do not connect to softened water or water with additives and only use water with a conductivity between 50 and 800  $\mu\text{S}/\text{cm}$ .
- The inlet water temperature may be up to 40 °C.
- Water inlet pressure: 1-10 bar.
- The supply line shall have a minimum diameter of 1/2 inch.
- The discharge shall flow freely into the tundish.
- Depending on local regulations, the supply line should have a pipe bow extending 300 mm above the cabinet (with an automatic vacuum breaker and non-return valve).

#### 3.1 Operation with softened water



**Attention:** Operation with softened water is generally not advisable, because one of the following problems could occur:



**Note:** When the HYGROMATIK steam generator is fed with softened water, please get in touch with HYGROMATIK.

- Salt bridge formation between the electrodes and their bushings on the inside of the top part of the cylinder.
- Foaming in the steam cylinder.

Salt bridges create electrical arcing, indicated by black grooves. The top part of the cylinder must then be replaced, otherwise the material will be further damaged and short circuits occur, leading to the main fuses blowing.

The foam touches the level electrode and triggers a signal indicating that the cylinder is full when it is not and the rated current has not yet been reached,



**Note:** In case a water softening system has been installed it is advised to use a mixture of softened water and normal tap water so that the water hardness will be 4 to 8 °dH.

### 3.2 Installation

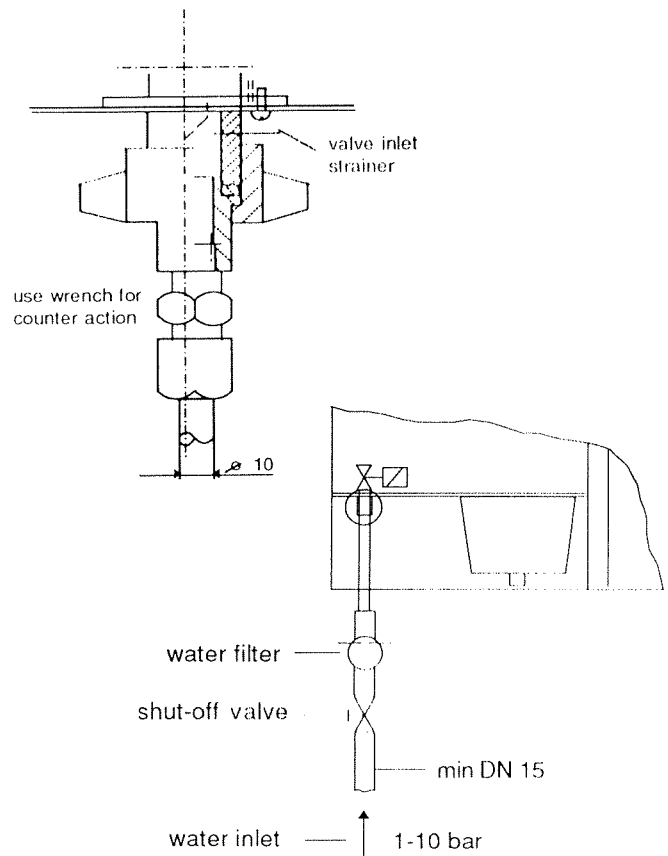
#### Water supply

In the supply hose

>> install a shut-off valve (8).

If the water quality requires it,

>> install a water filter (9).



The inlet connection of the water supply solenoid extends through the bottom tray.

Install as follows:

>> Screw on fitting using plastic nut (3). Tighten by hand.



**Note:** Tightening too much will destroy the fitting. The strainer must be in the solenoid valve.

>> Insert pipe (6) of 10 mm outside diameter into fitting (5) until stop and tighten brass-nut (5) by hand.

>> Tighten the brass-nut (5) by 17 mm wrench 1/2 to max. 1 1/4 turns and use a second 14 mm wrench for counter action (4).

## Water discharge

For the water drain, we recommend a discharge hose.

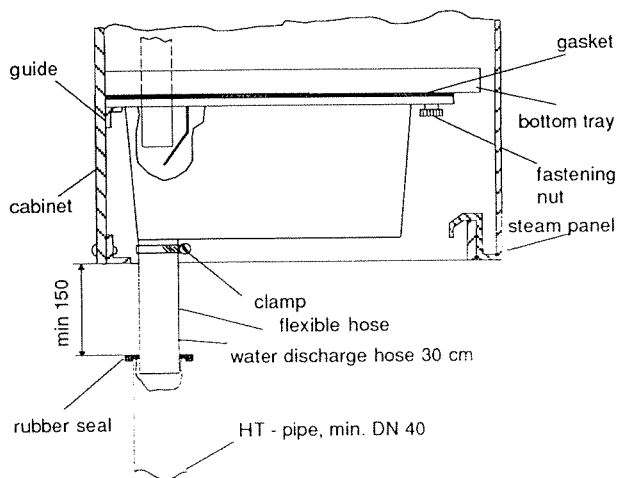


### Attention:

- The water drain shall withstand temperatures of up to 95°C.

Install the water drain system as follows:

- >> Discharge hose DN 1" extending approx. 300 mm from the tundish, so that the discharge can flow freely into a pipe having a minimum inside diameter of 40 mm. Place a rubber seal between pipe and hose.
- >> Connect the discharge hose to the outlet of the tundish using the supplied clamps.



discharged water must flow freely!

## 3.3 Checking before commissioning

Before switching on the unit please check the installation with the following list:

- Are the screws and clamps tightened ?
- Is the water supply connection correctly installed and the water discharge can flow freely ?
- Are the water supply and discharge lines free from any leakages ?



# HYGROMATIK Electrode Steam Humidifier for use with tap water

## Operation and Maintenance Instructions

### Part 4: for the Electrician

|           |   |              |
|-----------|---|--------------|
| <b>4.</b> | <b>Electrical installation</b>              | <b>p. 25</b> |
| 4.1       | Electrical connections                      | p. 25        |
| 4.2       | Checking before commissioning               | p. 26        |
| 4.3       | Commissioning                               | p. 26        |
| 4.4       | Connections LD, Wiring Diagram: E-92400     | p. 27        |
|           | Steam Generator, Wiring Diagram: E-92401    | p. 28        |
|           | Steam Bath Control, Wiring Diagram: E-92402 | p. 29        |

## 4. Electrical Installation



**Attention, Voltage:** All work must be carried out by qualified personnel. Switch power off beforehand! Observe local regulations.



**Attention:** Install as follows:

- The electrical connections must be made professionally.
- The electrical connections shall correspond to the wiring diagrams.
- The internal power supply transformer may not be used for other purposes (controller)!
- If rated capacities are above e.g. 33 kW only permanent connections at fixed installations are allowed.

### 4.1 Installation

- >> The safety fuses require a contact aperture of min. 3 mm.
- >> Each steam cylinder requires its own main power connection including fuses, main breaker, etc.
- >> The potential equalization is to be connected to the threaded bolt M6 outside the cabinet.
- >> Main power supply as follows:  
1 x 400V/3 Phases/N for DB4-DB45LD.

Other voltages available upon request.

Select fuses with quick or medium blow characteristics (applicable only for the above voltage):

| Model    | Nominal current | Fuses [A] |
|----------|-----------------|-----------|
| DB 4 LD  | 4.4             | 3x6       |
| DB 6 LD  | 6.5             | 3x10      |
| DB 8 LD  | 8.7             | 3x16      |
| DB 10 LD | 10.8            | 3x20      |
| DB 13 LD | 14.1            | 3x25      |
| DB 17 LD | 18.4            | 3x25      |
| DB 23 LD | 24.9            | 3x25      |
| DB 30 LD | 32.5            | 3x35      |
| DB 45 LD | 48.8            | 3x63      |

### Controls



**Attention:** The unit shall be controlled such that it will not be switched on or off more than 4 times per minute (this will otherwise lead to destruction of the breaker).

### Floating (volt-free) signal outputs

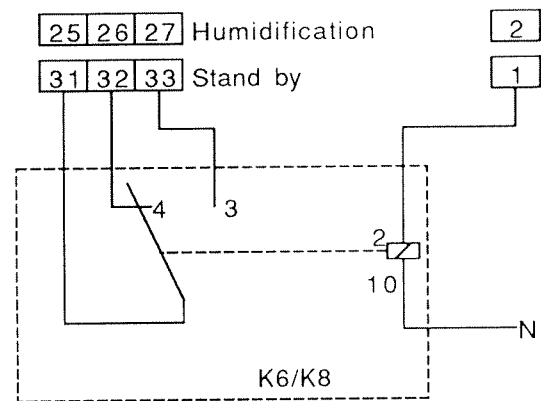
The maximum contact load is 250V/5A.

### Collective fault LD-Electronic

After removing the cover the additional pcb can be snapped directly onto the main pcb. See wiring diagram E-92401.

### Humidification / Stand-by LD-Electronic

Add-on relays and terminals should be installed on the rails in the unit. See diagram below.



### Temperature sensor

Connect the cable of the temperature sensor to the terminals 5/6 in the HYGROMATIK-steam generator.

Use the following table to check the installation. An exact alignment is possible at the steam bath control.

| Temperature [°C] | Resistance [Ω] |
|------------------|----------------|
| 10               | 1783           |
| 15               | 1854           |
| 20               | 1936           |
| 25               | 2000           |
| 30               | 2075           |
| 35               | 2152           |
| 40               | 2230           |
| 45               | 2309           |
| 50               | 2390           |
| 55               | 2472           |
| 60               | 2555           |

### Essence injector

- >> The solenoid valve connections are to be connected to the terminals 7/8 installed in the HYGROMATIK steam generator for that purpose (24 V AC/ 20 VA).

### Blow-down

Depending on the quality of the water the steam cylinder is drained completely every 3 to 8 days.



**Attention:** When water with low conductivity is being used this function is to be disabled (consult HYGROMATIK).

## 4.2 Checking before commissioning

All work - especially electrical - must be carried out by properly qualified personnel in accordance with the safety regulations.

- >> The supply voltage must correspond to the specified voltage on the name plate.
- >> All electrical connections must correspond to the wiring diagrams.
- >> Cable connections as well as plugs and their connections must be tightened.
- >> The unit must be connected to ground.

You can now switch on the steam generator.

## 4.3 Commissioning

### Switch off steam generator

Before the unit is put into operation, it must be clear how it should be switched off.

- >> Switch off the control switch on the unit door.
- >> Close the water feed shutoff valve.

### Switch on steam generator

- >> Open the water feed shutoff valve.
- >> Turn on the control switch on the door.

Then the following functions take place :

- The LED indicating humidification lights
- The steam generator runs the pump for a few seconds. The purpose of this is to check that the system is operating properly and to replace some of the water when restarting.

- The solenoid inlet valve opens and admits water into the cylinder.
- As soon as the electrodes start to become immersed, the current begins to rise from 0 to its rating as marked on the name plate (The steam output limit is set on 100% in the factory).
- Filling is interrupted as soon as the rated current is reached.
- The rise in temperature causes the electrical conductivity of the water to increase and the current to rise above its rated value with the same water level in the cylinder. This may lead to the pump draining some of the water in response to the overcurrent.

With water of normal conductivity steam production begins within a few minutes.

### Additionally Checks:

- Correct direction of fan air flow.

Once the solenoid valve starts replenishing the water periodically the cold start sequence is completed and the steam generator operates at constant rated output.

- >> Check the steam generator after 15 to 30 minutes of operation for any leaks around the electrode bushings. Turn the unit off.



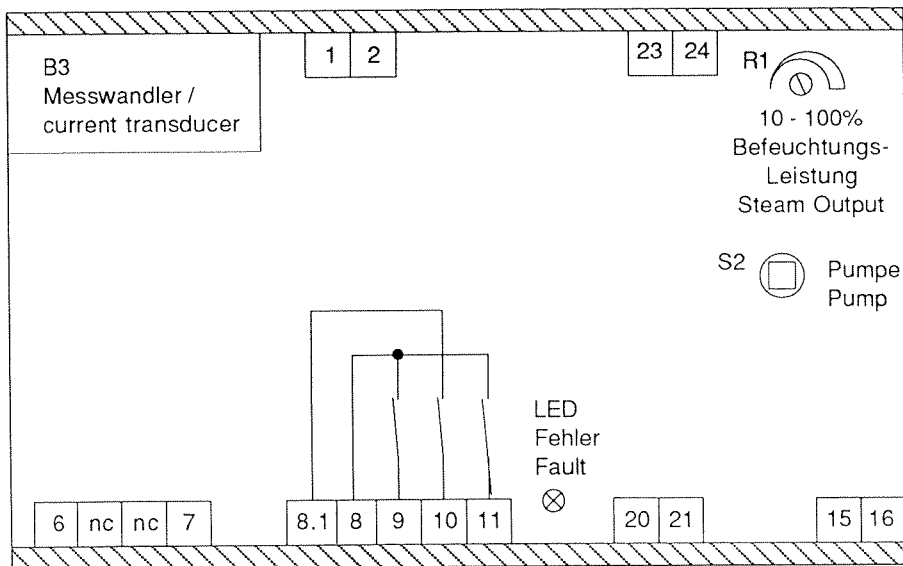
**Attention:** Observe safety regulations governing work carried out with live components!

- >> Stop the leaks by tightening nuts.

## Erläuterungen / Illustrations LD2:

|       |   |
|-------|---|
| B1    | = Sensorelektrode / sensor electrode  |
| B3    | = Messtrafo / current transducer  |
| F1-F4 | = Steuersicherung / control fuse 5A   |
| F5-F6 | = Steuersicherung / control fuse 3.2A   |
| F7    | = Steuersicherung / control fuse 5A   |
| F8    | = Sicherung Duftstoffgeber / fuse essence injector 1.6 A                                  |
| F9    | = Sicherung Lüfter / fuse fan 1.6 A   |
| F10   | = Sicherung Lampe / fuse lamp 1.6 A   |
| H2    | = Signalleuchte Befeuchten / indicating lamp humidification                               |
| H5    | = Signal-LED Zylinder Vollstand / indicating LED cylinder max. level                      |
| H6    | = Lampe Dampfkabine / lamp steam bath 24V AC max. 40W                                     |
| K1    | = Hauptschütz / main contactor  |
| L1-L3 | = Hauptklemmen / main terminals   |
| M1    | = Abschlämpumpe / drain pump  |
| M2    | = Lüfter Dampfkabine / fan steam bath 24V AC max. 40VA                                    |
| M3    | = HYGROMATIK Duftstoffgeber / HYGROMATIK essence injector 24V AC max. 40VA                |
| R1    | = Poti für Leistungsbegrenzung / potentiometer for capacity reduction                     |
| R9    | = Poti für Erhaltungsleistung / poti conservation level                                   |
| S1    | = Steuerschalter EIN / AUS / main switch ON / OFF   |
| S2    | = Taster für manuelle Abschlämzung / button for manual blow down                          |
| T1-T3 | = Trafo / transformer   |
| TF1   | = Temperaturfühler / temperature sensor   |
| Y1    | = Magnetventil / solenoid valve   |
| 1-2   | = Klemmen für Hygrostaten und Verriegelung / terminals for hygrostat and system interlock |
| 6-7   | = Eingang Sensorelektrode / input sensor electrode  |
| 8.1   | = Permanentversorgung Pumpenrelais / permanent supply pump relay                          |
| 8     | = Versorgung Magnetventil und Hauptschütz / supply solenoid valve and main contactor      |
| 9     | = Ausgang Magnetventil / output solenoid valve  |
| 10    | = Ausgang Pumpe / output pump   |
| 11    | = Ausgang Hauptschütz / output main contactor   |
| 15-16 | = Versorgung 9V AC / power supply 9V AC   |
| 20-21 | = Ausgang für H5 / output for H5  |
| 23-24 | = Ansteuerung 2. stufe / 2. step  |
| 25-27 | = Befeuchten / humidification   |
| 28-30 | = Sammelstörung / collective fault  |

### PCB



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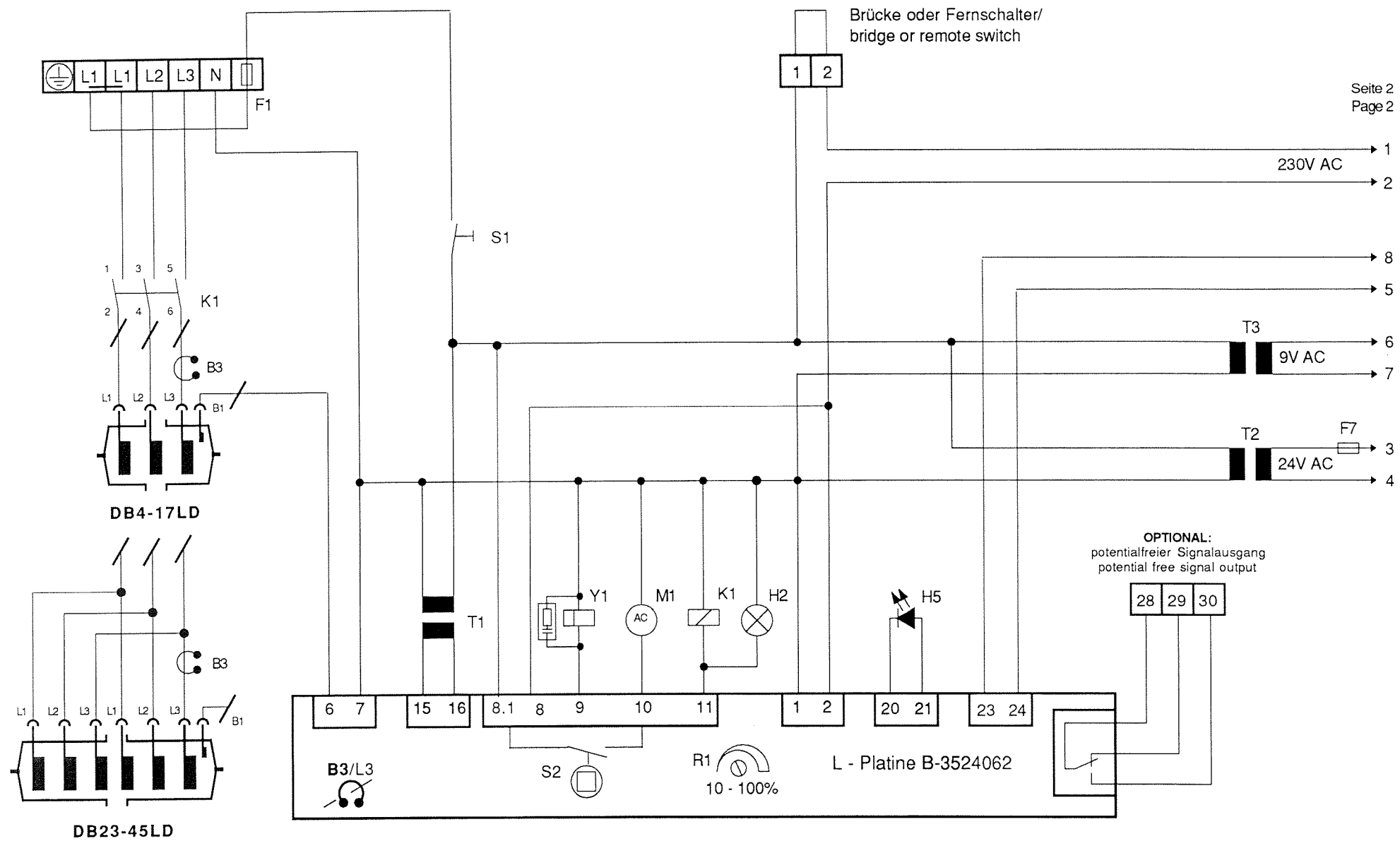
Typ / type:

Anschlüsse / Connections  
LD 2

E-Plan Nr. / No.: **E-92400**

Datum / date: **02.11.1990**

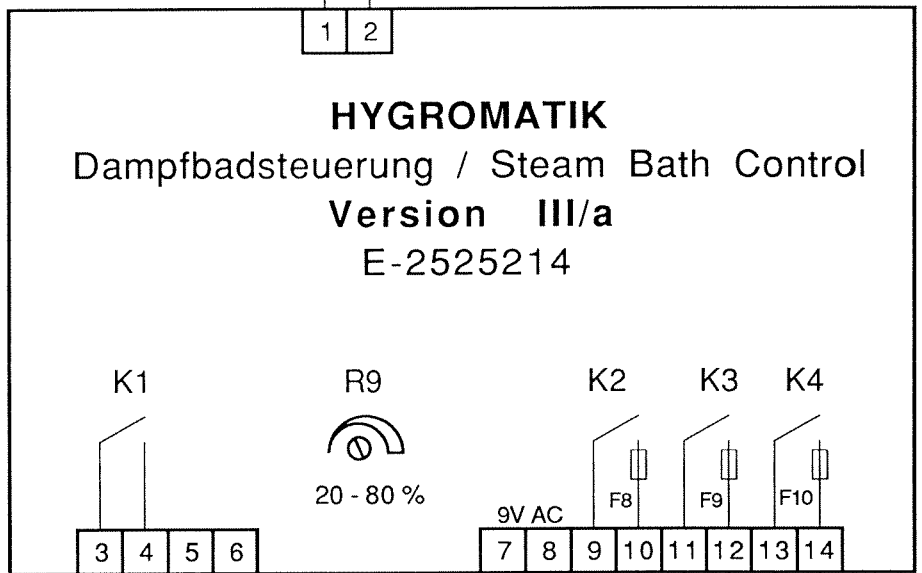
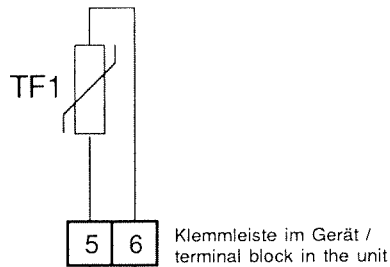
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Typ / type:  
**DB4-45LD/400/3**  
 Dampfbadsteuerung / Steam Bath Control  
**Version III/a**  
 Seite / Page 1

E-Plan Nr. / No.: **E-92401**  
 Datum / date: 07.05.1992  
 geändert / modified: 14.07.93



Seite1  
Page 1

- 1
- 2 230V AC
- 8
- 5
- 6 9V AC
- 7
- 3 24V AC
- 4

Klemmleiste im Gerät /  
terminal block in the unit

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Typ / type:

Dampfbadsteuerung / Steam Bath Control  
**Version III/a**

Seite/Page 2

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Datum / date: **07.05.1992**

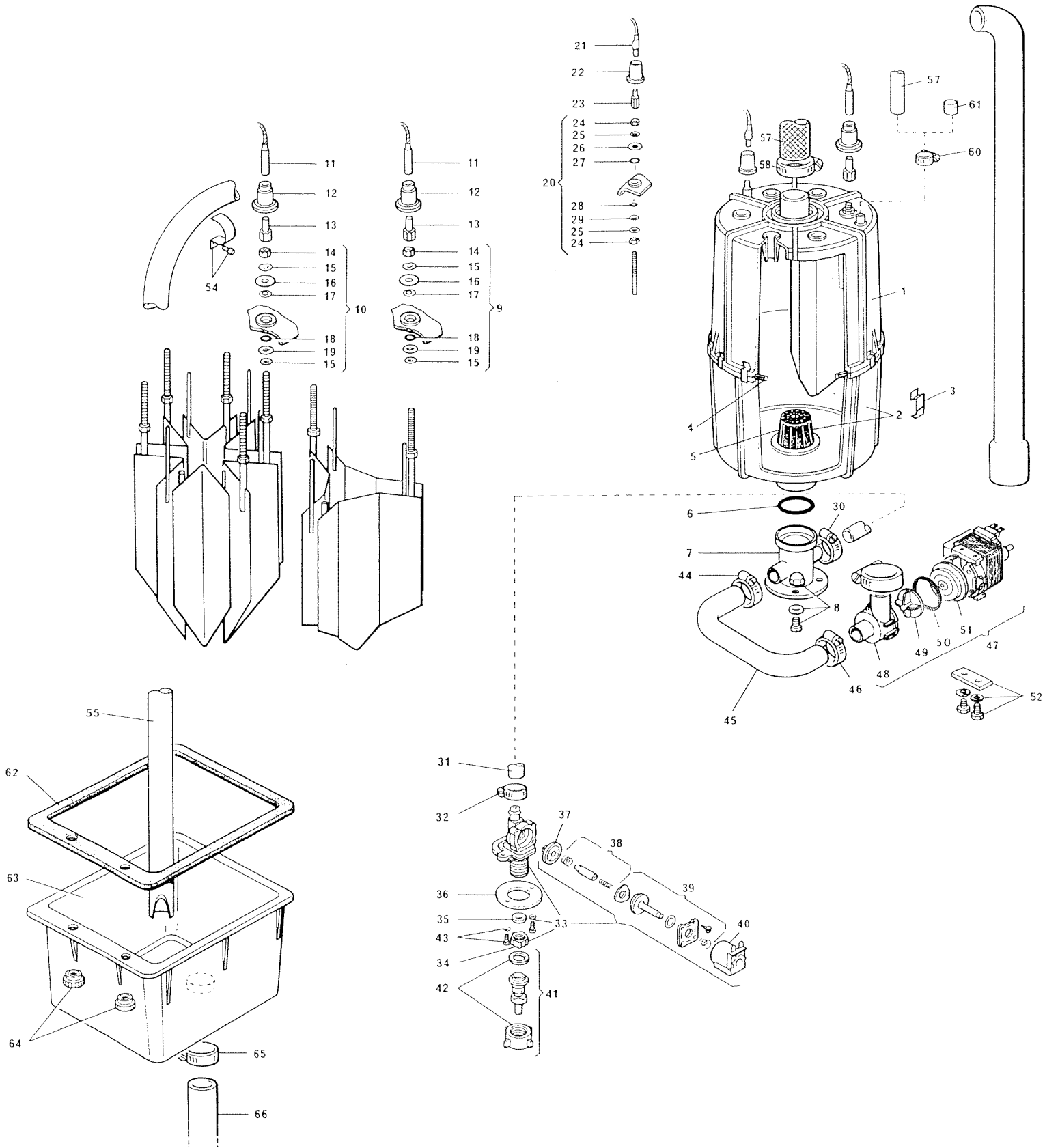
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# HYGROMATIK Electrode Steam Humidifier for use with tap water

## Operation and Maintenance Instructions

### Part 5: Spare parts list

|   |             |       |
|---|-------------|-------|
| 5 | Diagram 5.1 | p. 31 |
|   | Spare parts | p. 32 |



**Diagram 5.1**

Explosion View of Cylinder, Pump, Solenoid Valve, Hoses and Tundish



| *                       | DB..LD |       |       |   | 45        | Art. Nr.  | Description |
|-------------------------|--------|-------|-------|---|-----------|---|-------------|
|                         | 4-8    | 10-17 | 23-30 |   |           |   |             |
| <b>Cabinet</b>          |        |       |       |   |           |   |             |
| 1                       |        | 1     | 1     |   | B-3120403 | Cabinet, excl. electric blind, beige, green, empty                        |             |
|                         |        |       |       | 1 | B-2120503 | Cabinet, excl. electric blind, beige, green, empty                        |             |
|                         |        |       |       |   | B-2120802 | Cabinet, excl. electric blind, beige, green, empty                        |             |
| 1                       |        |       |       |   | B-3120413 | Set guide angle iron for DB4 cylinder                                     |             |
|                         |        | 1     |       |   | B-2120512 | Set guide angle iron for DB7 cylinder                                     |             |
|                         |        |       | 1     |   | B-2120513 | Set guide angle iron for DB5 cylinder                                     |             |
| 1                       |        |       |       |   | E-3120419 | Front panel for steam section   |             |
|                         |        | 1     | 1     |   | E-2120519 | Front panel for steam section   |             |
|                         |        |       |       | 1 | E-2121019 | Front panel for steam section   |             |
| 1                       |        |       |       |   | E-3120420 | Front panel for electric section, excl. electric blind                    |             |
|                         |        | 1     | 1     |   | E-2120520 | Front panel for electric section, excl. electric blind                    |             |
|                         |        |       |       | 1 | E-2121020 | Front panel for electric section, excl. electric blind                    |             |
| 1                       | 1      | 1     | 1     | 1 | E-2124014 | Safety lock for electric panel DB4-90 and steam panel DB60,90             |             |
| 1                       | 1      | 1     | 1     | 1 | E-2124016 | Safety lock for steam panel DB4-45  |             |
| 2                       | 2      | 2     | 2     | 2 | E-2124015 | Key for safety lock (per set = 2 pc.)                                     |             |
| 1                       | 1      | 1     | 1     | 1 | E-2120102 | Grip for electric panel DB4-90 / steam panel DB60,90, green, without lock |             |
| 1                       | 1      | 1     | 1     | 1 | E-2120101 | Grip for steam panel DB4-45, green, without lock                          |             |
| 1                       |        |       |       |   | B-3126010 | Complete set of cable entry fittings for connecting cable                 |             |
|                         |        | 1     | 1     |   | B-2125016 | Complete set of cable entry fittings for connecting cable                 |             |
|                         |        |       |       | 1 | B-2127014 | Complete set of cable entry fittings for connecting cable                 |             |
| 1                       |        |       |       |   | E-3120409 | Blind electric panel, LD-electronic                                       |             |
|                         |        | 1     | 1     |   | E-2120509 | Blind electric panel, LD-electronic                                       |             |
|                         |        |       |       | 1 | E-2121009 | Blind electric panel, LD-electronic                                       |             |
| 3                       | 3      | 3     | 3     | 3 | E-2120001 | Screw M4 for mounting grip E-2120102                                      |             |
| 5                       | 5      | 5     | 5     | 5 | E-2505123 | Plastic cap nut M3 for mounting electric and steam blind                  |             |
| 1                       | 1      | 1     |       | 2 | E-2120002 | Blind plug for hole in the steam part bottom                              |             |
| <b>Steam Generation</b> |        |       |       |   |           |   |             |
|                         |        |       |       |   | B-3226001 | Steam cylinder transp. compl. with electrodes, ready for installation     |             |
|                         |        |       |       |   | B-2206065 | Steam cylinder transp. compl. with electrodes, ready for installation     |             |
|                         |        |       | 1     |   | B-2206066 | Steam cylinder transp. compl. with electrodes, ready for installation     |             |
|                         |        |       |       | 1 | B-2207000 | Steam cylinder transp. compl. with electrodes, ready for installation     |             |
| 1                       | 1      |       |       |   | E-3226005 | Top part of steam cylinder DN 25/12, empty                                |             |
| 1                       |        | 1     |       |   | E-2206068 | Top part of steam cylinder DN 25/12, empty                                |             |
| 1                       |        |       | 1     |   | E-2206069 | Top part of steam cylinder DN 40/12, empty                                |             |
| 1                       |        |       |       | 1 | E-2207001 | Top part of steam cylinder 2xDN 40/12, empty                              |             |
| 2                       | 1      |       |       |   | B-3216007 | Lower part of steam cylinder, compl. with strainer                        |             |
| 2                       |        | 1     |       |   | B-2206046 | Lower part of steam cylinder, compl. with strainer                        |             |
| 2                       |        |       | 1     |   | B-2206071 | Lower part of steam cylinder, compl. with strainer                        |             |
| 2                       |        |       |       | 1 | B-2207002 | Lower part of steam cylinder, compl. with strainer                        |             |
|                         |        | 1     |       |   | B-3226003 | Top part of steam cylinder, compl. with electrodes                        |             |
|                         |        |       | 1     |   | B-2206086 | Top part of steam cylinder, compl. with electrodes                        |             |
|                         |        |       |       | 1 | B-2206087 | Top part of steam cylinder, compl. with electrodes                        |             |
|                         |        |       |       | 1 | B-2207003 | Top part of steam cylinder, compl. with electrodes                        |             |
| 9                       | 1      |       |       |   | B-3216008 | Set=3 electrodes, compl. w/ O-Ring /washer f. steam generator type DB4    |             |
| 9                       |        | 1     |       |   | B-2205008 | Set=3 electrodes, compl. w/ O-Ring /washer f. steam generator type DB2/3  |             |
| 10                      |        |       | 1     |   | B-2205009 | Set=6 electrodes, compl. w/ O-Ring /washer f. steam generator type DB2/6  |             |
| 10                      |        |       |       | 1 | B-2207005 | Set=6 electrodes, compl. w/ O-Ring /washer f. steam generator type DB10   |             |
| 20                      | 1      |       |       |   | B-3216020 | Sensor electrode compl. w/ O-Ring/washer, d=5mm,max. limitation           |             |
| 20                      |        | 1     | 1     | 1 | B-2206061 | Sensor electrode compl. w/ O-Ring/washer, d=5mm,max. limitation           |             |

\* Pos. - Nr. Diagram 5.1

| *                       | DB..LD  |           |           |    | Art. Nr.  | Description  |
|-------------------------|---------|-----------|-----------|----|-----------|--|
|                         | 4-<br>8 | 10-<br>17 | 23-<br>30 | 45 |           |  |
| <b>Steam Generation</b> |         |           |           |    |           |  |
| 16/26                   | 4       | 1         | 1         | 1  | E-3216016 | Large plain washer, d=5mm, for electr. DB4-8 and sensor electr. DB4-90     |
| 16                      |         | 3         | 6         |    | E-2204011 | Large plain washer, d=8mm, for electrodes                                  |
| 16                      |         |           |           | 6  | E-2207006 | Large plain washer, d=10mm, for electrodes                                 |
| 19/29                   | 4       | 1         | 1         | 1  | E-3216017 | Small plain washer, d=5mm, for electr. DB4-8 and sensor electr. DB4-90     |
| 19                      |         | 3         | 6         |    | E-2204012 | Small plain washer, d=8mm, for electrodes                                  |
| 19                      |         |           |           | 6  | E-2207007 | Small plain washer, d=10mm, for electrodes                                 |
| 15/25                   | 8       | 2         | 2         | 2  | E-2204017 | Serrated washer d=5mm, for electr DB4-8/sensor electr. DB4-90              |
| 15                      |         | 6         | 12        |    | E-2204016 | Serrated washer d=8mm, for steam generating electrodes                     |
| 15                      |         |           |           | 12 | E-2207008 | Serrated washer d=10mm, for steam generating electrodes                    |
| 14/24                   | 4       | 1         | 1         | 1  | E-2206058 | Counter nut M5 w/ contact pin for electr. DB4-8/sensor electr. DB4-90      |
| 14                      |         | 3         | 6         |    | E-2206057 | Counter nut w/ contact pin for electr., M8                                 |
| 14                      |         |           |           | 6  | E-2207009 | Counter nut w/ contact pin for electr., M10                                |
| 13                      | 3       |           |           |    | E-3216013 | Nut w/ contact pin for generating electrode, M5                            |
| 13                      |         | 3         | 6         |    | E-2204014 | Nut w/ contact pin for generating electrode, M8                            |
| 13                      |         |           |           | 6  | E-2207010 | Nut w/ contact pin for generating electrode, M10                           |
| 23                      | 1       | 1         | 1         | 1  | E-3216030 | Nut w/ contact pin for sensor electrode, M5                                |
| 17/27                   | 4       | 1         | 1         | 1  | E-3216018 | Large O-Ring, d=5mm, for electr. DB4-8 and sensor electr. DB4-90           |
| 17                      |         | 3         | 6         |    | E-2204020 | Large O-Ring, d=8mm, for electrodes  |
| 17                      |         |           |           | 6  | E-2207012 | Large O-Ring, d=10mm, for electrodes                                       |
| 18/28                   | 4       | 1         | 1         | 1  | E-3216019 | Small O-Ring, d=5mm, for electr. DB4-8 and sensor electr. DB4-90           |
| 18                      |         | 3         | 6         |    | E-2204026 | Small O-Ring, d=8mm, for electrodes  |
| 18                      |         |           |           | 6  | E-2207013 | Small O-Ring, d=10mm, for electrodes                                       |
| 4                       | 1       |           |           |    | E-3216010 | O-Ring for cylinder flange, transparent cylinder                           |
| 4                       |         | 1         |           |    | E-2206050 | O-Ring for cylinder flange, transparent cylinder                           |
| 4                       |         |           | 1         |    | E-2206051 | O-Ring for cylinder flange, transparent cylinder                           |
| 4                       |         |           |           | 1  | E-2207011 | O-Ring for cylinder flange, transparent cylinder                           |
| 6                       | 1       |           |           |    | E-3216011 | O-Ring seal for cylinder base  |
| 6                       |         | 1         | 1         | 1  | E-2204022 | O-Ring seal for cylinder base  |
|                         | 1       |           |           |    | B-3226050 | Complete set of O-Rings for transp. cylinder, flange, base, all electrodes |
|                         |         | 1         |           |    | B-2206053 | Complete set of O-Rings for transp. cylinder, flange, base, all electrodes |
|                         |         |           | 1         |    | B-2206054 | Complete set of O-Rings for transp. cylinder, flange, base, all electrodes |
|                         |         |           |           | 1  | B-2207014 | Complete set of O-Rings for transp. cylinder, flange, base, all electrodes |
| 21                      | 1       | 1         | 1         | 1  | E-3216025 | Plug-in contact with insulating hose for sensor electrode                  |
| 11                      | 3       |           |           |    | E-3216024 | Plug-in contact with insulating hose for steam generating electrodes       |
| 11                      |         | 3         | 6         |    | E-2206059 | Plug-in contact with insulating hose for steam generating electrodes       |
| 11                      |         |           |           | 6  | E-2207016 | Plug-in contact with insulating hose for steam generating electrodes       |
| 12/22                   | 4       | 1         | 1         | 1  | E-3216014 | Cap for plug-in contact of electrode DB4-8 and sensor electr. DB4-90       |
| 12                      |         | 3         | 6         |    | E-2204028 | Cap for plug-in contact of steam generating electrode.                     |
| 12                      |         |           |           | 6  | E-2207015 | Cap for plug-in contact of steam generating electrode.                     |
| 3                       | 12      | 18        | 24        | 24 | E-3216022 | Clamp for flange of transparent cylinder                                   |
| 5                       | 1       | 1         | 1         | 1  | E-2204023 | Drain filter   |
| 7                       | 1       |           |           |    | E-3216012 | Base for steam cylinder  |
| 7                       |         | 1         | 1         | 1  | E-2206052 | Base for steam cylinder, short type  |
| 8                       | 2       | 2         | 2         | 2  | E-2204032 | Plastic cap-nut M6 for mounting cylinder base                              |
| 61                      | 1       | 1         | 1         | 1  | E-2204035 | Condensate plug  |
| <b>Water Feed</b>       |         |           |           |    |           |  |
| 30/32                   | 2       | 2         | 2         | 2  | E-2304015 | Clamp for connecting hose solenoid valve - cylinder base, d= 12mm          |
| 31                      | 1       |           |           |    | B-3326002 | Connecting hose, solenoid valve - cylinder base, l=1000mm                  |

\*Pos. - Nr. Diagram 5.1

| *                               | DB.LD   |           |           |    | Art Nr.   | Description   |
|---------------------------------|---------|-----------|-----------|----|-----------|---|
|                                 | 4-<br>8 | 10-<br>17 | 23-<br>30 | 45 |           |   |
| <b>Water Feed</b>               |         |           |           |    |           |   |
| 31                              |         | 1         | 1         |    | B-2325013 | Connecting hose, solenoid valve - cylinder base, l=1445mm                               |
| 31                              |         |           |           | 1  | B-2327000 | Connecting hose, solenoid valve - cylinder base, l=1800mm                               |
| 33                              |         |           |           |    | B-3302411 | Solenoid valve, servo controlled, straight type, 0,2-10bar, 0,5l/min.                   |
| 33                              | 1       |           |           |    | B-2304017 | Solenoid valve, servo controlled, straight type, 0,2-10bar, 2,5l/min.                   |
| 33                              |         | 1         | 1         | 1  | B-2307001 | Solenoid valve, servo controlled, straight type, 0,2-10bar, 3,5l/min.                   |
| 34                              | 1       | 1         | 1         | 1  | E-2304029 | Fine filter in the inlet fitting of solenoid valve                                      |
| 35                              | 1       |           |           |    | E-3316100 | Flow rate controller 0.5l/min.  |
| 35                              | 1       |           |           |    | E-3320400 | Flow rate controller 2.5l/min.  |
| 35                              |         | 1         | 1         | 1  | E-2321100 | Flow rate controller 3.5l/min.  |
| 36                              | 1       | 1         | 1         | 1  | E-2304036 | Rubber seal solenoid valve - cabinet  |
| 37                              | 1       | 1         | 1         | 1  | E-2304031 | Servo controlled membrane for solenoid valve  |
| 38                              | 1       | 1         | 1         | 1  | B-2304038 | Valve piston with springs   |
| 39                              | 1       | 1         | 1         | 1  | B-2304039 | Piston coating, valve cover, coil-spring  |
| 40                              | 1       | 1         | 1         | 1  | E-2304034 | Solenoid valve coil with bayonet fitting, 230V/50-60Hz                                  |
| 41                              | 1       | 1         | 1         | 1  | B-2304024 | Threaded inlet fitting for solenoid valve, pipe d=10mm, complete with plastic union nut |
| 42                              | 1       | 1         | 1         | 1  | B-2304030 | Plastic union nut with seal for inlet fitting solenoid valve                            |
| <b>Water Drain</b>              |         |           |           |    |           |   |
| 44                              | 1       |           |           |    | E-3616006 | Clamp for drain hose, from cylinder base to drain pump                                  |
| 44/46/53                        | 2       | 3         | 3         | 3  | E-2404004 | Clamp f. drain hose, from cyl. base to drain pump DB10-90/pump DB4-90                   |
| 45                              | 1       |           |           |    | E-3416002 | Drain hose from base to drain pump  |
| 45                              |         | 1         | 1         |    | E-2404002 | Drain hose from base to drain pump  |
| 45                              |         |           |           | 1  | E-2407001 | Drain hose from base to drain pump  |
| 47                              | 1       | 1         | 1         | 1  | B-2404005 | Drain pump without mounting set   |
| 48                              | 1       | 1         | 1         | 1  | E-2404008 | Cover for drain pump  |
| 49                              | 1       | 1         | 1         | 1  | E-2404009 | Impeller for drain pump   |
| 50                              | 1       | 1         | 1         | 1  | E-2404006 | O-Ring seal for drain pump  |
| 51                              | 1       | 1         | 1         | 1  | E-2404007 | Shaft seal for drain pump   |
| 52                              | 1       | 1         | 1         | 1  | B-2424014 | Mounting set for drain pump   |
| 54                              | 1       | 1         | 1         | 1  | E-3416003 | Fastening clamp for drain hose  |
| 54                              | 1       | 1         | 1         | 1  | E-3416005 | Fastening clamp for drain hose, for split models  |
| 55                              | 1       |           |           |    | E-3426009 | Pump drain hose DN15, L=900mm   |
| 55                              |         | 1         | 1         |    | E-2424003 | Pump drain hose DN15, L=1445mm  |
| 55                              |         |           |           | 1  | E-2427000 | Pump drain hose DN15, L=1670mm  |
| 62                              | 1       | 1         | 1         | 1  | E-2420426 | Gasket for tundish  |
| 63                              | 1       | 1         | 1         | 1  | B-2420421 | Tundish for drain water, incl. seal   |
| 64                              | 2       | 2         | 2         | 2  | E-2420427 | Nut for mounting tundish  |
| 65                              | 1       | 1         | 1         | 1  | E-2404004 | Clamp for tundish hose  |
| 66                              | 1       | 1         | 1         | 1  | E-2420425 | Drain hose for tundish, DN1 inch, per m   |
| <b>Electronic<br/>Universal</b> |         |           |           |    |           |   |
|                                 | 1       | 1         | 1         | 1  | B-2502400 | Control switch, single pole, incl. protecting cap                                       |
|                                 | 1       | 1         |           |    | E-2501006 | Main contactor 20A, 230V  |
|                                 |         |           | 1         |    | E-2505007 | Main contactor 40A, 230V  |
|                                 |         |           |           | 1  | E-0505009 | Main contactor 63A, 230V  |
|                                 | 2       | 2         | 2         | 2  | E-2525151 | Transformer 230V/9V, 15VA   |
|                                 | 2       | 2         | 2         | 2  | E-2504039 | Control fuse 5A, 5x20 mm  |
|                                 | 1       |           |           |    | B-3520001 | Connecting cable terminal block - main contactor, set=3pc                               |

\* Pos. - Nr. Diagram 5.1

| *  | DB..LD  |           |           |    | Art. Nr.  | Description   |
|----|---------|-----------|-----------|----|-----------|---|
|    | 4-<br>8 | 10-<br>17 | 23-<br>30 | 45 |           |   |
|    |         | 1         |           |    | B-2524044 | Connecting cable terminal block - main contactor, set=3pc                 |
|    |         |           | 1         |    | B-2524045 | Connecting cable terminal block - main contactor, set=3pc                 |
|    |         |           |           | 1  | B-2527011 | Connecting cable terminal block - main contactor, set=3pc                 |
| 11 | 1       |           |           |    | B-3526013 | Connecting cables for electrodes with plug-in contact, set=3pc            |
| 11 |         | 1         |           |    | B-2524035 | Connecting cables for electrodes with plug-in contact, set=3pc            |
| 11 |         |           | 1         |    | B-2524036 | Connecting cables for electrodes with plug-in contact, cylinder1, set=6pc |
| 11 |         |           |           |    | B-2524037 | Connecting cables for electrodes with plug-in contact, cylinder2, set=6pc |
| 11 |         |           | 1         |    | B-2527009 | Connecting cables for electrodes with plug-in contact, cylinder1, set=6pc |
| 11 |         |           |           |    | B-2527010 | Connecting cables for electrodes with plug-in contact, cylinder2, set=6pc |
|    | 1       |           |           |    | B-2525201 | Main wire loom DB..LD   |
|    |         | 1         | 1         |    | B-2525202 | Main wire loom DB..LD   |
|    |         |           |           | 1  | B-2525203 | Main wire loom DB..LD   |
|    | 1       | 1         | 1         | 1  | E-2525121 | Cover for electronic pcb  |
|    | 1       | 1         | 1         | 1  | B-2525122 | Mounting set for cover  |
|    |         |           |           |    |           | <b>L-Electronic</b>   |
|    | 1       | 1         | 1         | 1  |           | L electronic pcb compl. with module holder                                |
|    | 1       | 1         | 1         | 1  | E-3516010 | Operation control lamp, "green", 230V                                     |
|    | 1       | 1         | 1         | 1  | E-3516011 | LED "red" for cylinder max. level   |
|    | 1       |           |           |    | B-3522481 | Terminal block complete for LD-electronic                                 |
|    |         | 1         |           |    | B-2524084 | Terminal block complete for LD-electronic                                 |
|    |         |           | 1         |    | B-2524085 | Terminal block complete for LD-electronic                                 |
|    |         |           |           | 1  | B-2524086 | Terminal block complete for LD-electronic                                 |
|    | 1       |           |           |    | B-3524001 | Wire loom signal lamp control   |
|    |         | 1         | 1         |    | B-2524002 | Wire loom signal lamp control   |
|    |         |           |           | 1  | B-2524003 | Wire loom signal lamp control   |
|    | 1       | 1         | 1         | 1  | E-3524070 | Signal output pcb for collective fault                                    |
|    |         |           |           |    |           | <b>Steam bath - electronic</b>  |
|    | 1       | 1         | 1         | 1  |           | Steam bath control IIIa   |
|    | 1       | 1         | 1         | 1  | E-0605221 | Temperature sensor for steam bath control lg:3m                           |
|    | 1       | 1         | 1         | 1  | E-2505207 | Holder for temperature sensor, incl. set screw and fittings               |
|    | 3       | 3         | 3         | 3  | E-2505206 | Replacement safety elements for light, fan, essence feeder 1.6A, 5x20mm   |
|    | 2       | 2         | 2         | 2  | E-2525151 | Transformer 230/9V for steam bath control                                 |
|    | 1       | 1         | 1         | 1  | E-2504154 | Transformer 230V/24V/130VA  |
|    | 1       | 1         | 1         | 1  | E-0605223 | Remote temperature display  |
|    | 1       | 1         | 1         | 1  | E-3504051 | Terminal row with safety element  |
|    | 1       | 1         | 1         | 1  | E-2505216 | Set screw M4x12, DIN 551, V2A, for mounting temperature sensor            |
|    | 2       | 2         | 2         | 2  | E-2505217 | Metal screw 3,9x19, DIN 7981, V2A, for mounting temp. sensor holder       |
|    |         |           |           |    |           | <b>Essence injector</b>   |
|    | 1       | 1         | 1         | 1  | B-2605000 | Essence injector, complete  |
|    | 1       | 1         | 1         | 1  | B-2304014 | Solenoid valve outlet for essence injector, 24V/50-60Hz                   |
|    | 1       | 1         | 1         | 1  | B-2304030 | Captive coupling ring for solenoid valve with seal                        |
|    | 1       | 1         | 1         | 1  | E-8301010 | Holder for solenoid valve   |
|    | 1       | 1         | 1         | 1  | E-2605001 | Essence receptable for sauna control                                      |
|    | 1       | 1         | 1         | 1  | E-2605002 | Wall console for essence injector   |
|    | 1       | 1         | 1         | 1  | E-2204009 | Connecting piece 1/4"   |
|    | 1       | 1         | 1         | 1  | E-2204043 | Nut 1/4" for connecting piece E-2204009                                   |
|    | 1       | 1         | 1         | 1  | E-2204044 | Seal 1/4" for connecting piece E-2204009                                  |
|    | 2       | 2         | 2         | 2  | E-2304015 | Hose clamp ø10-16mm   |
|    |         |           |           |    | E-8501035 | Woven hose 13x3.5mm, lg.:600mm  |

\* Pos. - Nr. Diagram 5.1

| *  | DB..LD  |           |           |    | Art. Nr.  | Description   |
|----|---------|-----------|-----------|----|-----------|---|
|    | 4-<br>8 | 10-<br>17 | 23-<br>30 | 45 |           |   |
|    |         |           |           |    |           | <b>Accessories</b>  |
| 57 |         |           |           |    | E-2604012 | Steam hose DN 25, per m                                     |
| 57 |         |           |           |    | E-2604013 | Steam hose DN 40, per m                                     |
| 59 |         |           |           |    | E-2604014 | Condensate hose DN 12, per m                                |
| 58 |         |           |           |    | E-2404004 | Steam hose clamp DN 25                                      |
| 58 |         |           |           |    | E-2604016 | Steam hose clamp DN 40                                      |
|    |         |           |           |    | E-2304015 | Condensate hose clamp                                       |
|    |         |           |           |    | E-2604019 | Steam manifold T-Stück DN 25                                |
|    |         |           |           |    | E-2604020 | Steam manifold T-Stück DN 40                                |
|    |         |           |           |    | E-2604021 | Condensate manifold T-Stück DN 12                           |
|    | 1       |           |           |    | B-3626010 | Fittings (threaded inlet fitting MV, cable fittings)        |
|    |         | 1         |           |    | B-2624022 | Fittings (threaded inlet fitting MV, cable fittings)        |
|    |         |           | 1         |    | B-2624023 | Fittings (threaded inlet fitting MV, cable fittings)        |
|    |         |           |           | 1  | B-2604026 | Steam solenoid valve 0-0,4 bar, compl. for steam hose DN 25 |
|    |         |           |           |    | B-2604040 | Steam solenoid valve 0-0.4 bar, compl. for steam hose DN 40 |
|    |         |           |           |    | E-2604029 | Hose spout DN 25  |
|    |         |           |           |    | E-2604030 | 90 degree elbow, DN25, for extremely small radius           |
|    |         |           |           |    | E-2604034 | 90 degree elbow, DN40, for extremely small radius           |
|    |         |           |           |    | E-2604031 | Reducing piece DN 40/DN 25                                  |

\* Pos. - Nr. Diagram 5.1