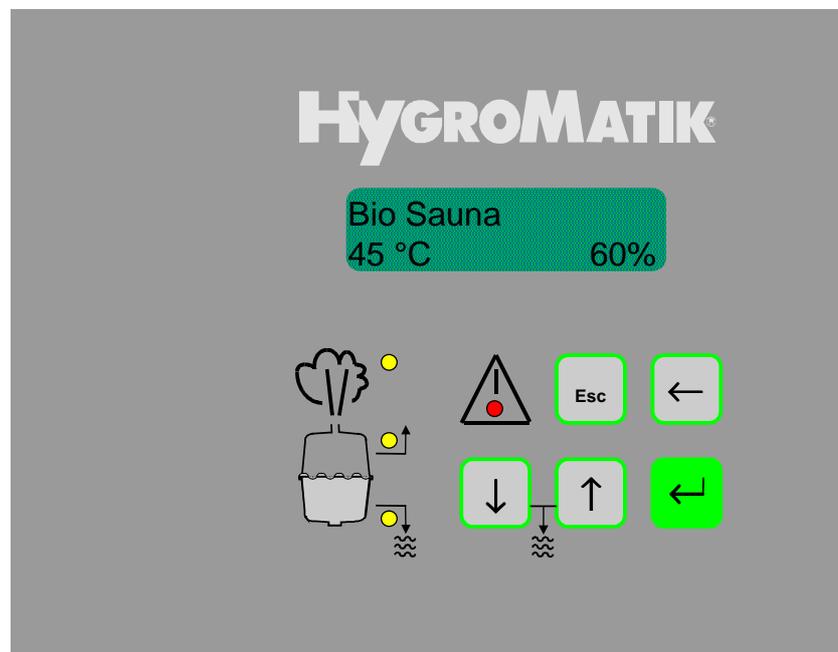


# DS-Electronic

for Electrode Steam Generator

Operation Instructions



# Service Life and Commissioning

All electrode boiler type humidifiers rely upon the fact that water contains minerals and is therefore conductive.

- Normal tap water is ideal, but just what is normal tap water?

People in all areas believe their tap water to be "normal".

The table in section 1.1 headed "Operating Instructions" shows our interpretation of normal to be between 200 and 500  $\mu\text{S}/\text{cm}$  (Micro Siemens per Centimeter) at 15 °C.

Some areas, however, have levels well outside our conception of normal and if the internal electronics of any electrode humidifier are not set correctly, then poor overall performance can result, e.g. fast electrode wear or reduced steam output.

In the HYGROMATIK electrode humidifier the preset blow-down parameters can easily be adjusted to the precise requirements of a particular area by a small change within the programme.

In addition, a plastic star can be inserted between the electrodes to reduce electrode wear. A Super Flush can also be installed in order to extend maintenance periods.

For this reason we recommend that any fitted unit be inspected and monitored early on in its installed life to ensure that the unit is set up correctly and the most efficient operation is obtained.

Your HYGROMATIK dealer will be pleased to do all the necessary commissioning work on request. Contact the service department. They can arrange for a site visit to test the water conductivity, advise on the particular settings required and set the unit to operate at the optimum level for the system installed.

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Information in this manual is subject to change or alteration without prior notice.



**Attention!** All work must be carried out by qualified personnel. All electrical installation and work on electrical components of this unit must be executed by a qualified electrician. Switch power off beforehand!

## DS-Electronic for Electrode Steam Generator

### Operation Instructions

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## 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 of operating your HYGROMATIK steam humidifier efficiently please read these Operation Instructions.**

Use the steam humidifier only in proper and safe conditions, paying attention to all notes in these instructions.

**If you have any questions...please contact us:**

Main office, Henstedt-Ulzburg:

Tel.: +49-(0)4193 / 895-0

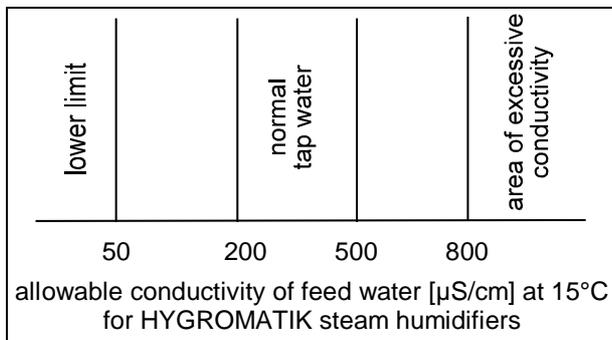
Tel.: +49-(0)4193 / 895-293 (Technical Hotline)

Fax: +49-(0)4193 / 895-33

### 1.1 Operating Instructions

The HYGROMATIK steam humidifier produces steam using normal tap water.

Be sure to use feed water with conductivity between 50 and 800  $\mu\text{S}/\text{cm}$ .



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

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

Only qualified and authorised personnel may operate the unit. Persons transporting or working on the unit, must have read and understood the corresponding parts of the Operation and Maintenance Instruction and especially the chapter „Safety Notes“. Additionally, operating personnel must be informed of any possible dangers. You should place a copy of the Operation and Maintenance Instruction at the unit's operational location (or near the unit).

### 1.2 Typographic Distinctions

- Enumeration with preceding heading: General enumeration.
- » Enumeration with preceding double chevron: Work or maintenance steps that must be followed sequentially.
- Sequential step to be checked.

### 1.3 Safety Notes

These safety notes are required by law. They are for your protection and to 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 Instructions.

## 2. Preamble

Highly developed microprocessors control the electrode steam generators. Intelligent and self-adjusting the unit chooses the most economic mode of operation for the available water quality.

Optimised start procedures provide rapid steam production and a quick reaction to control requirements. The electronics automatically monitor the cylinder water conductivity, the complete blow-down process and the water inlet solenoid function.

The microprocessor control DS provides a backlit LC display and a large number of extra features.

The DS-electronic offers e.g.:

- Three Operation modes: Steam Bath, Soft (Bio) Sauna, and classic Sauna
- Controls temperature and humidity according to the operation mode
- Integrated serial interface RS232 or RS485 optional
- 4 LED's for monitoring the operation
- up to 4 outputs for controlling ventilation, essence injection, heating and light
- Fuzzy logic
- Stand-by blow-down function to prevent standing cylinder water. After a period without steam production the cylinder is drained completely. Can be programmed individually.

Performance and settings of the DS-electronic are described in this manual in detail.

## 2.1 Function

### **Steam Bath:**

The HYGROMATIK-steam generator produces the steam for the steam bath. The in a cabin measured temperature is exploited to control the steam production. At the standard setting the cabin temperature will reach 45°C at 100 % relative humidity. A fan will transport partly of the warm air to ensure a continuous demand of steam and improve a constant temperature control.. An essence injector will inject an essence in the steam hose at intervals for a pleasant cabin odour.

### **Soft (Bio) Sauna:**

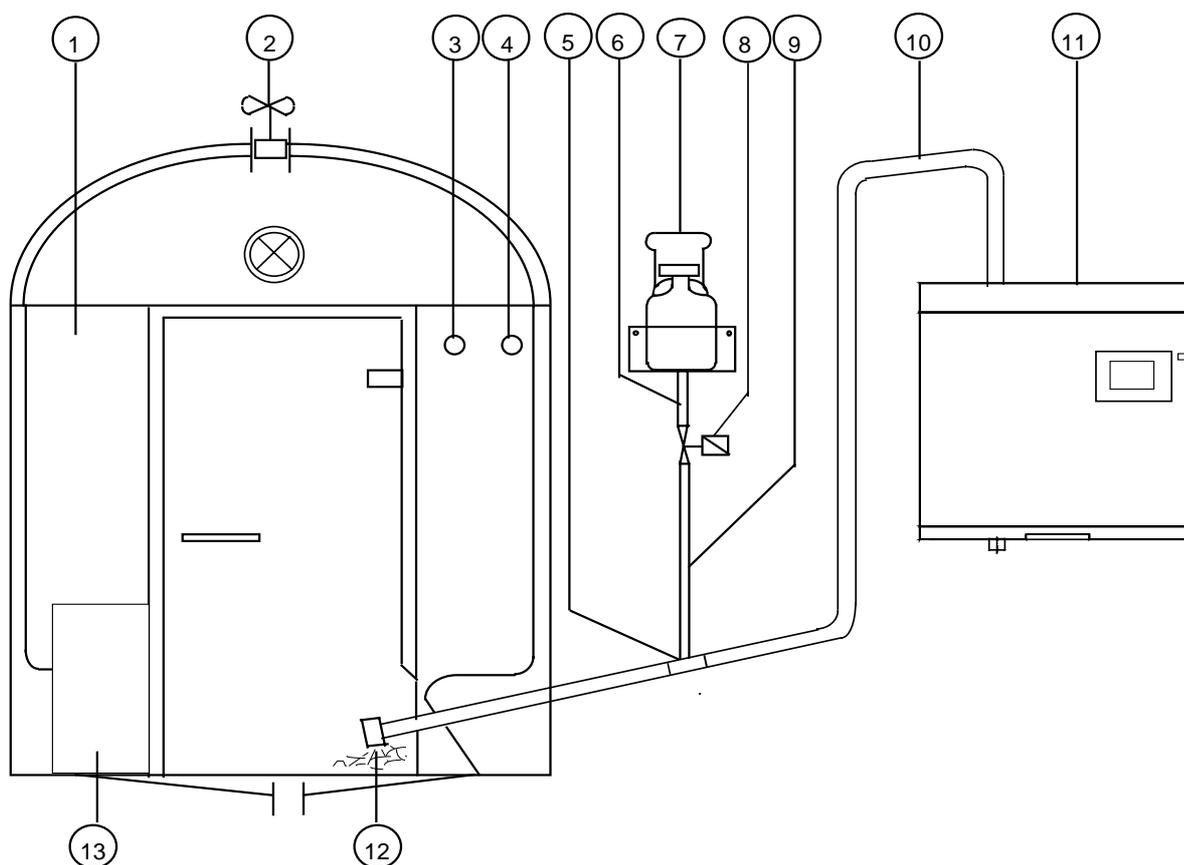
The HYGROMATIK control DS controls humidity and temperature of the cabin air. The initial setting of the set points are 60 % relative humidity and 50°C.. The steam production of the HYGROMATIK steam generator is depending of the actual cabin humidity. The DS control switches a contact for an external heater according to the actual cabin temperature. An essence injector will inject essence in the steam hose at intervals.

### **Classic Sauna:**

In this operation mode the actual cabin temperature is controlled. The DS control switches a contact for an external sauna heater. In this mode the cabin humidity is low and the temperature high, e. g. 95°C.

Position	Part	Steam Bath	Soft (Bio) Sauna	Classic Sauna
1	Cabin			
2	Fan	x		
3	Temperature sensor	x	x	x
4	Humidity sensor		x	
5	Essence supply (T-piece)	X	x	
6	Connection essence receptacle to essence solenoid valve	X	x	
7	Essence receptacle	X	x	
8	Essence solenoid valve	X	x	
9	Connection essence solenoid valve to essence injection	X	x	
10	Steam hose	X	x	
11	Steam generator	X	x	x
12	Steam manifold	X	x	
13	Heater (sauna)		x	x

x possible in the operation mode.



## 2.2 Installation of Sensors

Depending of the operating mode you have to install a temperature and/or humidity sensor in the cabin. The sensors provides the signals for the temperature and/or humidity control of the DS control.

Please be aware:

- Do not install the sensor near the steam distribution.
- Install sensors on the wall and not under the wall or behind it

The place over the door is in general a suitable place for the sensors:

- it will give a good measuring point
- the sensor is well protected.



**Attention:** It is not allowed to manipulate the sensor and hence the steam production.



**Note:** For electrical connection please refer chapter 3.4 and 12.

## 2.3 Installation Essence Injector (Option)



**Note:** The DS electronic controls the essence injection at the operating modes **Steam Bath** and **Bio Sauna**.

The 24 Vac HYGROMATIK essence injector can supply the essence to the cabin in case an optional 24V transformer is build in the steam generator. Main components are essence receptacle (7) and solenoid valve (8). The interval and injection time are adjustable at the DS control. The essence injection will only occur while steam is produced. The steam flows without pressure through the valve and hose to the steam hose. For this purpose you can order a T-piece at HYGROMATIK.

Please be aware:

- Essence supply (5) installation close to the cabin (1).
- The installation must ensure that no essence can be flow to the HYGROMATIK steam generator(11).
- The hose (9) between valve (5) and essence supply (5) must be straight down with a minimum length of 1.5 m.
- The hose (6) from essence receptacle to valve must installed straight down.

### Installation:

- » Install the essence receptacle (7) at a suitable place.
- » Connect (6) essence injector valve with the essence receptacle.
- » Connect (8) essence injector valve with essence supply (T-piece).



**Note:** For electrical connection please refer chapter 3.5 and 12.

## 2.4 Fan Installation (Option)



**Note:** The fan is only controlled at the mode **D0 = Steam Bath** from the DS control.

It is supposed to install a fan (2) for exhausted air in case an optional 24V transformer is build in the steam generator. The fan will extract warm air out of the cabin. This will give a constant demand of steam and ensure a stable temperature control.

The fan should be installed:

- above the cabin and
- in opposite of a fresh air inlet.

## 2.5 Cabin Light Installation (Option)

You can supply the cabin light from the steam generator. For this purpose two terminals for a supply of 24Vac are added in case an optional 24V transformer is build in the steam generator. The light switches are installed outside of the steam generator, e. g. near the cabin door-



**Note:** For electrical connection please refer chapter 3.6 and 12.

## 3. Control

The HYGROMATIK control of type DS you can set to three different modes:

<b>Control mode DS (Parameter D0)</b>
Steam Bath
Bio Sauna
Sauna

The setting of the parameter "Sauna Mode" (D0) you change according to chapter 7.1 "Main Menu" and 7.2 "Setting of Sauna Mode".

### Steam Bath:

In this mode the cabin temperature will be controlled unit. The DS electronic controls the steam production to keep the temperature stable:

<b>Temperatur control (Parameter U6)</b>
1step (on/off)
internal PI control (proportional)



**Note:** To adjust the parameter U6 please refer chapter 8 „Parameter Setting using Code“

### Bio Sauna:

Here an additional installed active humidity sensor is monitored from the DS electronic. The humidity is the control value for the steam production. The DS Electronic controls the humidity with:

<b>Humidity control (Parameter U6) (immutable)</b>
internal PI control (proportional)

In addition the DS electronic monitors the temperature and operates a relay output for an external oven to meet the temperature set point.

<b>Temperature control (immutable)</b>
1step (on/off)

### Sauna:

In this mode the DS electronic monitors only the temperature and operates a relay output for an external oven to meet the temperature set point.

<b>Temperature control (immutable)</b>
1step (on/off)

## 3.1 Output Limitation

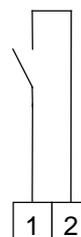
At the parameter "output limitation" (P1) the maximum steam production can be limited between 25 % and 100% of the nominal output (please refer chapter 7.7 "Additional Parameter". The actual cabin temperature or humidity will give the demand for the actual steam production. A steam output limitation is sometimes of use for a more stable control performance.

## 3.2 Remote Switch

For remote control you can switch the steam generator on/off at the terminals 1 and 2. Is this interlock not connected, the steam generator and the relay output of an external oven are stand-by.



**Attention:** Terminals 1 and 2 require potential free contacts. No power is to be supplied to 1 and 2.



Terminal block

## 3.3 Connection Temperature Sensor

Connect the cable of the sensor at terminals 6 and 7 of the HYGROMATIK steam generator.

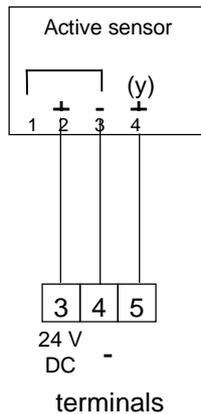
The table below is of use to check the sensor and the signal input. For calibration on side you need a measuring device for temperature.

Table Temperature-Resistance			
Temp. [°C]	Resistance [kΩ]	Temp. [°C]	Resistance [kΩ]
10	30,4	60	3,6
20	18,8	70	2,5
30	12,0	80	1,8
40	7,8	90	1,3
50	5,2	100	1,0

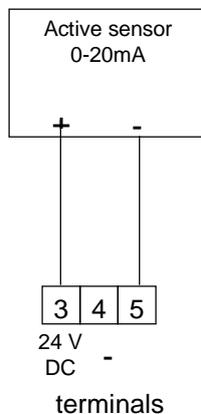
## 3.4 Connection Humidity Sensor (Option)

 **Note:** The humidity sensor is only in charge in mode **Bio Sauna**

A from HYGROMATIK ordered humidity sensor will give a 0-10V dc output signal. The sensor you have to connect as shown below:



An active sensor with 0-20 mA output signal and two wire connection, you connect as seen below to the HYGROMATIK steam generator:



The initial setting at HYGROMATIK for the sensor output signal is 0-10 Vdc. For different sensor signal output you can adjust the unit and change the parameter (E3):

Signal of active humidity sensor (E3)
0(2) - 5 V DC
0(2) - 10 V DC
0(4) - 20 V DC
0(2) - 12 mA DC
0(4) - 20 mA DC
0-140 Ohm
0 - 20 V DC (phase angle, Staefa)

## 3.5 Connection of a Fan (Option)

The fan you will connect to terminals 12 and 13 of the HYGROMATIK steam generator. A fuse of 1,6 A will protect the fan output. The maximum fan power may not more as 40 W.

## 3.6 Connection Essence Injection (Option)

 **Note:** The DS electronic controls the essence injection at the sauna modes **Steam Bath** and **Bio Sauna**.

The solenoid valve with 24 Vac coil will be connected to the terminals 10 and 11 of the HYGROMATIK steam generator.

## 3.7 Connection external Oven (Option)

 **Note:** The DS electronic controls an external oven at the sauna modes **Bio Sauna** and **Sauna**.

The maximum contact load 230V/5A.

The interlock of an external oven you will connect to the terminals 8 and 9 of the HYGROMATIK steam generator.

## 3.8 Connection Cabin Light (Option)

A cable for light can be connected to the terminals 14 and 15 of the HYGROMATIK steam generator. The output is equipped with a fuse of 1,6 A which gives a maximum load of 40 W.

A on/off switch will be installed, e. g. at the cabin door.

## 4. Commissioning



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

### Switch Off Steam Humidifier:



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

» Switch off the control switch located on unit cover.

» Close the fresh water tap.

### Switch steam humidifier on:

» Open fresh water tap.

» Switch on control switch located on unit cover.

The following functions are shown:

- Display shows :

Hygromatik®  
EMP Vers x.y

- Unit self tests

Self Test  
LED's On

- The LED's located in the cowling must light up.
- The pump will run for a couple of seconds (to check pump function and partial water exchange when re-activating system).

Self Test  
Part. Blow-down

- Depending on the actual sauna mode, the mode and the present temperature/humidity will be displayed e.g.,

Steam Bath  
45°C

- Inlet solenoid valve opens and introduces water into the cylinder.
- As soon as the electrodes are immersed the current rises from 0 A to nominal current. Nominal current is indicated on the unit name plate. Note also the steam output limitation value (see also chapter 8.2). Factory adjustment of the output limitation is 100%.

- When nominal current is reached, cylinder filling is stopped.
- Water electrical conductivity will increase with increasing temperature and with constant water levels the current will rise. This may lead to a partial blow-down due to over-current. If water conductivity is normal, then steam production will commence in a few minutes. The display shows, for instance:

### Further tests:

- All electrical functions must be in order

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

- » Keep the unit under observation for about 15-30 minutes. If any leaks become apparent switch unit off.



**Attention:** Follow all safety instructions regarding work on current carrying components.

- » Repair leaks.



**Attention:** The cover is securely electrically earthed only when the lock is in a locked position.

## 5. Operation



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

Put the unit into operation as follows:

- » Turn on water supply.
- » Switch on the control switch on unit cowling.

Now the unit proceeds as mentioned in chapter 4 "Commissioning".

## 6. DS Electronic

DS display and operating panel for local communication with the steam generator

### 6.1 DS Display and operating Panel



DS display and operating panel

The LC display is a two line alphanumeric backlit type.

The top line displays the operational mode of the steam generator **Steam Bath, Bio Sauna or Sauna**. The bottom line monitors the **actual temperature** and/or the **actual humidity** of the cabin.

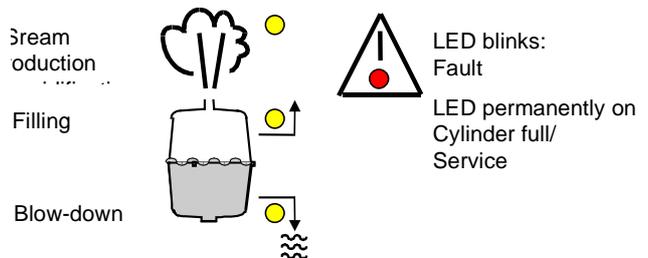
The operation modes **Steam Production / Humidification, Filling** and **Blow-down** are also indicated by LED's.

In case a fan, essence injection or relay output for an external oven is switched, it is monitored on the display:

	Display statement
Fan on	top line shows <b>V</b>
Relay for ext. oven on	top line shows <b>H</b>
Essence injection on	bottom line flashes <b>essence on</b>

A red LED blinks in the case of a humidifier malfunction. The humidifier is switched off and a fault message is shown in the display.

If the red LED lights permanently it means that the service interval is overdue or the cylinder is filled with water up to the sensor electrode „Cylinder full“. In this case the humidifier is still in service and the display shows the momentary operational mode.



Other information and functions can be called up by the panel keys.

The operator panel keys can be used for menu functions and parameter alterations as follows:

Key Functions	
	Back to previous menu level
	Cursor left
	Value decrease Page down within menu or parameter level.
	Value increase Page up within menu or parameter level.
	Store or confirm a value or figure Further to next sub menu level

## 6.2 Fault Messages



**Note:** Refer also to the "Faults" at chapter 13.

The blow-down pump, inlet solenoid valve, main contactor, humidity and temperature sensor are under constant electronic supervision. In a case of a fault the humidifier switches off.

The unit also switches off in case that it senses a period of one hour's operation in the „Cylinder full“ condition. The display shows the message **Service**. In most cases this indicates the necessity for a cylinder service (refer to the corresponding Technical Documentation).

When a fault message is shown, the red LED flashes on the operator panel. The following messages can be displayed:

Fehlermeldungen
Blow-down Fault
Fault Filling
Fault Contactor
Fault Humidity Sensor (Fault RH Sensor)
Fault Temp. Sensor (Flt. Temp. Sensor)
Service

### Blow-down Fault

The EMP-electronic periodically activates the pump to maintain a constant water conductivity in the cylinder.

If during a blow-down process no or too little water is drained, the electronic reports a **Blow-down Fault**.

### Fault Filling

The EMP-electronic activates the solenoid valve for 30 minutes. If during this time the water level in the cylinder does not correspond to the programmed current, the electronic displays a **Fault Filling** message.

### Fault Contactor

The main contactor is switched on when the controller calls for humidity and the safety interlock is closed.

The main contactor is switched off when the safety interlock opens or there is no demand.

If the electronic measures a current for at least 15 seconds, although the main contactor should be switched off, the electronic reports a **Fault Contactor**.

The cylinder-full message can only occur, if the main contactor is switched on, i.e. the controller calls for humidity and the safety interlock is closed. If the electronic ascertains a cylinder-full operating mode for at least 15 seconds, although the safety interlock is open or there is no demand, the electronic reports a **Fault Contactor**.

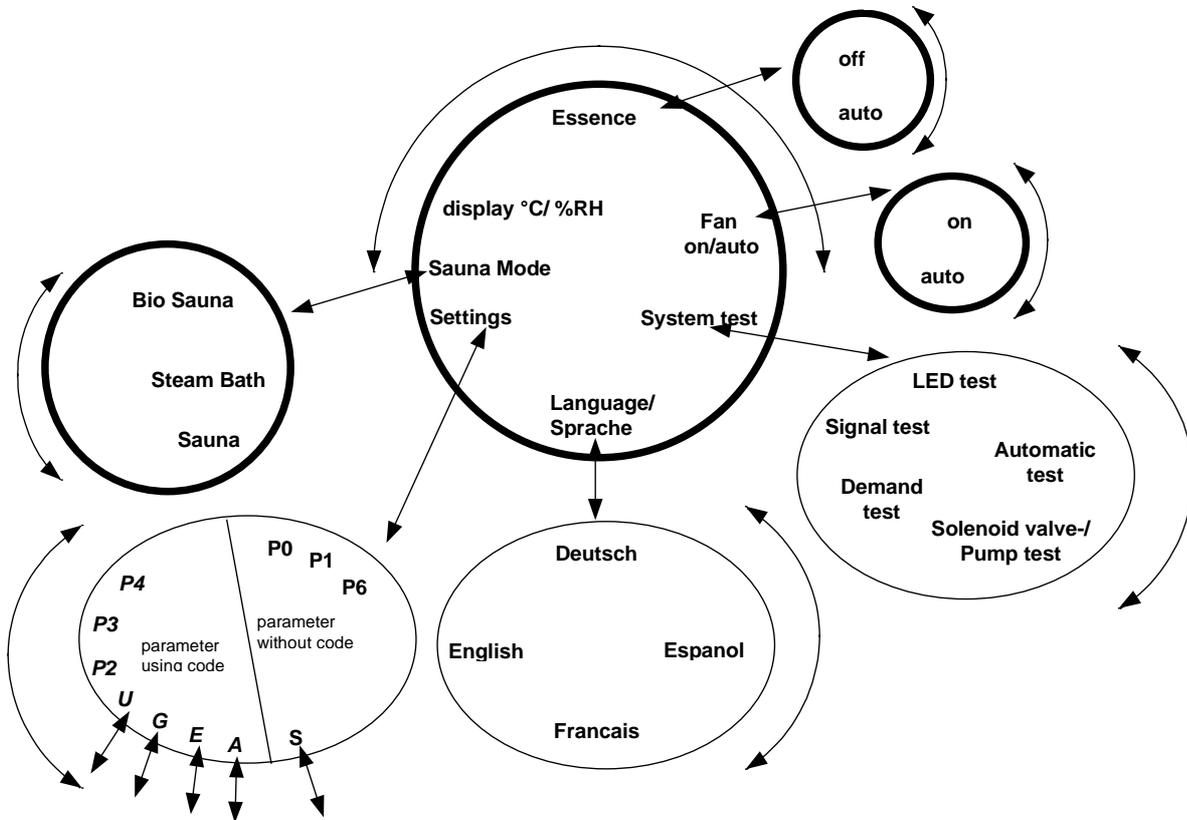
### Fault Humidity Sensor

If the signal of the humidity sensor equals 0% RH (cable break) for one hour, the electronic reports **Fault RH Sensor**.

### Fault Temperature Sensor

If the measured temperature will be 5 minutes out of the limits of 0° bis 130°C (50,4 to 0,42 kOhm), the display states **Flt. Temp. Sensor**. Please refer table at chapter 3.4 "Connection Temp. Sensor".

## 6.3 Menu DS-Control



## 7. Settings

### 7.1 Main Menu

With or you will change the display.

Settings/Parameter	
D0	Sauna Operation Mode: – Steam Bath with temperature monitoring – Bio (Soft) Sauna with monitoring temperature & humidity – Classic Sauna with temperature monitoring
D1*	Fan – Automatic (temperature controlled) – On (permanently)
D2**	Essence injector – Automatic (time controlled) – Off

\* only visible at setting D0 = Steam Bath

\*\* visible at settings D0 = Steam Bath & Bio Sauna



**Note:** If „Direct Setting“ (D3) is set to "no", the parameter D0 to D2 can not adjusted at the main menu. In this case the display monitors only temperature and/or humidity. For more information please refer to chapter 8 "Parameter Settings using Code".



**Note:** In case you will not give access of D0 to D3 to persons without permission, the setting "D3=no" makes sense.



**Note:** The parameter "Sauna Mode" (D0), "Fan" (D1), "Essence" (D2) and set point of temperature and humidity can be also programmed according chapter 8 "Parameter Settings using code".

In addition to the D parameter you will see **System-test**, **Sprache / Language** and **Settings** at the display in the Main Menu.

## 7.2 Setting of Sauna Mode

The DS electronic is suitable for Steam Bath, Bio (soft) Sauna and classic Sauna application. The sauna mode can be easily altered:

**Example:** Change of sauna mode **Sauna** to mode **Bio Sauna**:

 Switch on the steam generator. Select **Sauna Mode** with ↑ or ↓. The display shows:

Sauna Mode  
D0 = Sauna

Press the return key. A cursor appears under character **s** of sauna.

Sauna Mode  
D0 = Sauna

 Press once ↑. You will see:

Sauna Mode  
D0 = Stream Bath

 Press again ↑. Now the display shows:

Sauna Mode  
D0 = Bio Sauna

 Press return key to confirm the setting. The cursor disappears.

Saunabetriebsart  
D0 = Bio Sauna

With this steps the mode **Bio Sauna** is adjusted.

## 7.3 Fan (D1)



**Note:** The fan operates only at sauna mode **Steam Bath**.



**Note:** To adjust the function of the fan, the parameter "direct access " (D3) must set to "yes". Please refer to chapter 8 "Parameter Setting using Code".

### Automatic

Here the operation of the fan will be temperature controlled. The DS electronic switches the fan on if the temperature meets the set point. In case the temperature is below the set point minus a hysteresis the DS electronic switches the fan off.

Please refer parameter "set point temperature" (G3) und "Hysteresis fan" (G2). While the fan is switched on, on top line of the display appears the character **V**.



**Note:** Please see diagram at chapter 9. "Steam Bath".

### On (permanent operation)

The fan operates continuously independent of the temperature. With this setting the fan is switched on when the control switch on the steam generator is switched on.

## 7.4 Essence Injection (D2)



**Note:** The DS electronic controls the essence injection at the sauna modes **Steam Bath** and **Bio Sauna**.



**Note:** To adjust the function of the essence injection, the parameter "direct access " (D3) must set to "yes". Please refer to chapter 8 "Parameter Setting using Code".

### Automatic

With this setting the essence injection will switched on and off according to the programmed injection on time (G4) and pause (G5). The initial factory setting is 2 seconds on time and 5 minutes pause. During the injection on time the bottom line of the display flashes „Essence On“.



**Note:** For parameter setting of G4 and G5 refer chapter 8 „Parameter Setting using Code“

### Off

If parameter "Essence" (D2) is programmed to „Off“, no essence will added to the produced steam.

## 7.5 Change Set Points



**Note:** To adjust the set points of temperature and / or humidity, the parameter "Direct Setting" (D3) must set to "yes". Please refer to chapter 8 "Parameter Setting using Code".



**Note:** In the main menu the smallest change to adjust the temperature set point is 0.5 K and for humidity it is 1 % RH.

### 7.5.1 Setting Set Point Steam Bath

**Example:** The temperature set point should be reduced from 45 °C to 42 °C.

Switch on the steam generator. The display monitors the sauna mode and the actual cabin temperature.

Steam Bath  
42.5 °C

Press the return key once. The bottom line displays now the set point G2.

Steam Bath T Set.  
G2 = 45.0 °C

Press several times ↓ until the required set point appears:

Steam Bath T Set.  
G2 = 42.0 °C

Press the return key to accept the setting.

The new set point is accepted. After a few seconds the display will monitor the actual cabin temperature again:

Steam Bath  
42.4 °C



**Note:** The set point can also adjusted according to chapter 8. and 8.1. Please refer parameter "Steam Bath Temp. Set Point" (G3).

### 7.5.2 Setting Set Points Bio Sauna

**Example:** The temperature set point should be reduced from 60 °C to 55 °C. The humidity set point should be increased from 50 % RH to 65 % RH.

Switch on the steam generator. The display monitors the sauna mode and the actual cabin temperature and humidity.

Bio Sauna H  
58.9 °C 52.0%

Press the return key once. The bottom line displays now the set point G6.

Bio Sauna T Set.  
G6 = 60.0 °C

Press several times ↓ until the required set point appears:

Bio Sauna T Set.  
G6 = 55.0 °C

Press the return key to accept the setting and the second set point will appear at the display.

Bio Sauna RH Set.  
G7 = 52 %RH

Press several times ↓ until the required set point appears:

Bio Sauna RH Set  
G7 = 65 %RH

Press the return key to accept the setting.

The second set point is accepted. After a few seconds the display will monitor the actual cabin temperature and humidity again:

Bio Sauna H  
58.5 °C 53 %



**Note:** The set point can also adjusted according to chapter 8. and 8.1. Please refer parameter "Bio Sauna Temp. Set Point" (G6) and "Bio Sauna RH Set Point" (G7).

## 7.5.3 Setting Set Point Sauna

**Example:** The temperature set point should be reduced from 95 °C to 90 °C.

 Switch on the steam generator. The display monitors the sauna mode and the actual cabin temperature.

Sauna H  
93.0 °C

Press the return key once. The bottom line displays now the set point G8.

Sauna T Set  
G8 = 095.0 °C

 Press several times ↓ until the required set point appears:

Sauna T Set  
G8 = 090.0 °C

 Press the return key to accept the setting.

The new set point is accepted. After a few seconds the display will monitor the actual cabin temperature again:

Sauna H  
76.4 °C



**Note:** The set point can also adjusted according to chapter 8. and 8.1. Please refer parameter "Steam Bath Temp. Set Point" (G8).

## 7.6 Electronic Name Plate

The display can show 6 different sets of unit data.

Electronic Name Plate	
S1	Cylinder number
S2	Nominal capacity [kg/h]
S3	Software version
S4	Model type
S5	Year of manufacture
S6	Serial number

» Select sub menu **Settings** using  or  and confirm using .

» Using  to select letter **S**.  
Cursor is under letter **S**.

Parameter Set  
\*\*\* S \*

»  press.

» Call up information using  or . Display then shows, for example:

Nominal Capacity  
S2 = 45 kg/h

» Escape S-Parameter using .

## 7.7 Additional Parameters

The following parameters can be altered without the use of an access code:

Parameter	Description
P0	Code input
P1	Output limitation [%]
P6	Hours run meter (only readable) [days : hours]

### Input Code (P0)

The on board, non-volatile data memory allows operating parameters to be altered, adjusted and stored. For security reasons, some of the parameters can only be accessed after inputting a code in parameter **P0**. Please refer chapter 8. "Parameter Setting using Code".

### Output Limitation (P1)

The parameter **P1 Output Limitation** is used to adjust the steam output between 25 and 100% of the nominal steam output. The actual steam production is still a function of the control signal. A steam output limitation can sometimes be useful for optimising unit control.

**Example:** The output limitation P1 should be changed from 100 % to 70 %.

» Switch on steam humidifier using control switch (Display lights up).

» Select sub menu **Settings** using  or  and confirm selection with .

» Select the value to be altered with  or . Because the relative humidity is to be altered the display must now show:

Settings  
P1 = 100 %

» Confirm parameter selection using . Cursor appears under the first figure.

Settings  
P1 = 100 %

» Press  once. First character display zero.

Settings  
P1 = 000 %

Press  once. Cursor appears under second figure. » Press  twice. Cursor disappears from display.

Settings  
P1 = 000 %

» Press  three times. Cursor disappears from display.

Settings  
P8 = 070 %

» Press  twice. Cursor disappears from display.

Settings  
P1 = 070 %

The output limitation is now set at 70 %.

» Escape sub menu **Settings** using .

The changes are permanently stored only after leaving the sub menu **Settings**.

## Hours Run Meter (P6)

This value indicates the on time at which the unit produced steam. It will count only at sauna modes **Steam Bath** or **Bio Sauna** where steam is needed.

## 8. Parameter Settings using Code

The EMP Controller is equipped with a modern micro controller chip. The on board, non-volatile data memory allows operating parameters to be altered, adjusted and stored. For security reasons, these can only be accessed after inputting a code in parameter **P0**.

The sign "X" marks parameters which are adjustable in the concerning sauna mode.

Parameter	Description Initial Factory Setting [unit]	Steam Bath	Steam Bath	Bio Sauna	Sauna
		(D0) 1step (U6)	(D0) int. Control(U6)	(D0) int. Control(U6)	(D0)
A4	Stand-by Blow-down [h]	x	x	x	X
D3	Direct Setting Yes / No	x	x	x	X
E1	Gain PI-controller [Xp = 0 - 100%] <b>10%</b>	-	x	x	-
E2	Integration PI-controller [Tn = 0 - 255 sec.] E2= 0: Off <b>60 sec.</b>	-	x	x	-
E3	Control Signal 0(2)-5 V DC / <b>0(2)-10 V DC</b> 0(4)-20 V DC / 0(4)-12 mA DC 0(4)-20 mA DC / 0-140 Ohm 0-20 V phase-angle (Staefa)	-	x	x	-
E4	Calibration sensor [-15% RH to +15% RH] <b>0% RH</b>	-	-	x	-
G0	Temperature Correction [-5K bis +5K] <b>0,0 K</b>	x	x	x	x
G1	Temp. Hysteresis Temp. Control [0K - 5K] <b>1K</b>	x	x	x	X
G2	Temp. Hysteresis Fan [0K - 5K] <b>1K</b>	x	x	-	-
G3	Steam Bath Temperature Set Point [20 - 55°C] <b>45°C</b>	x	x	-	-
G4	Essence Injection time [0 sec. - 10 sec.] <b>2 sec.</b>	x	x	x	-
G5	Essence Interval [0 min. - 30 min.] <b>5 min.</b>	x	x	x	-
G6	Bio Sauna Temperature Set [20°C - 80°C] <b>50°C</b>	-	-	x	-
G7	Bio Sauna Humidity Set value [30% RH - 80% RH] <b>60% RH</b>	-	-	x	-
G8	Sauna Temperature Set value [40°C - 100°C] <b>80°C</b>	-	-	-	X
P2	Amount of Steam Service Interval [10 <sup>3</sup> kg/h]	x	x	x	X
P3	Reset Service Interval <b>No</b> / Yes	x	x	x	X
P4	Offset Humidity Sensor [0%-100%] <b>0%</b>				
U5	Pumping with mains disconnected On (Main contactor switch off) Off (Main contactor switch on)	x	x	x	X
U6	Control Mode On/Off Control (1step) Internal PI-Control (proportional)	Temp.:1step Humidity: not	Temp.:prop. Humidity: not	Temp.:1step Humidity: prop.	Temp.:1step Humidity: not

## 8.1 Example: Adjusting Set Point Bio Sauna

The temperature set point should be altered from 60 °c to 55 °C.



**Attention:** The sauna mode **Bio Sauna** must be active (Parameter D0).

» Switch on steam humidifier using control switch (Display lights up).

» Select sub menu **Settings** using or and confirm selection with .

» Select parameter **P0** using or .

Code  
P0 = > \* \* \* <

» Confirm parameter selection using . Cursor appears under first figure.

Code  
P0 = >000<

» Press once. Cursor appears under second figure.

Code  
P0 = >000<

» Increase value by pressing once.

Code  
P0 = >010<

» Press twice. After inputting code correctly display shows parameter **P1**.

Settings  
P1 = 100%

(P1 could alter between 25 and 100 %.)

» Press five times. Cursor appears under character **A**.

Parameter Set  
\* A \* U S E

Cursor appears under character **A**.

» Use to move cursor to character G.

Parametersatz  
\* A \* U S \* E D G

» Confirm with .



» Press some times, until the display monitors the actual set point of the temperature, e. g.:

Bio Sauna T Set  
G6 = 60.0 °C

» Confirm parameter selection . Cursor appears under the first character.

Bio Sauna T Set  
G6 = 60 °C

» Press once

Bio Sauna T Set  
G6 = 50.0 °C

» Confirm parameter selection . Cursor appears under the second character.

Bio Sauna T Set  
G6 = 50.0 °C

Press or five times until the correct second character appears.

Bio Sauna T Set  
G6 = 55.0 °C

» Confirm the value with . Cursor appears under the third character.

Bio Sauna T Set  
G6 = 55.0 °C

» Confirm the value with . Cursor disappears from display.

Bio Sauna T Set  
G6 = 55.0 °C

Now the setting of the new temperature set point at sauna mode **Bio Sauna** is complete.

Other values to be changed in the fashion described above.

The changes are permanently stored only after leaving the sub menu **Settings**.

» Escape with back to main menu and display of actual temperature and humidity:

Biosauna  
58°C      60% RH

## 8.2 Parameter Descriptions

### Stand-by Blow-down (A4)

If the unit is on stand-by for an extended time period it can drain itself automatically. This feature is activated and set by parameter A4. These prevents standing cylinder water.

### Direct Setting (D3)

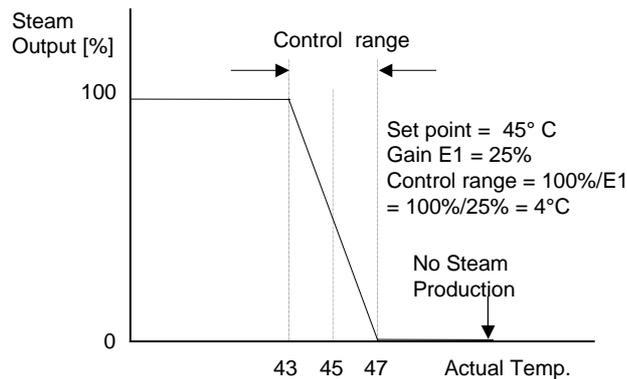
In case the value of the parameter „direct setting“ (D3) equals „yes, certain settings can be adjusted at the main menu, e. g. the set point or the sauna mode. Please refer to chapter 7.1 "Main menu“, too.

If the value of “direct setting” (D3) equals „no“, it is not possible to change parameters at the main menu. A setting must be carried out as described in chapter 8 „Parameter setting using Code“. The value “no” for D3 we suggest to deny settings without permission.

### Gain, PI controller (E1)

This parameter defines the control range.

Example:



### Integral time, PI controller (E2)

At a difference of more than 1K or 1% RH between set point and actual value the steam production is adapted in steps of 1% output increase or decrease.

### Correction humidity sensor(E4)

With this parameter the humidity sensor connected at terminals 3 – 5 could be calibrated if necessary.



**Note:** We will deliver an pre-adjusted sensor. On site the sensor can be calibrated between -15% RH. and +15% RH.



### Correction actual temperature (G0)

With this parameter the temperature sensor connected at terminals 6 – 7 could be calibrated if necessary.

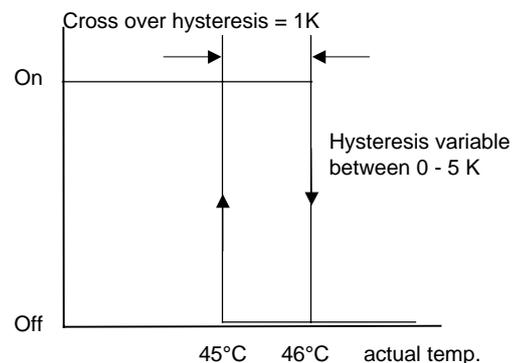


**Note:** We will deliver an pre-adjusted sensor. On site the sensor can be calibrated between -5 K. and +5 K.

### Hysteresis temperature-control (G1)

With this parameter the cross over hysteresis for on/off control can adjusted.

Example:



### Hysteresis Fan (G2)

Here the cross over hysteresis of the fan for on/off operation will be changeable.

### Ontime, Essence injection (G4)

At this parameter you could change the injection time of the essence.

### Pause, Essence injection (G5)

With this parameter the time (pause) between two injections can be adjusted.



**Note:** To adjust the parameter **G2 - G4** please refer the diagram at chapter 9 "Mode Steam Bath" und 10 "Mode Bio Sauna".

## Amount of Steam Service Interval (P2)

The EMP controller constantly monitors the actual amount of produced steam. This data is compared to parameter **P2 Amount of Steam Service Interval**. When the humidifier has produced the set amount of steam the red LED on the control panel lights up permanently.

The maintenance frequency is largely dependent upon the water quality (conductivity, water hardness) as well as the amount of generated steam. Using parameter P2, the maintenance interval can be adjusted to suit the water quality.

## Reset Service Interval (P3)

Following a service, the service interval is reset as follows (red LED still on):

» Select sub menu **Settings** using  or  and confirm using .

» Select Parameter **P0** with  or .

Code  
P0 = > \* \* \* <

» Confirm selection with . Cursor appears under first figure.

Code  
P0 = > 0 0 0 <

» Press  once. Cursor appears under second figure.

Code  
P0 = > 0 0 0 <

» Press  once.

Code  
P0 = > 0 1 0 <

» Press  twice. Cursor disappears from display and it monitors:

Settings  
P1 = 100%

» Select parameter **P3** using  or . Display shows:

Reset Service  
P3 = No



» Confirm parameter selection with . Cursor appears under first figure. Display shows:

Reset Service  
P3 = No

» Press  once.

Reset Service  
P3 = Yes

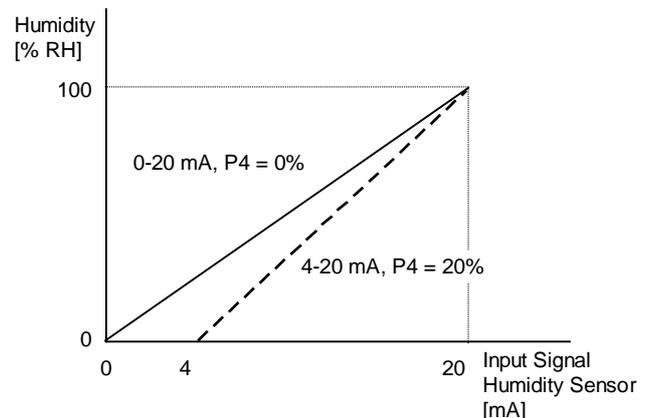
» Confirm using . The red LED is off.

Reset Service  
P3 = No

» Escape sub menu **Settings** using .

## Offset Humidity Sensor (P4)

Standard humidity sensors interpret 0 V, 0 mA and 0 Ohm signals as a relative humidity of 0% RH. With a humidity sensor, with e.g. a 4-20 mA input signal, the "Offset Humidity Sensor" parameter (P4) has to be set to 20%. The EMP-electronics can now correctly interpret a 4 mA-signal as 0% RH. (This parameter is available from software-version 5.0.)



## Pumping with Mains Disconnected (U5)

This parameter determines the main contactor position during the blow-down process. In the "Pumping with Mains Disconnected" mode the electrodes are disconnected from the power supply (main contactor is switched off). This can be useful when the mains power is protected by a fault-current circuit breaker.

## Control (U6)

At this parameter you could adjust the control mode of the sauna mode **Steam Bath**. The steam generator has standard value „On/Off control“ but can also operate proportional with the setting “int. PI control”. Please refer chapter 3 "Control".

## 8.3 Language/Sprache

This menu is used to select the desired system language.

Language / Sprache
English
Deutsch (German)
Francais (French)
Espanol (Spanish)

» Select sub menu **Language/Sprache** using  or  and confirm with .

» Display shows:

Language/Sprache  
English

» Select desired language using  or  and confirm using .

» Escape sub menu **Language/Sprache** with .

## 8.4 System Test

This menu is used to test various system functions (e.g. during system commissioning).

The following test routines are available:

System Test
LED Test
Sensor Test
Demand Test
Solenoid Valve / Pump Test
Automatic Test (comprises all individual tests)

» Select sub menu **System Test** using  or  and confirm using .

» The display shows:

System Test  
LED-Test

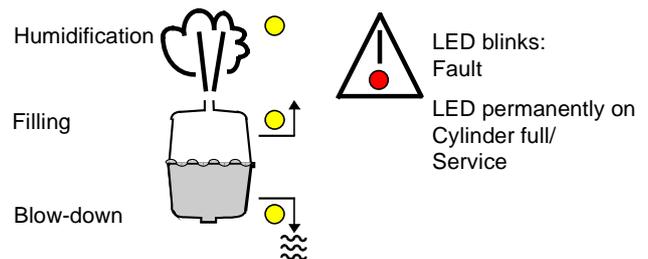


» Select desired tests with  or  and confirm using . The test will be carried out as selected.

» Escape sub menu **System Test** with .

### LED Test

This tests the LED functions. The LED's **Humidification**, **Filling**, **Blow-down** and **Fault/Service** are switched on, one after another, for a few seconds.



**Example:** LED **Humidification** is activated.

LED Test  
LED Humidificat.

The yellow LED **Humidification** must be on.

### Sensor Test

This tests the connected signals. It is not necessary in 1step controller mode.

Possible Messages	Condition
Sensor Test 6,3V 63%	Signal correct, Demand present
Sensor Test Fault < 1%	No signal (connected), Cable break No demand
Signal-Test Fault > 100%	Signal exceeds prescribed max. value. Check for correct adjustment.

This test does not check the sensor supply voltage of 24 V DC.

## Valve/Pump Test

This tests the function of the inlet solenoid valve and the blow-down pump. The following messages are possible:

Possible Messages	Condition
Valve/Pump Test Fault Filling	Solenoid valve not functioning properly, No water throughput See chapter "Faults", Filling Fault.
Valve/Pump Test Blow-down Fault	Pump not functioning properly, See chapter "Faults" , Blow-down Fault.



**Note:** This test can take up to 30 minutes.

## Demand Test

This tests whether the safety chain is closed. When using the control mode with external or internal controller the control demand function is also tested. (See also chapter "Faults" in this manual.)

Possible Messages	Condition
Demand Test Interlock On	The safety chain is closed. In on/off control mode, the unit is in operation.
Demand Test Interlock Off	The safety chain is open. (e.g. max.-hygrostat) The unit is in stand-by mode.
Demand Test 6,3 V 63% *	The safety chain is closed. There is a demand on the unit. The signal is displayed. The humidifier is in operation.
Demand Test No Demand *	There is no demand on the humidifier. The unit is in stand-by mode.

\* only if using controller mode (U6): external controller, internal PI controller and internal PI controller

## Automatic Test

The automatic test mode is sequenced automatically. Each test ends with a message displayed for some seconds. Then the next test starts.

## 9. Mode Steam Bath

At sauna mode Steam Bath a temperature sensor must installed inside the cabin of the steam bath. Depending on the actual temperature the DS electronic controls the steam production of HYGROMATIK steam generator.

In case of additional installed options you could connect an essence injector, a fan and light at the steam generator (please refer wiring diagrams and chapter 2 and 3).

### Example Diagram:

Here are the settings of the parameters G1, G2 and G3:

Hystereses of Temperature Control (G1) = **0,5K**  
 Temp. Hystereses of Fan Control (G2) = **1K**  
 Steam Bath Temperature Set Point (G3) = **45°C**

If the actual steam bath temperature decreases under the set point of **45°C**, the lack will compensated with increasing steam production.

In case the actual steam bath temperature will be above **45,5°C**, the steam, production is cut off with **U6 = On/Off control** and decreased if **U6 = int. PI control** (proportional).

The cut off temperature results in:  
 Steam bath temperature set point+  
 Hystereses of Temperature Control =  
 $45^{\circ}\text{C} + 0,5\text{K} = 45,5^{\circ}\text{C}$ .

At actual steam bath temperature above the set point the DS electronic switches the fan on to reduce the heat.

The DS electronic cuts the fan off at an actual temperature **44°C**. The cut off temperature is given as a result of:

Steam Bath Temperature Set Point  
 - Temp. Hystereses of Fan Control =  
 $45^{\circ}\text{C} - 1\text{K} = 44^{\circ}\text{C}$



**Note:** You must select automatic at parameter "Fan" (D1).

Steam is produced as long as the actual temperature is below the set point. If the actual steam bath temperature stays longer higher than the set point, no steam is produced and the reason could be of the following:

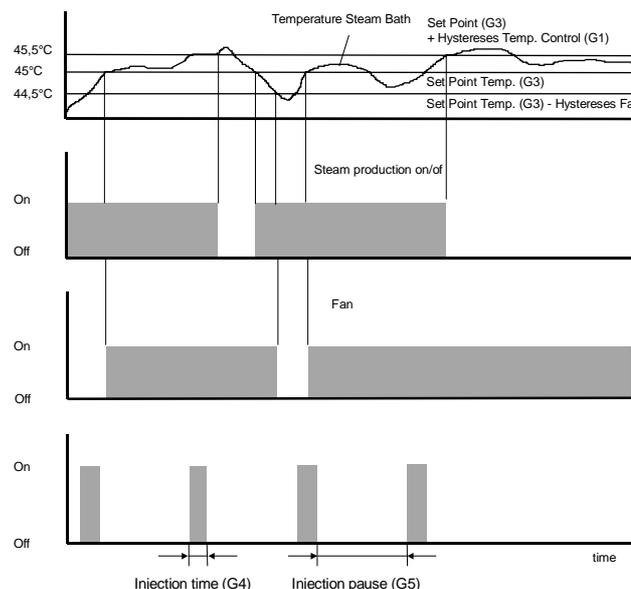
- steam bath is very good temperature insulated and / or
- to little air exchange of the steam bath, e. g. because of no fan.
- to much additional heat, e. g. extra heating of the steam bath walls or seats

A fan will support the air exchange, through steam bath temperature decreases faster. The lack of temperature is compensated through new produced steam. Therefore the a fan ensures an even steam production.

The essence injection time and pause is according to the parameters G4 und G5.



**Note:** You can alter parameter G0 and G5 according chapter 7.5.1 "Setting Set Point Steam Bath" and. 8. "Parameter Setting using Code".



## 10. Mode Bio Sauna

A temperature and humidity sensor must be installed at the bio sauna to measure temperature and humidity of the bio sauna. The DS electronic controls the HYGROMATIK steam generator for the humidity of the bio sauna and an external sauna oven via a relay for on/off control for the bio sauna temperature.

At terminals 8 and 9 you will find a relay output for an external sauna oven. The output can not directly switch the sauna oven. Please refer chapter 3.7, too.

### Example Diagram:

The parameter setting of G1, G6 und G7 is as follows:

Bio sauna humidity set point (G7) = **60% RH**.

Bio sauna temperature set point (G6):= **50°C**

Hystereses temperature control (G1) = **0,5K**

If the actual humidity decreases more than **60% RH**, it is compensated by increasing steam production.

Reduces the actual humidity of the steam bath below **60% RH.**, the steam production will increase to compensate the difference.

In case the bio sauna temperature drops under **50°C**, the DS electronic switch on the output relay at terminals 8 and 9.

At bio sauna temperatures higher than **50°C**, the relay at terminals 8 and 9 is switched off.

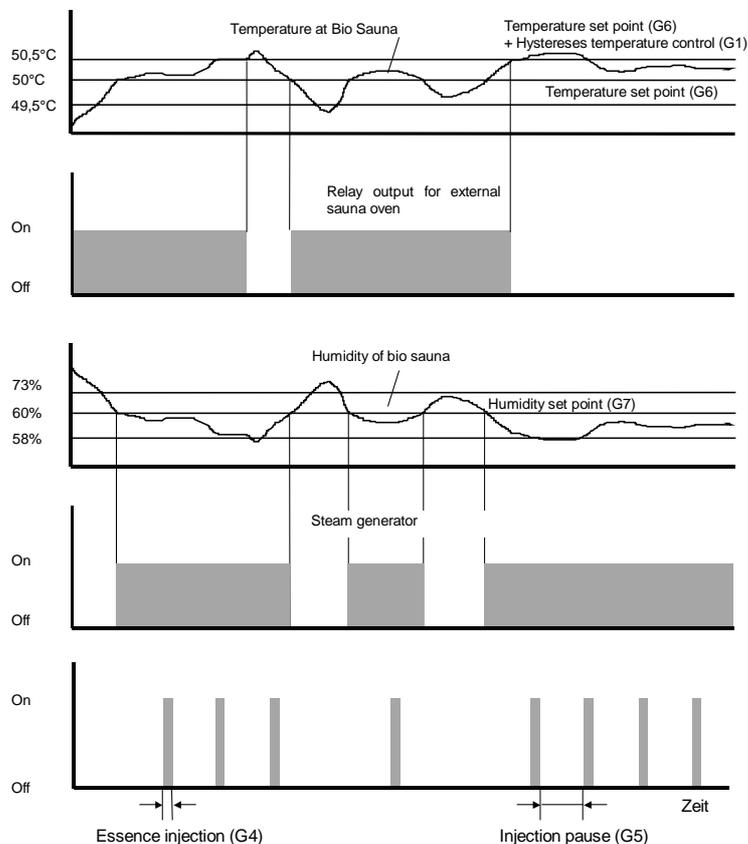
The switch off point of the relay output of the external sauna oven is estimated as:  
 Bio sauna temperature set point +  
 Hystereses temperature control =  
 $50^{\circ}\text{C} + 0,5\text{K} = 50,5^{\circ}\text{C}$ .

At the sauna mode **Bio Sauna** you could control an essence injector and connect light for the bio sauna (see wiring diagrams).

The essence injection time and pause is according to the parameters G4 und G5. Essence injection is only in operation while steam is produced.



**Note:** You can alter parameter G0 and G5 according to chapter 7.5.1 "Setting Set Point Steam Bath" and 8. "Parameter Setting using Code".



## 11. Mode Sauna

In the mode **Sauna** a temperature sensor measures the sauna temperature. The value of the sensor is given to the DS electronic. Depending on the sauna temperature the DS electronic control the relay output for an external sauna oven.

At terminals 8 and 9 you will find a relay output for an external sauna oven. The relay output can not direct switch the sauna oven. Please refer chapter 3.7, too.

### Example Diagram:

The parameter are given as:

Sauna temperature set point (G8): 90°C  
Hystereses temperature control (G1): 1K

In case the bio sauna temperature drop under **90°C**, the DS electronic switch on the relay output at terminals 8 and 9.

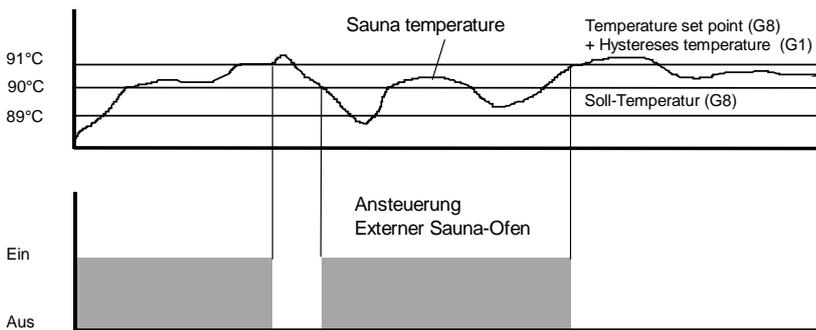
At bio sauna temperatures higher than **91°C**, the relay output at terminals 8 and 9 is switched off.

The switch off point of the relay output of the external sauna oven is estimated as:

Sauna temperature set point +  
Hysteresis temperature control =  
 $90^{\circ}\text{C} + 1\text{K} = 91^{\circ}\text{C}$ .



**Note:** You can alter parameter G1 and G8 according chapter 7.5.1 "Setting Set Point Steam Bath" and. 8. "Parameter Setting using Code".



## 12. Faults



**Attention:** If a fault occurs switch off the steam humidifier immediately. Faults are only to be rectified by qualified personnel following the proper safety instructions.

Fault	Causes	Measures
<p><b>Service</b> The red LED is flashing.</p> <p>The unit is switched off in case it senses a period of one hour's operation in the „Cylinder full“ condition.</p>	<ul style="list-style-type: none"> <li>• Cylinder is full of scale, which limits the active immersion depth of the electrodes.</li> <li>• Electrodes are worn.</li> <li>• One phase is missing (external safety fuse is defect).</li> <li>• Phase L3 has not been passed through the current transducer on the pcb.</li> <li>• Cylinder is filled up to the maximum water level electrode without the nominal current or nominal steam output being reached.</li> </ul>	<p>Clean cylinder.</p> <p>Replace electrodes.</p> <p>Replace safety fuses.</p> <p>Pass phase L3 through the current transducer.</p> <p>Check water quality (conductivity, carbonate and total hardness) and contact HYGROMATIK.</p>
<p><b>Blow-down Fault</b> Unit is automatically switched off after one hour. Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Cylinder outlet, blow-down pump and/or draining system are blocked by scale preventing operation.</li> <li>• Blow-down pump is not receiving electrical power.</li> <li>• Solenoid valve has not fully closed. Water level in the steam cylinder is only decreasing very slowly, although the pump is running.</li> </ul>	<p>Clean cylinder outlet, blow-down pump and/or draining system.</p> <p>Check cable connections. Check whether relay on the pcb operates (clicks).</p> <p>Check solenoid valve.</p>
<p><b>Filling Fault</b> Unit is automatically switched off after one hour. Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Water shut-off valve is not open.</li> <li>• Solenoid valve or water supply pipe is blocked.</li> <li>• Solenoid valve is not receiving electrical power.</li> <li>• Coil is defective.</li> </ul>	<p>Open shut-off valve.</p> <p>Clean or exchange solenoid valve. Flush water supply pipe, if necessary</p> <p>Check cable connection.</p> <p>Measure the coil and exchange solenoid valve if necessary.</p>
	<ul style="list-style-type: none"> <li>• Water is being drained permanently from the outlet. Pump is not operating. <ul style="list-style-type: none"> <li>– Steam hose installed sags.</li> <li>– Pressure in duct too high.</li> <li>– (Maximum duct pressure 1500 Pa)</li> </ul> </li> </ul>	<p>Remove blockage in steam hose. See chapter "Installation Examples".</p> <p>Lengthen drain hose. Contact HYGROMATIK if necessary.</p>

Fault	Causes	Measures
<p><b>Main Contactor Fault</b> Unit is automatically switched off after one hour. Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Main contactor is defective.</li> <li>• Sticking relays on main board.</li> </ul>	<p>Change main contactor. Change main board</p>
<p><b>Fault Temp. Sensor</b> Unit is automatically switched off after five minutes out of the valid temperature range 0°C to 120°C.</p>	<ul style="list-style-type: none"> <li>• Temperature sensor or connection cable defective.</li> <li>•</li> </ul>	<p>Check temperature sensor and connection cable. Exchange if necessary.</p>
<p><b>Fault RH Sensor</b> (Fault Humidity Sensor ) Unit is automatically switched off after one hour with less than 3% RH measured.</p>	<ul style="list-style-type: none"> <li>• Humidity sensor or connection cable defective.</li> </ul>	<p>Check humidity sensor and connection cable. Exchange if necessary.</p>
<p><b>Cylinder Full</b> The red LED is on. The unit is operating.</p>	<ul style="list-style-type: none"> <li>• Cylinder is filled up to the maximum water level sensor without the rated current or rated steam output being reached.  This may happen when: <ul style="list-style-type: none"> <li>- starting from cold,</li> <li>- restarting after a full blow-down</li> <li>- water conductivity is low or subject to considerable fluctuation</li> </ul> </li> <li>• Unit has to be maintained.</li> <li>• Service interval has been exceeded.</li> </ul>	<p>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.</p> <p>Check water quality (conductivity, carbonate and total hardness) and contact HYGROMATIK.</p> <p>Maintain humidifier. See also fault <b>Service</b>.</p> <p>Maintain or check steam humidifier. Service interval is reset by parameter P3. Using parameter P2, the maintenance interval can be adjusted to suit water quality.</p>

Fault	Causes	Measures
<p>No steam produced.</p> <p>Display shows <b>Stand By</b>.</p> <p><b>Note:</b> Running "Sensor Test" and "Demand Test" give additional pointers for possible cause of fault at sauna mode <b>Bio Sauna</b>. See chapter „System Test“.</p>	<ul style="list-style-type: none"> <li>• If the humidity or temperature exceeds the value set on the controller there is no demand for steam.</li> <li>• With wrong signal selection the unit will not operate</li> <li>• The safety interlock system at terminals 1 and 2 has been triggered.</li> <li>• Only sauna mode <b>Steam Bath</b>: No steam at high temperature because of to little air/heat exchange,</li> </ul>	<p>Check the setting and if necessary operation of the sensor and controller.</p> <p>Check parameters "E3". See also chapter "Parameter Settings with Code" in this manual.</p> <p>Look for failing function and remedy. Insert a bridge between the terminals 1 and 2 on the terminal block. Installation of a fan</p>
<p>No steam production, although the unit is switched on</p> <p>Electrodes are energised but no water filling</p>	<ul style="list-style-type: none"> <li>• Water inlet solenoid valve is not switched on or water supply is closed</li> </ul>	<p>Open water supply</p> <p>Please refer <b>Filling Fault</b>, too.</p>
<p>No steam production, although the unit is switched on.</p> <p>The Display is dark.</p>	<ul style="list-style-type: none"> <li>• The control fuse F1 1.6 A is defective.</li> <li>• Phase L1 is missing (external safety fuse is defective).</li> <li>• The micro fuse 125 mA on the pcb is defective.</li> </ul> <p>The optional interface is not correctly plugged into the EMP-electronic.</p>	<p>Check and exchange fuse if necessary. See also chapter "Wiring Diagrams" in this manual.</p> <p>Replace external safety fuse. Check for the reason that caused the fuse to blow.</p> <p>Check and exchange micro fuse if necessary. See also chapter "Connections EMP-Electronic" in this manual.</p> <p>Ensure that the interface is correctly plugged into the EMP-electronic. Regard the notes "Front" and "Back".</p>
<p>Humidity or temperature level too low</p>	<ul style="list-style-type: none"> <li>• Steam output limiting function of the unit is preventing full output.</li> <li>• Steam humidifier operates in the "Cylinder full" condition.</li> <li>• Despite full output being attained the humidity cannot be achieved due to incorrect output parameters.</li> <li>• If one phase is missing the desired output is reduced.</li> <li>• A long steam hose passing through cold and drafty rooms can lead to increased condensation levels.</li> </ul>	<p>Check parameter P1 "Output limitation". See chapter "Parameter Settings without using Code".</p> <p>See fault <b>Service</b>.</p> <p>Check steam output data.</p> <p>Check if one phase is missing.</p> <p>Reposition unit, insulate hose.</p>

Fault	Causes	Measures
Set point of temperature or humidity will not achieved	<ul style="list-style-type: none"> <li>• The sensor signal does not match the setting</li> <li>• Temperature or humidity sensor are not calibrated sufficiently.</li> </ul>	<p>Check the parameter humidity signal (E3) and "Offset humidity sensor" (P4). See chapter 8.</p> <p>Check parameter "correction humidity" (E4) or "correction temperature" (G0). Please refer chapter 8.</p>
Temperature or humidity too high	<ul style="list-style-type: none"> <li>• The sensor signal does not match the setting</li> <li>• Temperature or humidity sensor are not calibrated sufficiently.</li> </ul>	<p>Check the parameter humidity signal (E3) and "Offset humidity sensor" (P4). See chapter 8.</p> <p>Check parameter "correction humidity" (E4) or "correction temperature" (G0). Please refer chapter 8.</p>
No or not sufficient essence injection Only at mode <b>Steam Bath</b>	<ul style="list-style-type: none"> <li>• Essence receptacle empty</li> <li>• Essence injection is switched off</li> <li>• To short injection time</li> <li>• To long injection time</li> <li>• Essence injection blocked</li> <li>• Fuse or relay output of essence injection damaged</li> </ul>	<p>Refill essence</p> <p>Switch on essence injection (check voltage at the essence injector)</p> <p>Increase injection time</p> <p>Decrease injection time</p> <p>Clean the essence injection valve</p> <p>Change fuse or DS electronic (check voltage at essence injection valve)</p>
Too much essence injection Sauna mode <b>Steam Bath</b>	<ul style="list-style-type: none"> <li>• To long injection time</li> <li>• To short injection time</li> <li>• Permanently essence injection.</li> </ul>	<p>Decrease injection time</p> <p>Increase injection time</p> <p>Clean essence injection valve</p>
External oven not active. Sauna mode <b>Bio Sauna</b> and <b>Sauna</b>	<ul style="list-style-type: none"> <li>• In case the actual temperature is above the set point (parameter G3 or G8), there is no demand</li> </ul>	<p>Check and adjust the parameter G3 or G8. See chapter 8.</p>
External oven not active. The display monitors the character <b>H</b> . Sauna mode <b>Bio Sauna</b> and <b>Sauna</b>	<ul style="list-style-type: none"> <li>• External sauna oven not right connected</li> <li>• DS electronic relay (pin 34-36) defect.</li> </ul>	<p>Connect the oven control to the relay output (terminals 8 and 9) according to the wiring diagram.</p> <p>Change the DS electronic.</p>
The blow-down pump is operating but no water is being drained	<ul style="list-style-type: none"> <li>• Cylinder outlet is blocked.</li> </ul>	<p>Clean cylinder outlet.</p>

Fault	Causes	Measures
Cylinder is completely drained after a blow-down although the pump has stopped.	<ul style="list-style-type: none"> <li>• Vent pipe in the drain hose is blocked.</li> </ul>	Clean or replace vent pipe. See chapter "Function" * pos. 3.
Water collecting on base plate of the steam humidifier	<ul style="list-style-type: none"> <li>• The cylinder was reassembled incorrectly after maintenance:               <ul style="list-style-type: none"> <li>– O-ring seal damaged or not replaced.</li> <li>– The flange itself is damaged.</li> <li>– Scale has collected in the flange.</li> </ul> </li> <li>• Cylinder is incorrectly inserted into the base.</li> <li>• Discharged water cannot flow freely.</li> </ul>	<p>Look for faults and eliminate. Re-assemble cylinder as described in chapter "Cleaning Steam Cylinder" *.</p> <p>Insert the cylinder correctly with a new o-ring in the cylinder base.</p> <p>Insure proper draining. See chapter "Water Discharge" *.</p>
Water leaks from the top part of the cylinder	<ul style="list-style-type: none"> <li>• Hose clamps for the steam and condensate hose are not tightened</li> <li>• Electrodes are improperly secured.</li> <li>• Adapter for the steam hose has not been fitted correctly or the o-ring was not exchanged during maintenance.</li> <li>• If the condensate is not being returned to the cylinder then a condensate sealing cap is used.</li> <li>• Main contactor does not operate (No "Cylinder full" signal)</li> </ul>	<p>Tighten clamps.</p> <p>Tighten hand nuts.</p> <p>Fit or exchange o-ring. See chapter "Cleaning Steam Cylinder" *.</p> <p>Insure that condensate sealing cap is fitted..</p> <p>Replace main contactor.</p>
Intermitted electrical malfunction	<ul style="list-style-type: none"> <li>• External sources of electrical interference.</li> </ul>	Switch off control switch and after a short time switch on again.
<p>No steam from steam distributor</p> <p>Permanently there is water being drained from the outlet. Pump is not operating.</p>	<ul style="list-style-type: none"> <li>• Steam hose installed sags.</li> <li>• Pressure in duct too high (Maximum duct pressure: 1500 Pa)</li> </ul>	<p>Remove blockage in steam hose. See chapter "Installation Examples" **.</p> <p>Lengthen drain hoses. Please contact HYGROMATIK, if necessary.</p>

Fault	Causes	Measures
Uneven electrode wear	<p>Electrode has not been supplied with power.</p> <ul style="list-style-type: none"> <li>• Fuses have been triggered.</li> <li>• Main contactor is defective.</li> <li>• Phases are not symmetrically loaded.</li> <li>• Immersion depth of electrodes uneven. Unit has not been installed in a level position.</li> </ul>	<p>Check main fuses. Replace if necessary.</p> <p>Check main contactor and exchange if necessary.</p> <p>Check power supply. (Measure phase difference)</p> <p>Install humidifier in level position.</p>
<p><b>Attention:</b> Electrical arcing/flash in the cylinder</p> 	<p>Electrical arcing/flash in the cylinder indicates that the conductivity of the water is too high or the cylinder is not being drained frequently enough.</p> <p>In this case please contact HYGROMATIK.</p> <ul style="list-style-type: none"> <li>• Blow-down pump is operating incorrectly.</li> </ul>	<p>Switch unit off immediately, the unit could be damaged.</p> <p>Inspect steam cylinder:</p> <ul style="list-style-type: none"> <li>- Exchange electrodes.</li> <li>- Clean steam cylinder</li> <li>- Check water quality (conductivity). See chapter 1.1</li> </ul> <p>Increase pumping time.</p> <p>Check function of blow-down pump. Exchange blow-down pump if necessary See: <b>Blow-down Fault.</b></p>

\* Refer also to the corresponding chapter in the Technical Documentation. .

## 13. DS Electronic Description

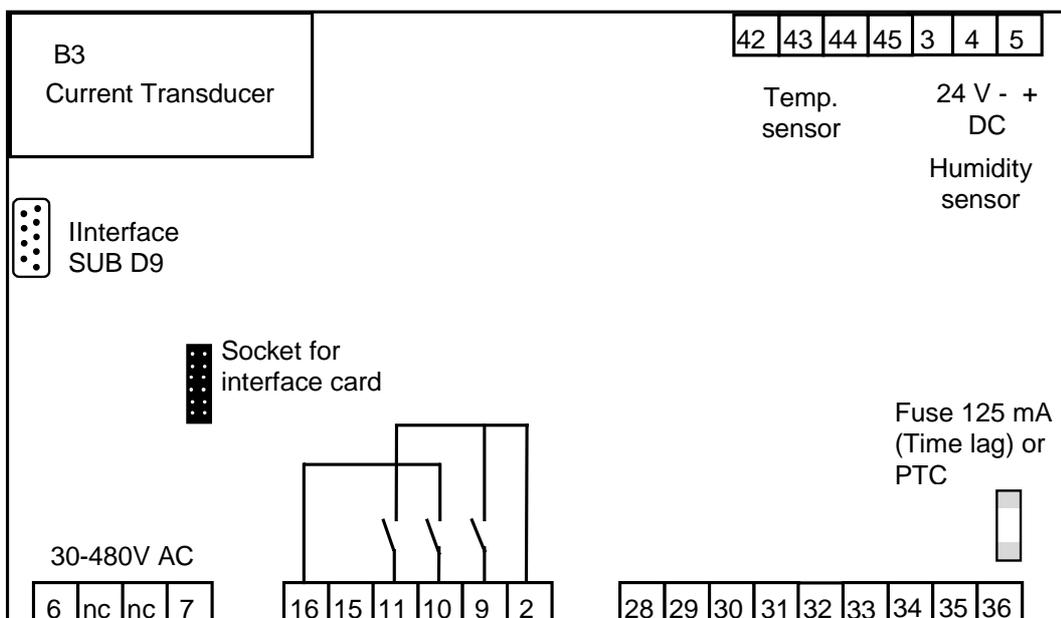
### Electronic DS

B3	Current transducer
2	Supply solenoid valve & main contactor
3-5	Input signal for humidity sensor
6-7	Input sensor electrode
9	Output main contactor
10	Output blow-down pump
11	Output solenoid valve
15-16	Power supply
B3	Current transducer
16	Supply blow-down pump
28-30	Fan output
31-33	Essence Injector output
34-36	Relay output for external sauna oven
42/44	Input temperature sensor
45	Blind piece

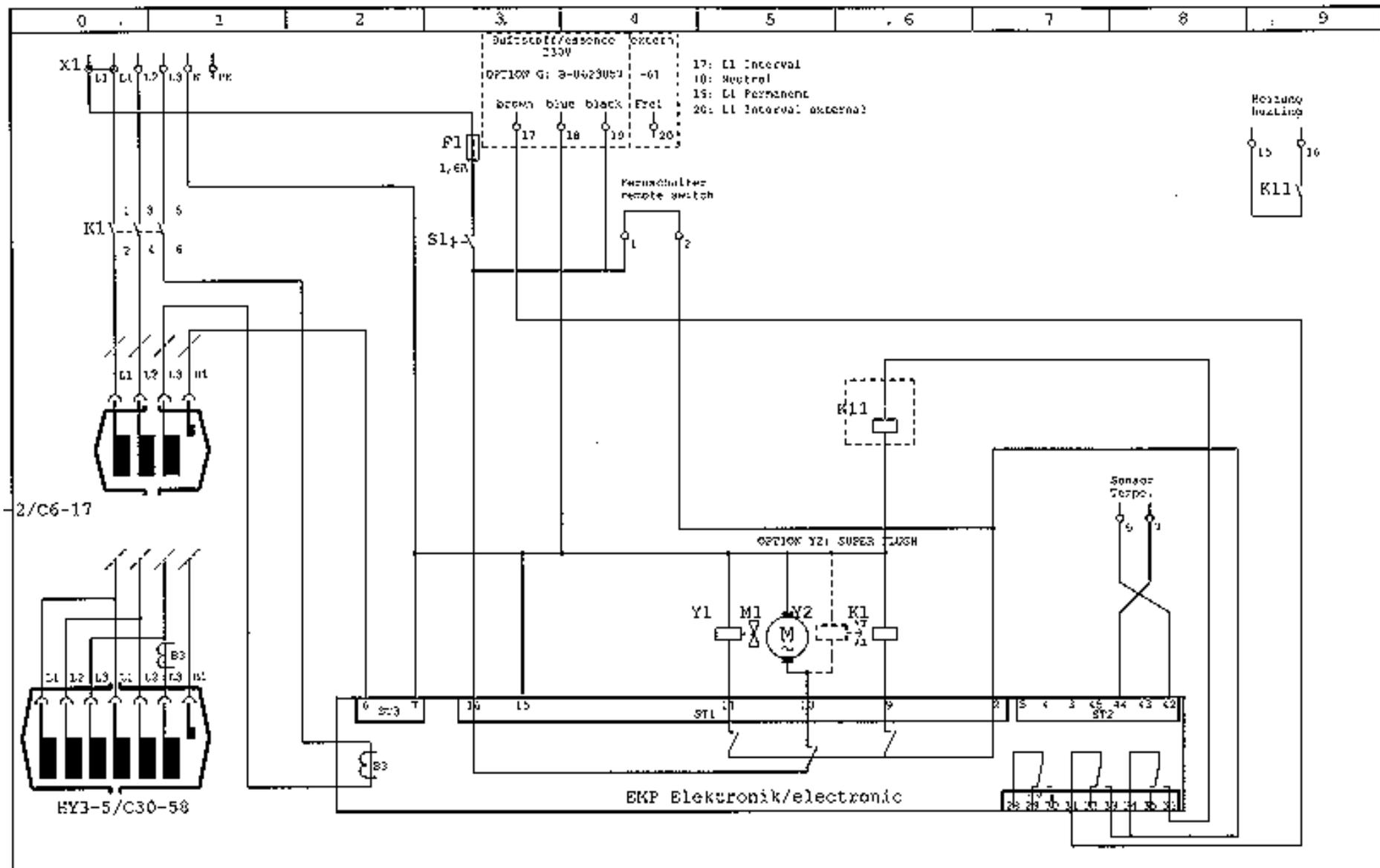
### Steam Generator

B1	Sensor electrode
F1	Controller fuse 1,6 A
F2	Fuse transformer T1 5 A
F3	Fuse essence injector 1,6 A
F4	Fuse fan 1,6 A
F5	Fuse light 1,6 A
K1	Main contactor
L1-L3	Main terminals
M1	Blow-down pump
S1	Control switch ON/OFF
Y1	Solenoid Valve
Y2	SUPER FLUSH (optional)
X1	Connector strip
1-2	Terminals for hygrostat and safety interlock
3-5	Terminals for humidity sensor
6/7	Terminals for temperature sensor
8/9	Terminals for relay output 250V/5A of an external sauna oven
10/11	Terminals essence injector, max. 40W/24V/1.6A
12/13	Terminals fan, max. 40W/24V/1.6A
14/15	Terminals light, 40W/24V/1.6A

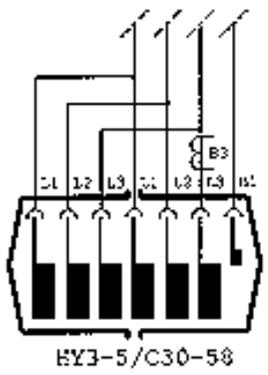
## 14. Connections DS-Electronic







2/C6-17



a	Freigebe	20.01.00	Luc	Decon	23.01.00	(Benennung)	(Zeichnung Nr.1)	HYGROMATIK	Telefax	Phone
b	31.08.00	06.02.00	Luc	Bea/L	Luc	HY1-5/C6-58DS/400/3/N	S-002405	Lise-Beitner-Str. 3	149-1014193 / 835 - 33	149-1014193 / 835 - 0
				Gepr.	Luc	+ Duft 230V +Heizung		3-24558 Henstedt-Ulsbjerg		
								Germany	(Date)	S002405B.001
Best.	Änderung	Datum	Name	Norm	Urspr.	Erst-d	Erst-d			Blatt 1

## Electronic Type DS for Electrode Steam Generator

### Technical Data

Steam Generator Type HY1DS- HY5DS							
Type	HY1.05	HY1.08	HY2.13	HY2.17	HY3.23	HY4.30	HY5.45
Steam Output [kg/h]	5	8	13	17	23	30	45
Electrical Power [kW]	3,8	6,0	9,8	12,8	17,3	22,5	33,8
Current [A]	5,4	8,7	14,1	18,4	24,9	32,5	48,8
Fuse [A]	3x6	3x10	3x16	3x20	3x35	3x35	3x63
Electrical Supply *	400V/3/N/50-60Hz						
Control voltage	230V/50-60Hz						
* Other voltages on request.							

Steam Generator Type C6DS- C58DS						
Type	C6	C10	C17	C30	C45	C58
Steam Output [kg/h]	6,0	10,0	17,0	30,0	45,0	58,0
Electrical Power [kW]	4,5	7,5	12,8	22,5	33,8	43,5
Current [A]	6,5	10,8	18,4	32,5	48,8	62,8
Fuse [A]	3x10	3x16	3x20	3x35	3x63	3x63
Electrical Supply *	400V/3/N/50-60Hz					
Control voltage	230V/50-60Hz					
* Other voltages on request.						