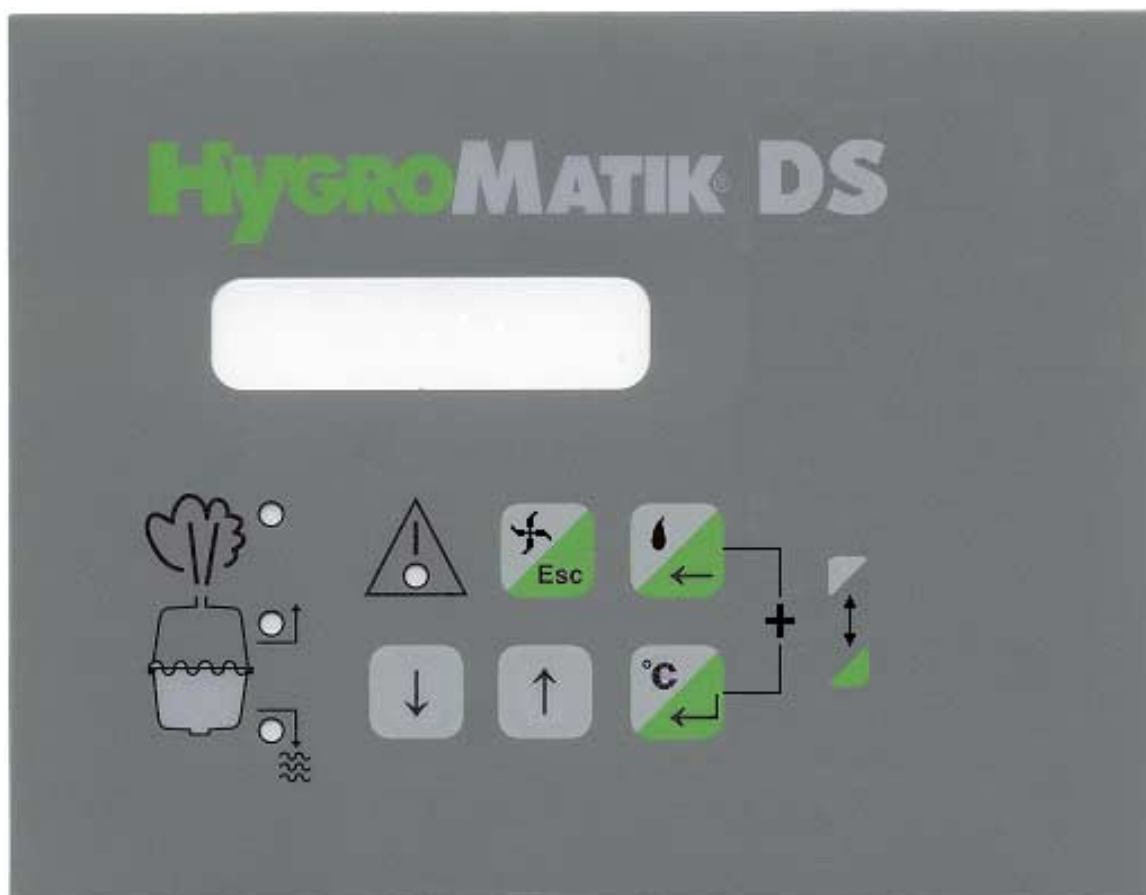




Operating instructions

DS Control

for Electrode Steam Generators



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A member of the **Spirax Sarco** Group

Service Life and Commissioning

All electrode steam 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".

Our interpretation of "normal" is a conductivity between 200 and 500 $\mu\text{S}/\text{cm}$ (MicroSiemens per centimetre) 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 within certain limits 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 distributor 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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DS-Control e 020225

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



Attention, Voltage: 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!

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1. Introduction

Dear customer,

the HYGROMATIK steam generator is designed and built using state-of-the-art technology.

Some of its best features are its operational safety, ease of operation and highly economical energy demands.

In order to use your HYGROMATIK steam generator in the safest and most economical way, please read these instructions very carefully.

Please use your steam generator only in proper working condition, safety and hazard conscious and in accordance with these instructions and with regard to all the notes therein.

Please don't hesitate to contact us if there are any questions:

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

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

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

e-mail: hot1@hygromatik.de

Please inform us of the unit type and serial number (on name plate) when ordering spare parts or for any other queries.

1.1 Proper Applications

The HYGROMATIK steam generator is utilised for producing steam.

Please use only tap water with a conductivity between 50 and 1200 $\mu\text{S}/\text{cm}$.

Lower fringe range		Normal tap water		Area of high conductivity; might require adjustment	Upper fringe range
50	200	500	800	1200	
Allowed conductivity of tap water [$\mu\text{S}/\text{cm}$] for HYGROMATIK steam generators at ca. 15 °C					



Please note: The HYGROMATIK Steam generator produces steam with a temperature of 100 °C. The steam should not be inhaled directly.

Proper applications include compliance with our installation instructions, instructions of assembly and dismantling, initial operation, maintenance and disposal after dismantling.

Only qualified and designated personnel may work on and with the unit. Persons dealing with transport or working on the unit must comply with the respective part of the operating instructions. Especially, they must have read and understood the section - "Safety Notes". In addition, these persons must be informed by the system operator about possible sources of danger. A copy of the operating instructions must be placed where the unit is installed.

The manufacturer/agent bears no responsibility for any damages which occur due to the non-application of these instructions and safety notes. The same applies to consequential damages.

1.2 Typographic Distinctions

- General point
- » Operational point which must or should be done in the proper order.
- ☑ Installation point which must be checked out.

1.3 Safety Notes

The safety notes are required by law. They cover operational safety and accident prevention.

Warning notes and safety symbols

The following safety symbols indicate positions where danger sources are pointed out. Please be sure to make yourself familiar with these symbols.



Attention: Ignoring these warnings can mean injury or danger to life and limb and/or damage to the unit.



Attention, Voltage: Dangerous electrical voltage! Ignoring these warnings can mean danger to life and limb.



Note: Materials which must be handled in accordance with the law and/or must be properly disposed.



Note: Explanations or cross referenced explanations which refer to other positions in the operating instructions.

2. DS Control

This display- and operating panel is for local communication with the steam generator.

2.1 DS Display- and Operating Panel



DS control display- and operating panel

The display is a two line, back-lit LC display.

Steam bath FE
XX.X°C

1.Line: Steam generator operating mode, **steam bath** and the **fan and essence status**.

2.Line: present cabin temperature

Operational conditions: **Steam production / humidification, filling** and **blow-down** may also be read off and shown on the display LEDs.



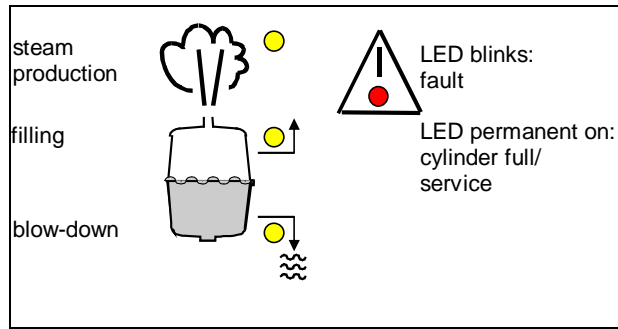
Note: If parameter (D0) = **with status**, then the operational conditions are also displayed.

If the control activates the fan or essence injector, a message is displayed.

	Message in display
Fan on	1 st line in display F
Essence automatic on	1 st line in display E
Essence injector on	2 nd line blinking: Essence on

The red LED blinks if a steam generator fault is sensed. The control shuts down the steam generator automatically. A fault message appears in the display.

If the red LED is permanently on, this indicates either that a service is overdue or the water level sensor has sensed that the cylinder is filled to the max. In both cases the steam generator is still in operation and the display shows the steam bath mode and the present cabin temperature.



Extract from DS control display- and operating panel

Three yellow LEDs show the operational conditions: steam production, cylinder filling and blow-down.

Other displays and functions are called up by pressing the appropriate buttons.

Operating panel buttons are used for the menu and to change parameters, as follows:

2.1.1 Control buttons – toggle function



The buttons have two function levels – grey and green. When both buttons are pressed and held down simultaneously the function is toggled between the grey and green function levels.

2.1.2 Button functions

The operating panel buttons are for menu scrolling and changing parameters as follows:

	Grey switch area	Green switch area
	Changing fan On / Automatic	ESC back to previous menu
	Switching essence Off / Automatic	arrow to the left cursor to the left
	value reduction scrolling in the menu or parameter level	
	Increasing a value scrolling in a menu or parameter level	
	Changing nominal temperature	storing actual value or verifying a value or digit. Continue to next menu level.

3. For the Steam Bath User

3.1 Functions and Features

The HYGROMATIK steam generator produces the necessary steam for the steam bath. The temperature measured in the steam bath is used to control the steam production. Using standard settings, a temperature of 45°C at 100% humidity will be reached. A steam bath fan (supply) blows in fresh air. An extraction fan extracts warm air from the steam bath and ensures a continuous steam supply and stable temperatures. An essence injector feeds essence into the steam bath at certain intervals.






Note: Light-, fan- and essence-controls are optional accessories.

HYGROMATIK steam bath functions are available in 24V or 230V versions.



Attention: Steam baths must use low safety-voltages (e.g. 24V). When using 230V the customer must make appropriate safety provisions.

3.2 Main Menu "Steam bath"

The buttons Temperature , Fan  and Essence  have a direct function. They are used for the following settings:


3.2.1 Changing nominal temperature value (G2)



Note: Temperature is variable in 0.5°C steps in the main menu. This change is no longer valid after switching off unit.

Example: Temperature nominal value is to be reduced from 45°C to 42°C.

» Switch steam generator on. Display shows operational mode and the actual cabin temperature.

» Press  once. Display shows programmed nominal temperature value.

» Press  until temperature value 42°C is displayed.

» Press  once.

The new nominal temperature value is programmed. The programme returns to the standard display after a few seconds. Display once again shows the actual cabin temperature.

Steam bath
42.5°C

Steam bath °C set
G2=45.0°C

Steam bath °C set
42.0°C

Steam bath
42.4°C



Note: for parameter (G2) see also section 4.3.1 – Steam Bath Parameters (G0 - G9).

3.2.2 Fan (D1)

3.2.2.1 Extraction Fan (D1)



Note: In order to change the steam bath operational mode the parameter "Changing Direct Nominal Value" (D3) must be programmed to "YES".

Automatic

In this mode the fan operation is dependent upon the temperature in the steam bath. The control switches on the fan when the nominal temperature value is reached and off when the nominal temperature is not yet reached minus the extraction fan hysteresis (Parameter G3).

See also parameter "Nominal Temperature" (G2) and "Fan Hysteresis" (G3). When the control switches on the fan the letter **F** is shown in the first line of the display.



Note: See also diagram in section 3.4 "Steam Bath Temperature Control".

Continuous operation (constant On)

Fan F
D1 = On

The extraction fan operates independently of the steam bath temperature when in continuous mode. The fan is switched on and off simultaneously with the steam bath generator via the generator control on/off switch. The display shows the letter **F** constantly.

3.2.2.2 Supply Fan (D1)

The supply fan is operational as long as the extractor fan is not activated.



Note: Extraction fan and supply fan are opposite functions and therefore cannot be controlled separately.

3.2.3 Essence Peristaltic Pump (D2)



Note: In order to change the essence injector mode, the "Direct Nominal Value Change" parameter (D3) must be set to "YES".

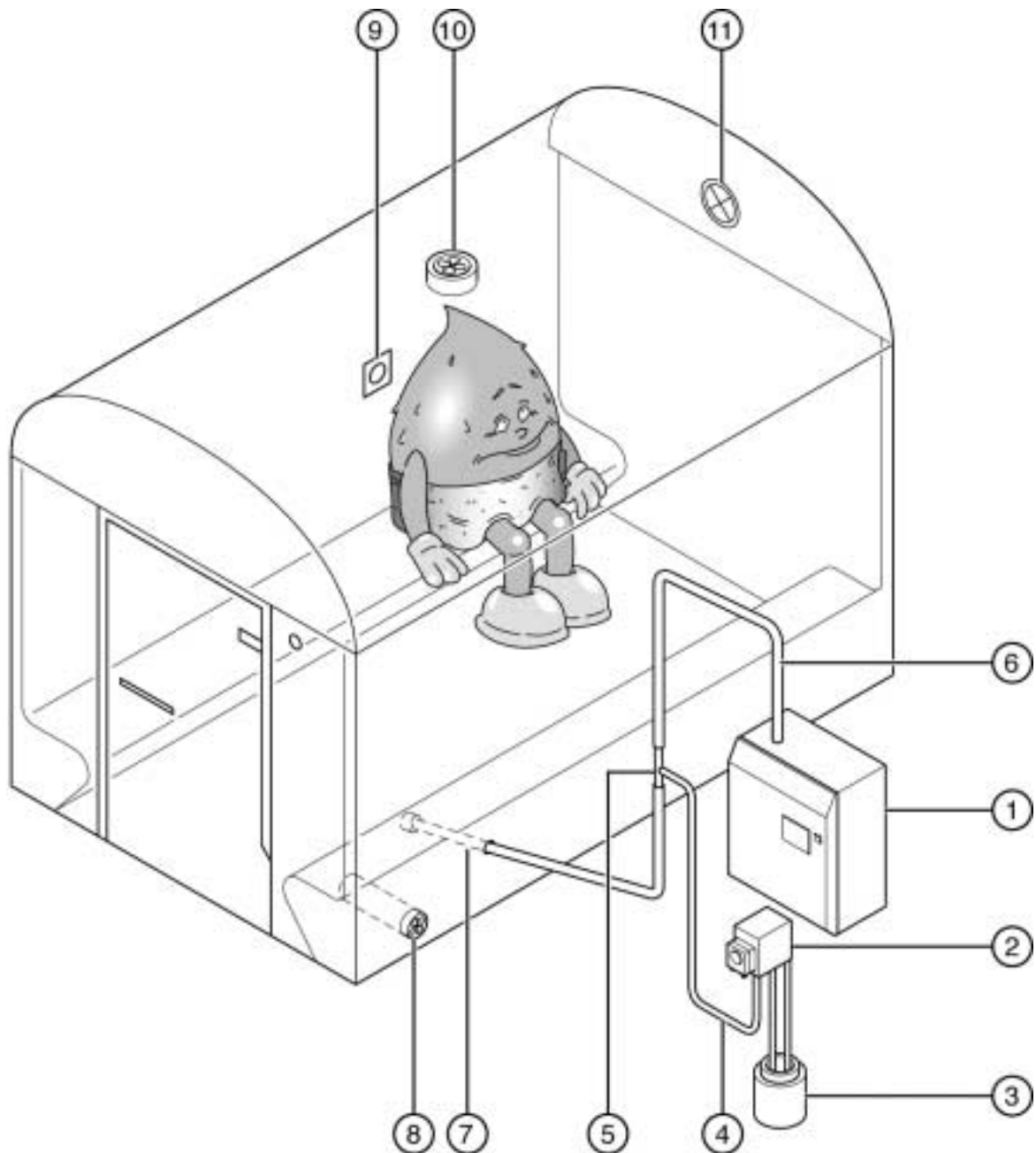
Automatic

Essence injector
D2 = Automatic

When the "Essence Injector" parameter (D2) is programmed to "Automatic", the essence injection is dictated by the programmed essence pause timing (G5) and injection timing (G4). Display shows E constantly. Factory settings are: Essence pause timing 5 minutes and injection timing 2 seconds. When the control switches on the essence injector the display shows "Essence On" in blink mode.

3.3 Steam Bath Features

Position	Description
1	Steam generator
2	Essence peristaltic pump
3	Essence receptacle
4	Essence hose </td
5	T-piece for essence injection
6	Steam hose
7	Steam manifold
8	Extraction fan
9	Temperature sensor
10	Supply fan
11	Cabin light



3.4 Steam Bath – Temperature Control

A **steam bath** must have a temperature sensor for measuring the temperature in the steam bath.

The DS control controls the HYGROMATIK steam generator dependent upon the temperature measured.

Depending upon the steam generator options chosen, an essence injector, light and fan can also be connected.

The following example shows the way in which the DS control functions:

Parameter (G1) to (G3) are programmed as follows:

"Hysteresis temperature controller" (G1) = **0,5K**

"Steam bath °C set value" (G2) = **45°C**

"Fan hysteresis" (G3) = **1K**

If the steam bath temperature drops below **45°C**, an increased steam production compensates for this.

If the steam bath temperature exceeds **45,5°C**, the 1-step mode shuts down steam production and the proportional mode regulates the steam production down accordingly.

The steam generator shut-off point results from the following:

"Steam bath °C set value" (G2) +
 "Hysteresis temperature controller" (G1) =
 $45^{\circ}\text{C} + 0.5\text{K} = 45.5^{\circ}\text{C}$.

If the steam bath temperature rises above the programmed nominal temperature of **45°C**, the DS control switches on the steam bath fan. The control switches off the steam bath extract fan at **44°C**. The switch point for the steam bath extract fan results from the following:

"Steam bath °C set value" (G2) –
 "Fan hysteresis" (G3) =
 $45^{\circ}\text{C} - 1\text{K} = 44^{\circ}\text{C}$



Note: Parameter (D1) "Steam bath fan (extractor)" must be set to automatic.

Steam is produced only if the steam bath temperature is below the nominal temperature. If the steam bath temperature is over the nominal temperature for any long period of time no steam will be produced. – the reasons for this could be:

- a well insulated steam bath and/or
- not enough air exchange in the steam bath
- too much heat in the steam bath e.g. through heated seating surfaces.

A steam bath extract fan supplements air exchange whereby the steam bath temperature drops faster. The temperature drop is compensated for by additional steam production. In

this way, the fan ensures an even, continuous steam production.



Note: Change parameters for "Temperature correction - actual value"(G0) and "Hysteresis temperature max." (G7) in accordance with section 4.3.1 "Steam Bath Parameters" (G0 – G9).

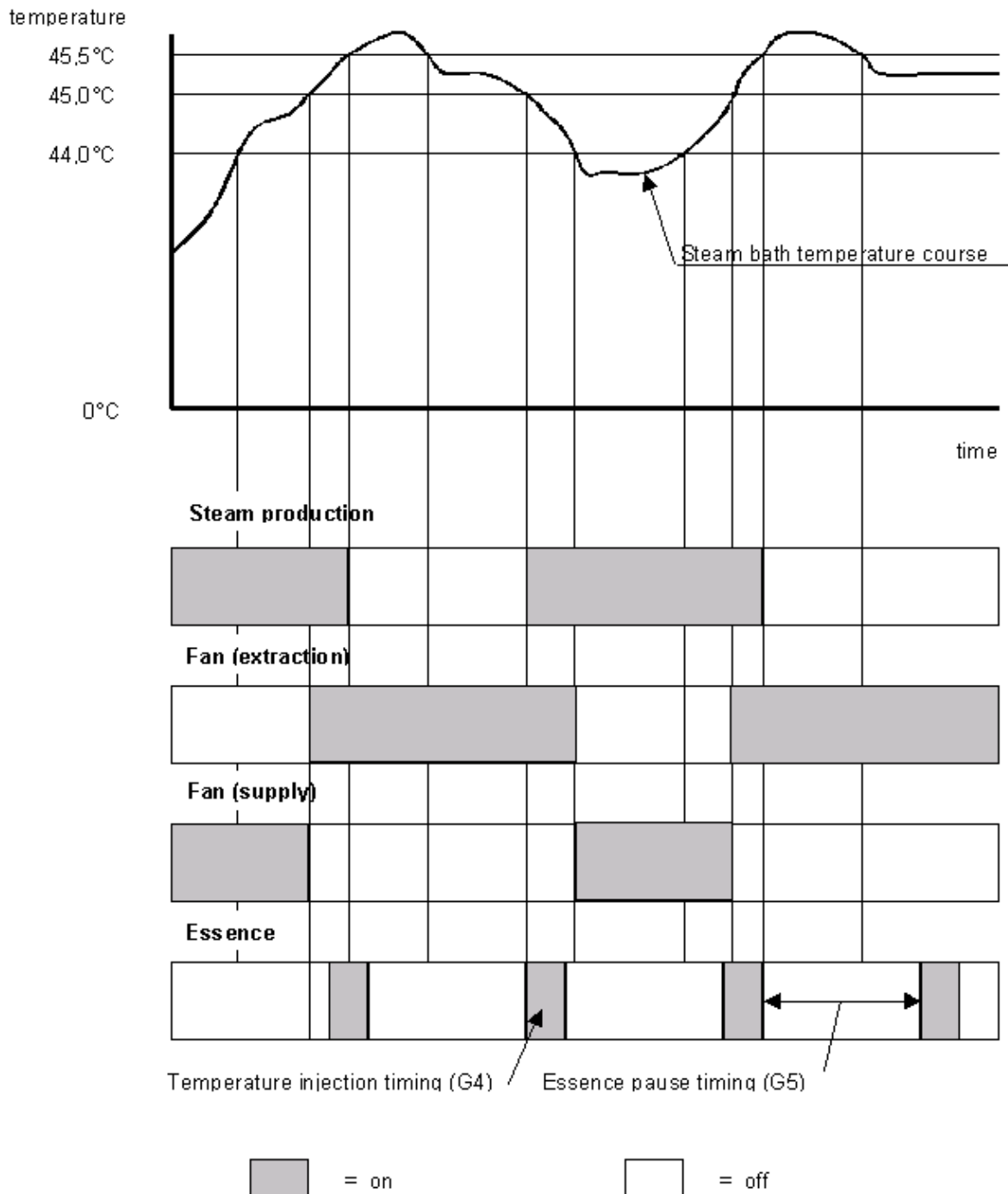


Diagram showing DS control functions dependent on steam bath temperature.

4. For the Operator

4.1 Introduction - Control

The HYGROMATIK steam generator is controlled using highly developed microprocessors. These intelligent and self-adapting microprocessors select the most economical steam generator operation dependent upon the available water quality. Optimised start procedures ensure rapid steam production and quick reaction to control demands. The HYGROMATIK control also controls and self-monitors the cylinder water conductivity, the entire blow-down process and the water inlet solenoid valve.

The HYGROMATIK microprocessor control type DS is a particularly user friendly control which supplies the user with all the most important information.

The DS control features:

- Operating modes selection: steam bath with and without status display
- Temperature control dependent upon operating mode
- A back-lit alphanumeric LC display
- An integrated computer interface RS232 or RS485 or according to customer specification a BUS system
- An optimal steam generator adaptation using freely adjustable parameters
- 4 LEDs at the user interface showing an immediate indication of the most important operational data
- Fuzzy logic controlled steam production
- A stand-by blow-down function to prevent standing cylinder water. The cylinder is completely emptied following any lengthy periods without steam production
- 4 optional connections for controls for steam bath fans, essence and light



The HYGROMATIK control type DS outputs and adjustment capabilities are detailed below.

4.2 Extended Main Menu

Steam bath F E
XX.X °C



Steam bath F E
Settings

Simultaneous pressing and holding down the buttons  and  toggles the level from the user level to the extended main menu level. The menu level toggle is successfully done when the display shows changing parameters

The main menu can now be scrolled using the buttons  .

Information

Any adjustments done in the extended main menu mode are permanent changes and remain changed even after the unit is switched off.

The menu is now extended and the following adjustments can be made:

Steam bath F E
Settings

Initial menu for parameter level – with and without code.

Steam bath F E
XX.X °C

Nominal steam bath temperature adjustments.

Essence Inject.
G4 = 2 sec.

Essence injection timing alterations. Shown only when parameter "Direct adjustment" (D3) is set to YES.

Essence Interval
G5 = 5 Min.

Alterations to the pause time between two essence injections. Shown only when parameter "Direct adjustment" (D3) is set to YES.

Steam bath F E
System test

Selection and start for various functions and system tests. See also section 8.6.

Steam bath F E
Language/Sprache

Setting for various menu languages. See also section 8.5.

Steam bath mode
D0 = no Status

Control operational modes adjustments with and without status display. See also section 4.3.3. Shown only when parameter "Direct adjustment" (D3) is set to YES.

Fan
D1 = Automatic

Fan mode adjustment. Selection between automatic (dependent upon steam bath temperature) and constant mode. Shown only when parameter "Direct adjustment" (D3) is set to YES. See also section 4.3.4.

**Essence
D2 = Automatic**

Essence injection adjustment. Selection between automatic mode (timing controlled) and operation without essence injection. Shown only when parameter "Direct adjustment" (D3) is set to YES. See also section 4.3.5.



Note: When the parameter "Direct adjustment" (D3) is set to NO, no alterations can be done in the main menu. The display shows only system operational information such as: present cabin temperature or essence ON. See also section 8.3 – “Settings with Code”



Note: If it is necessary to protect the parameters from change by unauthorised persons then it is advisable to set parameter (D3) to NO.



Note: Parameter "Select mode" (D0), "Fan" (D1), "Essence injector" (D2) and nominal temperature can be changed according to section 8.3 “Settings with Code”.

4.3 Steam Bath Functions

4.3.1 Steam Bath Parameters (G0 – G9)



Note: Steam bath parameters (G0) – (G9) can also be accessed over the parameter level using code (code 010).

**Temp. Correction
G0 = 0.0 K**

Temperature correction - actual value (G0)

The temperature sensors connected to terminals 6 and 7, can be calibrated using this parameter.



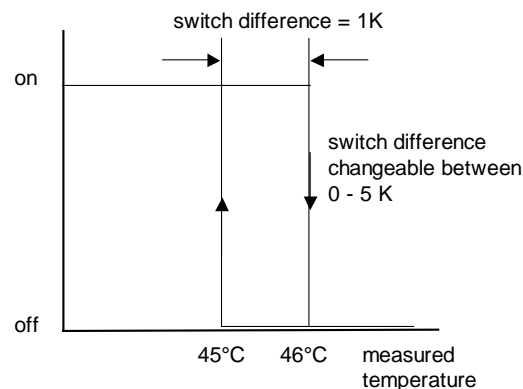
Note: The sensor is factory adjusted. Later adjustment with a second temperature measurement unit is possible between -5K to +5K.

**Hysteresis Tmp.
G1 = 1.0 K**

Hysteresis - temperature controller (G1)

This parameter adjusts the difference between the temperature controller ON and OFF switch point. The steam generator switches off at a "Steam bath °C set value" (G2) + "Hysteresis temperature controller" (G1). At a temperature lower than the "Steam bath °C set value" (G2), the steam generator switches on again.

Example: (G2) is 45°C and G1 is set at 1 K. The steam generator switches off at 46°C and on again at 45°C.



Steam bath °C set
G2 = 47.0°C

Steam bath temperature nominal value (G2)

This parameter adjusts the nominal steam bath temperature. This adjustment, in the parameter level with code, is a permanent adjustment, and remains effective even after switching off the system.

Hysteresis Fan
G3 = 1.0 K

Fan hysteresis (G3)

This parameter establishes the steam bath fan (extractor) switch-off point. The fan switches off when the "**Steam bath °C set value**" (G2) – "**Fan hysteresis**" (G3) is achieved.

Example: (G2) is set to 45°C and (G3) to 2 K. The fan switches off at 43°C.

Essence Inject.
G4 = 8 sec.

Essence injection timing (G4)

This parameter sets the essence injection duration.

Essence Interval
G5 = 5 Min.

Essence pause timing (G5)

This parameter sets the pause between essence injections.

Hysteresis Essence
G6 = 25 K

Essence hysteresis (G6)

This parameter establishes at which cabin temperature the essence injections occurs. The essence injection is activated when "**Steam bath °C set value**" (G2) - "**Essence hysteresis**" (G6).

Example: (G2) is set to 45°C and (G6) at 25 K. Essence injection is enabled at 20°C.

Hysteresis °C Max
G7 = 10 K

Hysteresis temp. max.(G7)

This parameter sets the maximum safe cabin temperature at which the steam generator switches off. The steam generator switches off at "**Steam bath °C set value**" (G2) + "**Hysteresis T max**" (G7).

Example: (G2) is set at 45°C and (G7) at 10 K. The steam generator switches off at 55°C.

Fan run-on time
G8 = 15 Min.

Fan run-on time (G8)

This parameter establishes whether and how long the fan runs on after the safety interlock is released.

Power Retention
G9 = 40%

Power retention (G9)

This parameter establishes whether the steam generator switches off after reaching nominal temperature or goes into an adjustable power retention mode from 1-50%. Power retention remains in function either until "**Steam bath °C set value**" (G2) + "**Hysteresis temp. max.**" (G7) or the temperature drops below "**Steam bath °C set value**" (G2).



Note: Power retention is designed to compensate for the cold feeling caused by constant fresh air supply



Note: For parameter (G2) – (G4) see also the diagram in section 3.4 "Steam Bath Temperature control".

4.3.2 Changing Temperature Nominal Value (G2)



Note: The temperature is adjustable in 0.5°C steps in the main menu. This adjustment is no longer valid after switching off the unit.

Example: Temperature set value shall be reduced from 45°C to 42°C.

Steam bath
42.5°C

Steam bath °C set
G2= 45.0°C

Steam bath °C set
G2= 42.0°C

Steam bath
42.4°C

- » Switch on steam generator. Display shows operational mode and the present cabin temperature.
- » Press once. Display shows programmed set temperature.
- » Press until display shows temperature value of 42°C
- » Press once.

The new set temperature value is programmed. The programme jumps back to the standard display after a few seconds. The display shows the present cabin temperature again.



Note: For parameter (G2) see also section 4.3.1 "Steam Bath Parameters". (G0 – G9).

4.3.3 Operational Mode Selection (D0)

The DS control is designed for use in steam baths. Additional information regarding steam production may be useful for servicing and/or initial operation.

Change from operational mode steam bath **without status** to operational mode **with status** as follows:


Steam bath mode
D0 = without status



Select **steam bath mode** parameter using Display shows:

Steam bath mode
D0 = without status

Steam bath mode
D0 = with status

Steam bath mode
D0 = with status

Verify parameter selection with  Return button. Cursor shows in display:

- » press  once. Display shows:
- » Verify selection with  Return. Cursor is no longer in display.

Control is now programmed for steam bath mode **with status** display.

4.3.4 Fan (D1)

4.3.4.1 Steam Bath Extract Fan (D1)

Note: In order to adjust the steam bath fan operation, parameter "Direct adjustment nominal value" (D3) must be set to YES.

Automatic

In this setting, the extract fan is dependent upon the steam bath temperature. The control switches the fan on when the nominal temperature is reached and off if it is lower than the nominal temperature, minus a hysteresis for the steam bath fan.

See also parameter "Steam bath °C set value" (G2) and "Fan hysteresis" (G3). When the control switches the fan on the first line of the display shows the letter **F**.

Note: See also diagram in section 3.4 "Steam bath-temperature control".

Continuous operation (constant on)

The steam bath fan operates independent of the steam bath temperature in constant on mode. The steam bath fan and the steam generator are both switched on or off using the on – off control switch.

4.3.4.2 Steam Bath Supply Fan

The supply steam bath fan is in function as long as the extractor fan is not switched on.

Note: Steam bath fan (supply) and steam bath fan (extractor) are opposite functions and can therefore not be controlled separately (one is ON while the other is OFF an vice versa).

4.3.5 Essence Injector with Peristaltic Pump (D2)

Note: In order to adjust the essence injector function, the parameter "Direct nominal value adjustment " (D3) must be programmed to YES.

Automatic

If the parameter "Essence injector" (D2) is set to automatic the essence injections are controlled by the programmed



Fan
D1 = Automatic



Fan F
D1 = On



Essence injector E
D2 = Automatic

"Essence pause timing" (G5) and "Essence injection timing" (G4). "E" is constantly displayed. The factory settings are: Essence pause timing 5 minutes and essence injection timing 2 seconds. When the control switches the essence injection on the display shows the blinking message: "Essence On".



Note: For essence injection and pause timing see also section 4.3.1 "Steam Bath Parameters" (G0 – G9).

Off

When the parameter "Essence injector" (D2) is programmed to **Off** no essence is injected into the steam.

Essence injector
D2 = Off

4.3.6 Direct Nominal Value Adjustment (D3)

When the parameter "Direct adjustment nominal value" (D3) is programmed to YES, adjustments can be made directly in the main menu. This might be an alteration of the nominal temperature or the operational mode, for instance. See also section 4.2 "Extended Main Menu".

When the parameter "Direct adjustment nominal value" (D3) is programmed to NO, no adjustments can be made in the main menu mode. An adjustment, for instance, of the nominal temperature can then only be done as outlined in section 8.3 "Parameter Setting with Code". Setting the "Direct adjustment nominal value" (D3) to NO is useful if prevention of access to unauthorised persons is desired.

Direct adjustment
D3 = Yes

4.3.7 Operational Mode Temperature Controller (U6)

The steam bath temperature can be controlled in a 1-step or proportional mode.

Controls
U6 = 1-step

Controls
U6 = int. Pi-Reg.











Note: Parameter "Controls" (U6) must be programmed accordingly. See section 8.3 "Settings with Code" for programming.

4.3.8 Output Limitation (P1)

The parameter "Output limitation" (P1) allows an adjustment of steam output between 25 and 100% of the nominal output, whereby the actual steam output is also dependent upon the measured temperature. A steam output limitation can sometimes be useful for a more accurate control.

Example: Output limitation shall be changed from 100% to 70%.

» Select **Settings** with   and verify with .

- | | |
|---|---|
| Outp. Limitation
P1 = 100 % | » Select value to be altered with   . Output limitation is to be altered therefore display must show: |
| Outp. Limitation
P1 = <u>1</u>00 % | » Verify parameter selection with  . Cursor appears under first digit. |
| Outp. Limitation
P1 = <u>0</u>00 % | » Press  . The first digit changes from 1 to 0. |
| Outp. Limitation
P1 = <u>00</u>0 % | » Press  once. Cursor is below second digit. |
| Outp. Limitation
P1 = <u>07</u>0 % | » Press   until display shows 7. |
| Outp. Limitation
P1 = <u>070</u> % | » Press  twice. Cursor is no longer displayed. 7 is still shown. |

Output limitation is set to 70 %.

- » Leave **Parameters** submenu with .

The parameter change is only permanent (until the next change) after the **Parameters** submenu is properly escaped using the escape button.

5. For the Fitter

5.1 Temperature Sensor Installation

A temperature sensor must be installed in the steam bath cabin. This sensor measures the cabin temperature and directs this information to the controller. This data is used by the controller to control steam production

Please note:

- Do not locate the sensor in the vicinity of the steam manifold.
- Locate the sensor on the wall – not under, or in it, or under the panelling.



Note: The best installation position for the temperature sensor is between 800 – 1000 mm above seating height (approx. at the height of the steam bath user's head).



Attention: Do not attempt to affect steam production by manipulating the sensor (e.g. by covering over or by using cold water).

5.1.1 Connection Temperature Sensor

Connect the temperature sensor wires to the terminals 6 and 7 in the HYGROMATIK steam generator.

The table on the left is for checking purposes. The sensor is factory adjusted. A later calibration from - 5K to + 5K is possible with the use of a second temperature measurement unit.

Temperature-Resistances Table	
Temperature in °C	Resistance in kOhm
10	30,4
20	18,8
30	12,0
40	7,8
50	5,2
60	3,6
70	2,5
80	1,8
90	1,3
100	1,0

5.2 Essence Injector Installation with Peristaltic Pump (Option)



Note: The DS control controls this function only when the parameter "Essence injector" with peristaltic pump (D2) is set to **Automatic**.

The HYGROMATIK essence injector with peristaltic pump supplies the steam bath with essence. Its most important components are the essence container, (3) and the peristaltic pump (2). Frequency and impulse timing can be set in the control unit. Essence injection occurs only during steam pro-

duction. The essence is admitted into the steam hose under pressure. HYGROMATIK supplies the necessary T-piece.

In the unlikely event of an essence hose break an essence return hose returns the essence to the essence container.

Please note:

- Locate essence inlet (5) as close as possible to the steam bath.
- Locate essence inlet so that no essence can flow into the HYGROMATIK steam generator (1).
- Locate peristaltic pump (2) above the essence container (3), but not higher than 1,7m .
- The essence inlet (5) may be located no more than maximal 4m above the essence pump.

Installation:

- » Install essence container (3) at a suitable position.
- » Install peristaltic pump (2) above the essence container – but not higher than max. 1,7m.
- » Install suction hose between peristaltic pump (2) and essence container (3).
- » Install essence return hose between peristaltic pump (2) and essence container (3).
- » Install hosing (4) between peristaltic pump (2) and essence inlet (5).

5.2.1 Connecting Essence Injector and Peristaltic Pump 24 V (Option)



Note: The DS control controls the essence injector with peristaltic pump only when parameter (D2) is set to **Automatic**.

Connect peristaltic pump to steam humidifier connecting wires to terminals 8, 9 and 13 (24 V-Peristaltic pump). The pump has a 3,15 A fine-wire fuse. The maximum connection output is 75 W.

5.2.2 Connecting Essence Injector with Peristaltic Pump 230 V (Option)

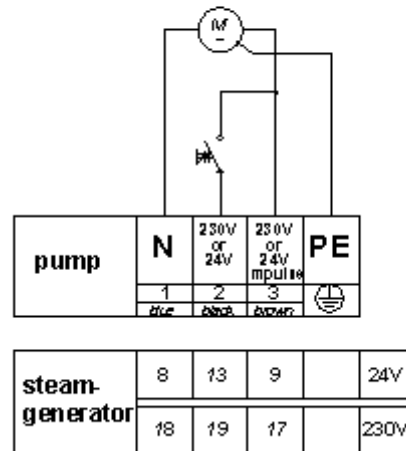


Note: The DS control controls the essence injector with peristaltic pump only when parameter D2 is set to **Automatic**.

Connect pump connecting wires to steam generator terminals 17, 18 and 19 (230V peristaltic pump). The pump has a 1.6 A fine-wire fuse. Maximum wattage is 75 W.

connection assignment:

unit with DS-control



Connection plan from the HYGROMATIK peristaltic pump

5.3 Fan Installation (Option)

The steam bath should have a steam bath fan (extractor) (10) installed. The fan extracts warm air from the steam bath thus ensuring a continuous steam input and a stable temperature.

Depending upon the steam bath configuration, a steam bath fan (8) can also be installed and controlled.

The extractor steam bath fan should be installed:

- high up and
- opposite the air supply opening.

The steam bath supply fan should be installed:

- low down and
- opposite the extractor fan.

5.3.1 Steam Bath Extractor Fan Connection 24 V (Option)

Connect the fan wiring to the terminals 10 and 11 in the steam generator. The fan has a 1,6 A fine-wire fuse. The maximum connection output is 40 W.

5.3.2 Steam Bath Supply Fan Connection 24 V (Option)

Connect the fan wiring to the terminals 10 and 12 in the steam generator. The fan has a 1,6 A fine-wire fuse. The maximum connection output is 40 W.



Note: The DS control controls the fan only when parameter (D1) is set to **Automatic**.

5.3.3 Connecting Inlet and Extraction Fans 230 V (Option)



Attention: A safety voltage of 24V for air and light must be used in the steam cabin.

When using 230 V fans, an appropriate distance must be ensured between fan and steam cabin.

Connect extractor fan connecting wires to the designated steam generator terminals 20 and 21 (230 V) and for the inlet fan the terminals 20 and 22 (230V). The fan has a 1.6 A fine-wire fuse. Maximum wattage per fan is 40W.

5.4 Cabin Light Installation (Option)

A cabin light can also be connected to the steam generator.

5.4.1 Cabin Light Connection (Option)

Connect the 24V cabin light wiring to terminals 13 and 14 in the steam generator.

The cabin light has a 1.6 A fine-wire fuse. The maximum connection output is 40 W. The light is operated by an On/Off switch, which has to be installed on site.

5.5 Remote Switching

Terminals 1 and 2 are reserved for an optional remote steam generator On/Off switching facility. When there is an electrical bridge between terminal 1 and terminal 2 the steam generator can be operated. If terminals 1 and 2 are not electrically connected then the generator cannot be operated.



Attention: The contacts which are connected to terminals 1 and 2 must be potential free and suitable for switching 230V.

6. Potential Free Signal Outputs

The contacts can be used for 250V/5A.

Collective fault:

The DS control is equipped with a **collective fault** feature. The potential free contact is a transfer contact.

The connection terminals are located on the PCB. (normally-open contact: connection terminals 28 and 30; normally-closed contact: terminals 28 and 29).

The **collective fault** message includes the fault messages: "**Blow-down fault**", "**Service**", "**°C sensor fault**", "**°C max fault.**", "**Internal fault**", "**Fault contactor**" and "**Filling fault**".



Attention: For the 24 V option use only 24 V for the collective fault message.

Operation:

The "**Operation**" message can be taken directly off from the main contactor in accordance with the wiring diagram.

7. Initial Operation



Attention: The unit may only be put into operation by qualified personnel.

Switch off steam generator:



Attention: Before the unit can be put into operation, it is necessary to know how it is switched off.

- » Switch off unit with control switch.
- » Shut down water supply.

Switch on steam generator:

- » Open up fresh water supply.
- » Switch on unit with control switch.

Hygromatik®
EMP Vers x.y

Self-Test
LEDs on

Self-Test
Part. Blow-down

Steam bath
45°C

The following functions are included in the start-up routine:

- The unit goes through a self-test program.
- The control LEDs all light up for a short period.
- After this the blow-down pump is activated for some seconds. This is for function monitoring and a partial water change when re-initialising the system.
- After a successful partial blow-down, the display shows "Steam bath" and present cabin temperature.
- When there is a steam demand, the system opens up the inlet solenoid valve and fills water into the cylinder.
- As soon as the electrodes immerse, the current raises from 0 A to maximum nominal current. Nominal current can be read off the system name plate.

Please note the value set in "Output limitation" (see section 4.3.8). Factory setting is 100%.

- The filling function is halted as soon as the nominal current is reached.
- The water temperature in the steam cylinder increases after a short period. The electrical conductivity of the water rises as a result of the increased water temperature. And therewith also the current. The higher current may cause an over-current partial blow-down. Steam production begins within a few minutes, assuming normal water conductivity.

Further tests:

- All electrical functions must be capable of activation.

As soon as the solenoid valve begins periodically supplying water, the system functions constant nominal output is reached, and the cold start mode is completed.

- » Keep an eye on the system for 15-30 minutes. If there are any signs of leakage, switch the system off.
- » Repair leakage's.



Attention, Voltage: Please comply with the safety instructions with regard to components carrying voltage



Attention, Voltage: The unit cover panel must be closed. This ensures an adequate earth connection.

8. Operation



Attention: The unit may only be used by fully qualified and designated personnel.

Put the unit into operation in the following way:

- » Open up fresh water supply.
- » Switch on unit using control switch.




Now the functions described in section 7 "Initial Operation" begin.



8.1 Electronic Name Plate

The electronic name plate contains 6 unit-specific data:

Electronic name plate	
S1	Cylinder number
S2	Nominal steam output [kg/h]
S3	Software version
S4	Unit type
S5	Year of manufacture
S6	Serial number




Parameter
*** S *

Select **Parameter** sub menu with   and verify with .

- » Select  letter S. Cursor appears under **S**.
- » Press .

Nominal Capacity
S2 = 45 kg/h

Display shows unit output.

- » Further information can be read off using  .
- » Leave S-parameter level with .

8.2 Further Parameters

The following parameters are accessible without access code in the parameter level:

Parameter	Description
P0	Code input
P1	Output limitation [%]
P6	Operation time counter (only read-off) [days:hours]

Code
P0 = >***<

Outp. Limitation
P1 = 100 %

Hours Run Meter
P6 = 10 : 2

Code input (P0)

Access to some parameters are security coded in the interests of safety. parameter (P0) is used for code input. See also section 8.3. "Parameter Setting Using Codes".

Output limitation (P1)

Parameter "Output limitation" (P1) allows an adjustment of the nominal steam output between 25 and 100% of the nominal output. The actual steam output is dependent upon the measured temperature.

Operation time counter(P6)

This parameter displays the time which the unit has spent producing steam.

8.3 Settings with Code

The DS controller is equipped with a modern micro-computer chip. This programmable, non-volatile data storage facility allows the user to change operational parameters to suit his requirements. In the interests of security, parameter change access is possible only after entering a code in parameter (P0). Access to the following values is achieved by using the code (P0) = 010 (extended user level). If the parameters are to be **changed permanently** this must be confirmed with the code (P0) = 015 by leaving the Settings program level.

Example: Changing "Operation mode" function using parameter U6.

Operation mode function (U6) is to be changed from ON/OFF to internal PI controller:

Code input
P0 = >***<

Code input
P0 = >000<

Code input
P0 = >000<

Code input
P0 = >010<

Parameter
P1 = 100%

Parameter set
* A * U S * D G

Pump without K1
U5 = off

Operation mode
U6 = ON/OFF Cont.

- » Select sub menu Parameters with and confirm with .
- » Select parameter (P0) using .
- » Confirm with . Cursor appears under first digit.
- » Press once. Cursor appears under 2nd digit.
- » Press once.
- » Press twice. Display shows following after correct code input:
- » Select parameter **U** with till cursor appears under **U**. Display shows:
- » Confirm parameter with . Display shows:
- » Press once.
- » Confirm parameter with . Cursor appears under 1st letter:

Operation mode
U6 = int. PI-Control

Operation mode
U6= int. PI-Control

Parameter set
* A * U S * D G

Code input
P0 = >***<

Code input
P0 = >000<

Code input
P0 = >000<

Code input
P0 = >010<

Code input
P0 = >010<

Code input
P0 = >015<

- » Select required Operation mode with . Display shows:
- » Confirm parameter with . Display shows:
- » Exit sub-menu **Parameter** with . Display shows:
- » Press again. Display shows code input request again.
- » Confirm parameter with . Cursor appears under 1st digit.
- » Press once. Cursor appears under 2nd. digit.
- » Press once.
- » Press once. Cursor appears under 3rd digit.
- » Press five times.
- » Press once. Following correct code input, display shows first "saved" than sub-menu **Settings** again.

The parameter change is now permanently stored. All changes which are not stored with the Code=015 will be volatile by switching off the humidifier.

8.4 Parameter Description

Standby blow-down (A4)

Stand-by Blow-d.
A4 = 70 Min.

If the internal steam generator should demand no humidity for any considerable time period, it is advisable to blow-down the cylinder water. The parameter "Stand-by blow down" (A4) sets the timing at which an automatic full blow-down occurs. Water is fed to the cylinder only after a new steam production demand. Values can be adjusted in 10 min-steps in a range of 0-2550 minutes.

Address (long) (A5)

Address long
A5 = 173

Three digit address for RS 485 network connection.

Address (short) (P5)

Address short
P5 = 2

One digit address for RS 485 network connection.

Pumping without main contactor (U5)

Pump without K1
U5 = Off

This parameter establishes the main contactor condition during a blow-down. Adjustment "On" switches the contactor off during the blow-down. This adjustment can be advisable when the power line has a current-overload fault protection (FI).

Operation Mode
U6 = int. PI-Reg

Temperature controller controls (U6)

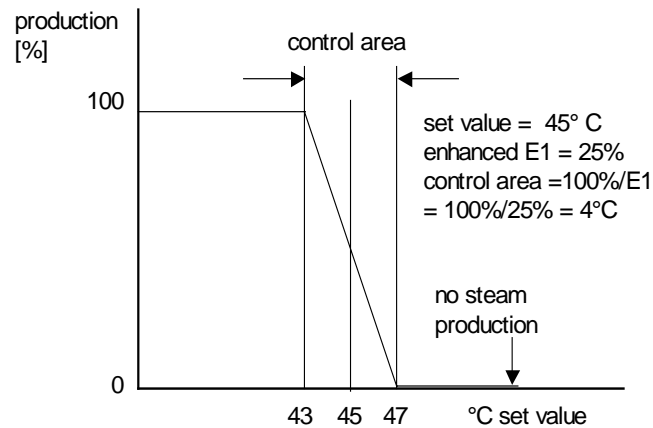
This parameter switches the steam generator control characteristics between 1-step and proportional. See also section 4.3.7 "Temperature Controller Operational Mode".

Xp-PI-Controller
E1 = 5%

Enhanced PI-controller (E1)

This parameter sets the control zone for the controller. A larger Xp value (proportional – enhancement factor) in E1 causes a smaller control zone and vice versa.

Example:



Integrated action time PI-controller (E2)

After expiry of the integral action time T_n , steam production is adapted by 1% following an absolute control deviation of more than 1% nominal value.

Tn-PI-Controller
E2 = 60 Sec.

Steam amount service (P2)

The DS control registers the total amount of produced steam. Parameter "Steam amount service" (P2) contains a figure which is used to compare the produced steam amount with the service interval. When the steam generator has produced this amount of steam, a red LED on the operating panel lights up permanently (service message).

Service Interval
P2 = 5E3kg

Service intervals are dependent upon the water quality (conductivity, carbonate hardness) and from the steam amounts produced. Parameter "Steam amount service" (P2) can be set by the user to service intervals according to the water quality.

Reset service interval (P3)

The service interval is reset following a service as follows (red LED is still on):

- » Selects sub menu **Parameters** with   and verify with .

Code
P0 = >***<

» Select parameter **(P0)** with .

Code
P0 = >000<

» Verify selection with , cursor appears under digit 1.

Code
P0 = >000<

» Press once, cursor appears under digit 2.

Code
P0 = >010<

» Press once.

Settings
P1 = 100%

» Press twice. Display shows the following after correct code input:

Reset Serv. Int.
P3 = No

» Select parameter **(P3)** with , display shows:

Reset Serv. Int.
P3 = No

» Verify with , cursor appears under digit 2.

Reset Serv. Int.
P3 = Yes

» Press once

Reset Serv. Int.
P3 = No

» Reset service interval with , red LED switches off. Display shows message:

» Escape sub-menu **Settings** with .

8.5 Language

This menu establishes the desired steam generator communication language:

Language
German
English
French
Japanese / (Spanish on demand)

Language / Sprache
German

» Select sub-menu **Language / Sprache** with and verify with .

» Display shows:

» Select desired language with

» Verify with .

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

8.6 System Test

This menu allows tests of various steam generator functions (e.g. during initial operation).

The following test routines are available:

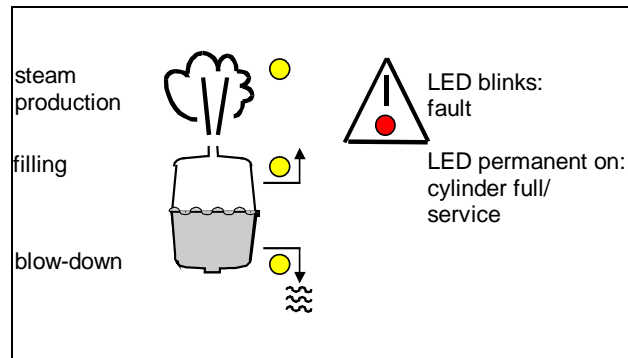
Self Test
LED test
Demand test
Valve-/pump test
Auto test (comprises all test routines)

System Test
LED-Test

- » Select sub-menu **System test** with and verify with .
- » Display shows:
- » Select desired test with .
- » Verify with , the selected test is begun.
- » Escape sub-menu **System Test** with .

LED test

This routine tests whether the LED are functioning correctly. The LEDs **Operation**, **Filling**, **Blow-down** and **Fault/Service** are activated for a few seconds.



Extract from DS control display- and operating panel

LED-Test
LED Humidificat.

Example: The **Operation** LED is activated. The yellow LED must light up.

System Test
MV-/Pump-Test

Solenoid valve-/pump test

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

Display	Condition
MV-/Pump-Test Filling Fault	Solenoid valve not functioning, or no water inlet. See section "Faults", Filling fault.
MV-/Pump-Test Blow Down fault	Blow-down pump not functioning. See section "Faults", Blow-Down fault.



Note: This test can last up to 30 minutes.

Steam generator demand test

System Test Demand Test

This test checks whether terminals 1-2 are enabled. Demands from the internal controller are also checked out in the **Steam bath with proportional temperature controller** mode. See also section "Fault" in this instructions.

Possible Display	Condition
Demand test Demand On	Remote switch is switched on. The steam generator is in operation in the steam bath, 1-step mode.
Demand test Demand Off	Remote switch is switched off. Steam generator is in ready mode.
Demand test Demand 63% *	Remote switch is closed. There is a demand from the steam generator. Demand is displayed as a percent value. The steam generator is in operation.
Demand test No Demand *	There is no demand from the sensor. Steam generator is in operation.

* Only in steam bath with proportional temperature control mode.

Automatic test

System Test Auto Test

The automatic test carries out all tests described, one after the other. Every test closes with a message in the display. The message is displayed for a few seconds. The next test is carried out immediately following this displayed message.

8.7 Fault Messages



Note: See section 9 "Faults" for fault solutions.

The DS control continuously monitors the functions: Blow-down pump, inlet solenoid valve, main contactor and temperature sensor signal. If the control registers a fault, the steam generator is switched off.

HYGROMATIK®
Service

The control also switches the steam generator off after 1 hour of operation in the cylinder-full condition. Display shows **Service**. In most cases a cylinder maintenance is then necessary (see unit technical documentation).

A **Fault message** causes the red LED on the operation and display unit to blink. The steam generator has switched off automatically. Display may show the following messages:

Blow-down Fault

The DS control activates the blow-down pump periodically in order to keep the cylinder mean water conductivity constant.

If no, or too little, water is drained during a blow-down, the control flags a **Blow-down Fault**.

HYGROMATIK®
Blow-down Fault

Filling Fault

The control activates the water inlet solenoid valve for maximum 30 minutes. The water level must be in accordance with the programmed current during this period. If this is not the case then the control flags a **Filling Fault**.

HYGROMATIK®
Fault Filling

Main Contactor Fault

The control switches the main contactor on when there is a demand from the internal controller, and terminals 1 – 2 are enabled. The control switches the main contactor off when terminals 1 – 2 are not enabled, or when no demand is present.

If the control measures a current for a period of 15 seconds although the main contactor should be in the off condition, the control flags a **Main Contactor Fault**.

The cylinder full message is shown only when the main contactor is on, i.e. when a demand is present and the terminals 1 – 2 are enabled. If the control registers cylinder full for longer than 15 seconds without a terminal 1 - 2 enable, or no demand present, then the control flags a **Main Contactor Fault**.

HYGROMATIK®
Fault Main Contactor

Temperature Sensor Fault

If the temperature is measured as being outside the allowed sensor limits of 0° to 130°C (50,4 to 0,42 kOhm) for longer than 5 minutes, the control flags a **°C Sensor Fault**. See also table section 5.1.1 "Temperature Sensor Connection".

HYGROMATIK®
Fault °C Sensor

Maximum Temperature Fault

If the measured cabin temperature is over the allowed maximum temperature for longer than 60 seconds, the control flags a **°C Max Fault**.

HYGROMATIK®
Fault °C Max.

8.8 Blow-Down

Partial Blow-down

The control system automatically dilutes the concentration of dissolved solids in the steam cylinder whenever necessary.

Full Blow-down

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

Manual Drain:

- » Press the on/off control switch in position "II". The water will be drained off manually.



Note: The cylinder base is equipped with a hose for manual draining. See technical documentation for CompactLine or HyLine.

8.9 Stand-By Blow-Down

If the unit is on stand-by for an extended period it can drain itself automatically. This prevents standing cylinder water. Normally this function is not activated. For activating the function see chapter 8.4 Setting A4.

9. Faults



Attention: Switch off the unit immediately when faults occur. Faults may be repaired only by qualified personnel and in accordance with the safety notes

Message / Fault	Possible cause	Action
<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"> Service 42.2 °C </div> <p>The system switches off after 60 min. in operation in cylinder full condition. Red LED blinks.</p>	<ul style="list-style-type: none"> • unit requires maintenance: <ul style="list-style-type: none"> – Cylinder full of scale deposits which limit the electrodes immersion depth. – Electrodes worn out. • Phase defective (external fuse faulty). • Phase L3 is not fed through current transducer ring. • With very low water conductivity continuous steam production is insufficient in order to concentrate and raise the water conductivity. 	<p>Clean steam cylinder and electrodes or replace electrodes.</p> <p>Replace electrodes. (If electrode wear is high, see note in section "Electrode Exchange" in unit handbook)</p> <p>Replace fuse.</p> <p>Feed phase through current transducer ring.</p> <p>Establish water values and/or contact HYGROMATIK about the problem.</p>
<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"> Internal Fault 42.2 °C </div> <p>Red LED blinks. Control switches unit off automatically.</p>	<ul style="list-style-type: none"> • Strong external factors which may cause controller irritations. • Internal watchdog routines determine controller malfunction. 	<p>Restart system using main switch</p> <p>Contact HYGROMATIK if this condition persists.</p>


Message / Fault	Possible cause	Action
<p>Blow-down Fault 42.2 °C</p> <p>Red LED blinks. Control switches unit off automatically.</p>	<ul style="list-style-type: none"> • Blow-down pump or discharge system blocked by scale deposits. • Blow-down pump is not electrically activated. • Defective blow-down pump. • Solenoid valve not closing correctly. Water level in cylinder sinks very slowly although the blow-down pump is pumping water. 	<p>Check blow-down pump, discharge system and cylinder for scale deposits. Clean and/or replace. See also section "Exploded view" in unit handbook)</p> <p>Check wiring connections.</p> <p>Check whether relays on PCB are switching (clicking).</p> <p>Change blow-down pump.</p> <p>Check solenoid valve.</p>
<p>Fault Filling 42.2 °C</p> <p>Red LED blinks. Control switches the unit off automatically.</p>	<ul style="list-style-type: none"> • Dirty solenoid valve or supply hoses. • Solenoid valve or coil defective. • No water inlet supply: <ul style="list-style-type: none"> – Solenoid not connected. – Water supply cock unopened. • Water seeps from drain-hose while pump is inactive. <ul style="list-style-type: none"> – Faulty steam hose installation (water-block). – Over-pressure in duct system (max. over-pressure 1500 Pa). 	<p>Clean solenoid valve and/or supply hoses.</p> <p>Measure coil and/or change out coil and solenoid valve.</p> <p>Check wiring connections.</p> <p>Open water supply cock.</p> <p>See section "Installation types" in unit handbook.</p> <p>Re-lay steam hose according to section "Installation types" in unit handbook.</p> <p>Lengthen drain hose, contact HYGROMATIK.</p>
<p>Fault Sensor 42.2 °C</p> <p>Red LED blinks. (Temperature sensor Fault) Control switches off unit automatically.</p>	<ul style="list-style-type: none"> • Sensor wiring breached (infinite resistance). • Sensor wiring short circuit (no resistance). 	<p>Check wiring.</p> <p>Check connection.</p> <p>Change temperature sensor.</p>

Message / Fault	Possible cause	Action
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;"> <p>Cylinder Full 42.2 °C</p> </div> <p>Red LED lights up constantly. Unit is in operation.</p>	<ul style="list-style-type: none"> • Nominal current or nominal output not reached although cylinder filled up to maximum-limitations electrode. Water input is interrupted. Possible causes: <ul style="list-style-type: none"> – Water conductivity too low. – Cold start. – Re-start following full blow-down. – Changing water conductivity. – Electrodes worn out. • Unit requires maintenance. • Maintenance interval is overdue. • No electrode supply cable fed through current transducer ring. 	<p>Continuous steam production and increasing water conductivity can cause the control lamp to switch off automatically after a period of operation time. Nominal output is reached automatically.</p> <p>Check water values and/or contact HYGROMATIK.</p> <p>Replace electrodes.</p> <p>See Service section in unit handbook.</p> <p>Check or service steam generator. Reset service interval with parameter "Reset service interval" (P3). Service interval can be changed to suit water quality using parameter (P2).</p> <p>Feed a cable through current transducer ring</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;"> <p>Fault °C Max 56.0 °C</p> </div> <p>Red LED blinks. (Maximum temperature fault) Control switches unit off.</p>	<ul style="list-style-type: none"> • Heat accumulation in cabin. • Additional heat source in steam cabin. • Power retention to high. 	<p>Ensure continuous heat extraction.</p> <p>Parameter G9 = 0. See chapter 4.3.1</p>

Message / Fault	Possible cause	Action
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 5px;"> Fault contactor 42.2 °C </div> <p>Red LED blinks. Control switches off unit automatically.</p>	<ul style="list-style-type: none"> • Main contactor defective. • Seized up relay on PCB. 	<p>Change main contactor.</p> <p>Change PCB.</p>
<p>No steam production, although steam generator is on. Display is illuminated. Electrodes have no voltage supply.</p> <p>Note: Demand and signal tests give additional possible causes See section "System Test".</p>	<ul style="list-style-type: none"> • No steam demand is present when temperature or humidity greater than set nominal values. • Unit is switched off remotely (terminals 1 and 2 in steam generator are not bridged). • Steam bath operation only: Too little air exchange. Steam bath temperature remains over programmed nominal value for some time. 	<p>Check nominal and actual temperature values. See these instructions in section 3.2. Check sensor function.</p> <p>Switch on system remotely and/or bridge terminals 1 and 2. See instructions in wiring diagram.</p> <p>Install fan.</p>
<p>No steam production. Electrodes have voltage but no water is supplied.</p>	<ul style="list-style-type: none"> • Water supply unopened or solenoid valve not electrically activated. 	<p>Open water supply.</p> <p>See also Filling Fault.</p>
<p>No steam production although steam generator on. Display is dark.</p>	<ul style="list-style-type: none"> • Control fuse F1 1.6 A is defective. • Phase L1 missing. (external Fuse has blown or is defective.) 	<p>Check and/or change fine-wire fuse. See also section "Wiring Diagrams" in these Instructions.</p> <p>Change external fuse and ascertain why it has blown.</p>
<p>Set temperature not reached.</p>	<ul style="list-style-type: none"> • Unit output limitation prevents full unit output. • Unit is operating in "Cylinder full mode". • Wrong output specification. • One phase missing (external fuse). 	<p>Check parameter "Output limitation" (P1). See section "Parameter Setting without Code".</p> <p>See message Cylinder-Full/Service.</p> <p>Check output data, steam bath insulation and size.</p> <p>Replace fuse.</p>

Message / Fault	Possible cause	Action
Temperature too high	<ul style="list-style-type: none"> Temperature sensor incorrectly calibrated. 	Check parameter "Correcting temperature actual value" (G0). See section 4.3.1.
No, or too little essence in steam bath.	<ul style="list-style-type: none"> No essence in container. Essence inlet not switched on. Essence filling time too short. Essence pause time too long. Essence fuse or relays in controller defective. Peristaltic pump hose defective (essence returning to essence container). 	Refill. Switch on (check voltage supply on essence solenoid valve and on peristaltic pump). Increase time. Decrease time. Change fuse (check power supply on essence solenoid valve). Replace peristaltic pump hose.
Too much essence in steam bath.	<ul style="list-style-type: none"> Essence filling time too long. Essence pause time too short. Essence permanently on. 	Shorten time. Lengthen time. Clean essence solenoid valve and/or change gasket.
Blow-down pump activated, but no water pumped.	<ul style="list-style-type: none"> Cylinder base or blow-down system clogged. 	Clean.
Cylinder empties completely after blow-down although pump is off.	<ul style="list-style-type: none"> Elbow breathing pipe clogged. 	Clean and/or change elbow adapter. See also unit handbook.

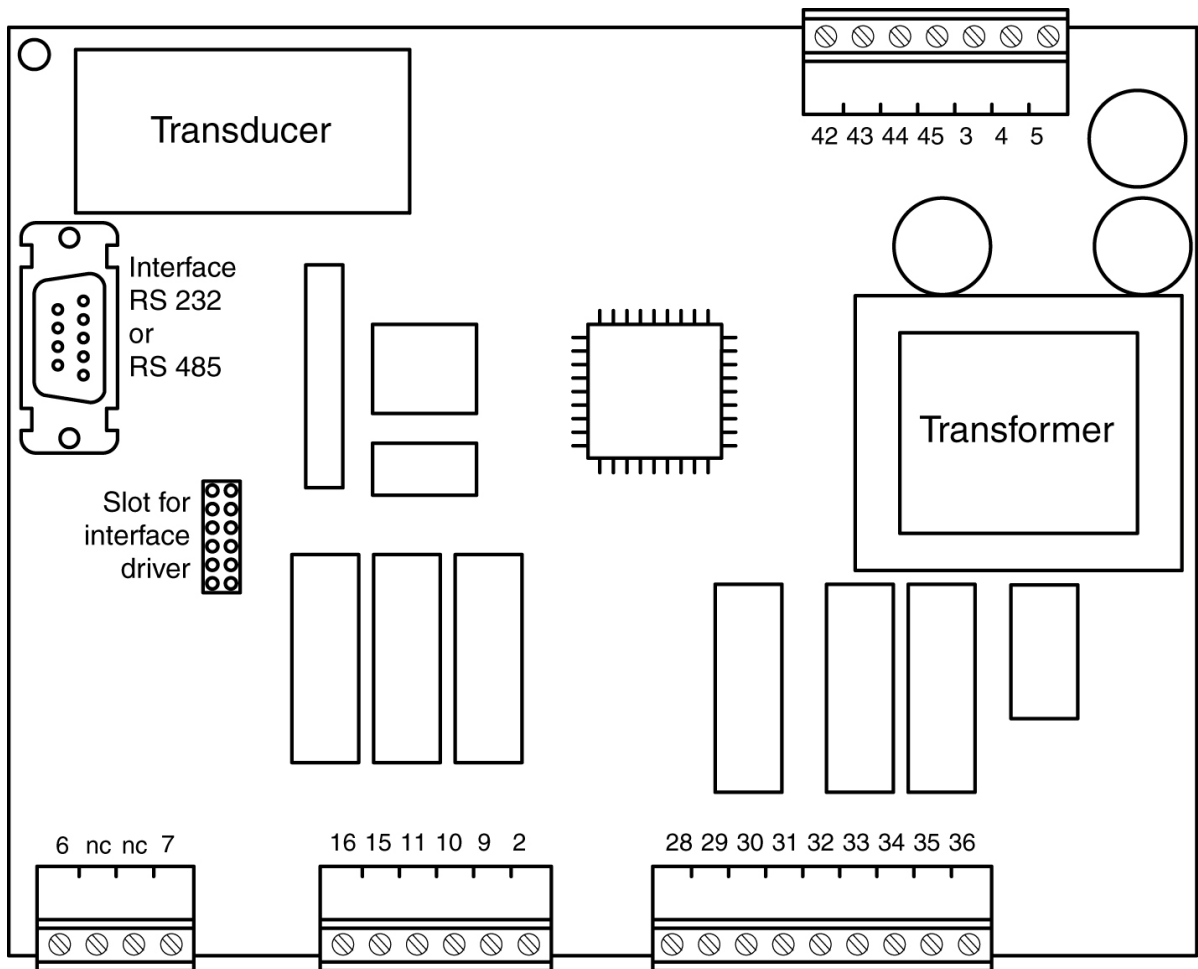
Message / Fault	Possible cause	Action
Water puddles on inside of base.	<ul style="list-style-type: none"> • Cylinder wrongly assembled after service. <ul style="list-style-type: none"> – Base or flange O-ring damaged, not changed or missing. – Flange damaged. – Scale deposits in flange. – Not enough, or unevenly spaced flange clamps. • Cylinder seated incorrectly on base. • Drained water cannot flow away freely. 	<p>Re-assemble cylinder as described in section "Cleaning Steam Cylinder" in unit handbook.</p> <p>Seat cylinder as described in section "Cleaning Steam Cylinder" in unit handbook.</p> <p>Ensure free flow. See section "Water discharge" in unit handbook.</p>
Water seeps from cylinder top part.	<ul style="list-style-type: none"> • Steam- or condensate hose clamp loose. • Electrodes seated incorrectly. • Main contactor defective Cylinder-Full not registering. • Steam hose adapter incorrectly installed or O-ring not changed when serviced. • If condensate not returned to steam cylinder, a condensate cap must be installed. 	<p>Tighten.</p> <p>Check and rectify.</p> <p>Change main contactor.</p> <p>Change O-ring. See section "Cleaning Steam Cylinder" in unit handbook.</p> <p>Replace or install condensate cap.</p>

Message / Fault	Possible cause	Action
Unit functions are disturbed.	<ul style="list-style-type: none"> • Voltage spikes caused by external user. 	Switch control off then on again.
No steam out of steam manifold. Water seeps periodically from drain hose while pump not activated.	<ul style="list-style-type: none"> • Incorrect steam hose installation (water stoppage). • Over-pressure in duct system (max. over-pressure 1500 Pa). 	Install steam hose according to section "Installation Types" unit handbook. Lengthen drain hose and/or contact HYGROMATIK.
Uneven electrode wear.	<ul style="list-style-type: none"> • Electrode(s) has/have no voltage supply. • Fuse blown. • Main contactor contact in-operative. • Uneven phase load. • Uneven electrode immersion depth. Unit is in-correctly installed horizontally and vertically. 	Check and/or replace fuse. Check main contactor. Possibly change. Check voltage supply. (Measure voltage variations) Install unit correctly.
 <p>Attention: Lights or light flashes in cylinder.</p>	<ul style="list-style-type: none"> • Lights or light flashes in cylinder indicate accelerated electrode wear (dark brown-black deposits) and very high water conductivity. <p>In this case contact HYGROMATIK.</p> <ul style="list-style-type: none"> • Blow-down pump malfunctions or is defective. 	Switch unit off immediately otherwise damage may occur. Service system: <ul style="list-style-type: none"> – Change electrodes. – Clean steam cylinder. – Check water quality (conductivity) (see section "Proper Applications"). Increase blow-down frequency and/or increase blow-down amount. Check blow-down pump function. Possibly change blow-down pump. See message Blow-down Fault .

10. Descriptions DS

Control DS

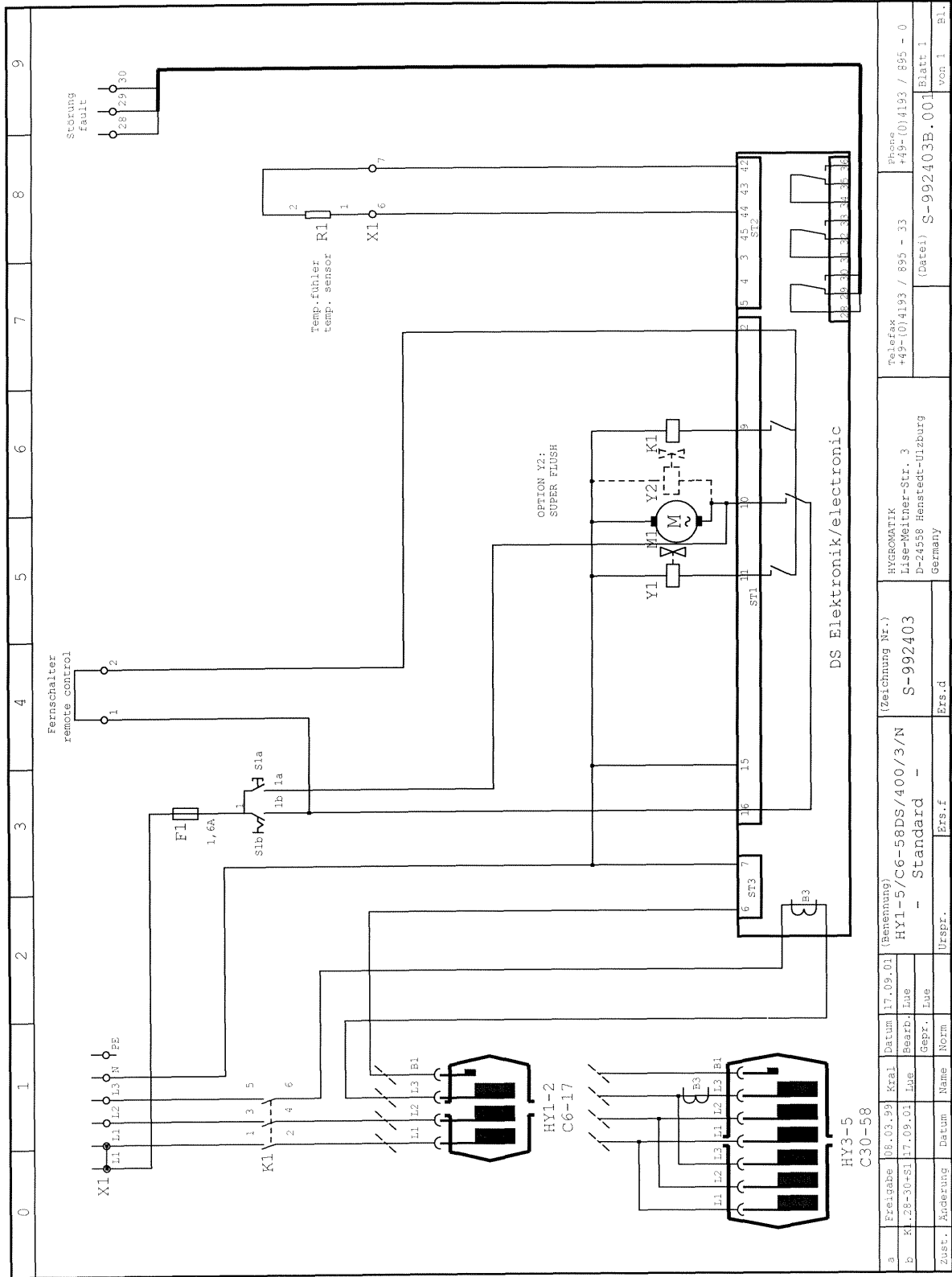
2	Transducer	11	Output solenoid valve
6-7	Solenoid valve and Main contactor power supply	15-16	Power supply control
9	Input max.-fill condition electrode	16	Blow-down pump power supply
10	Output main contactor	28-30	Output collective fault
	Output blow-down pump	31-33	Output fan
		34-36	Output essence injector
		42/44	Input signal temperature sensor



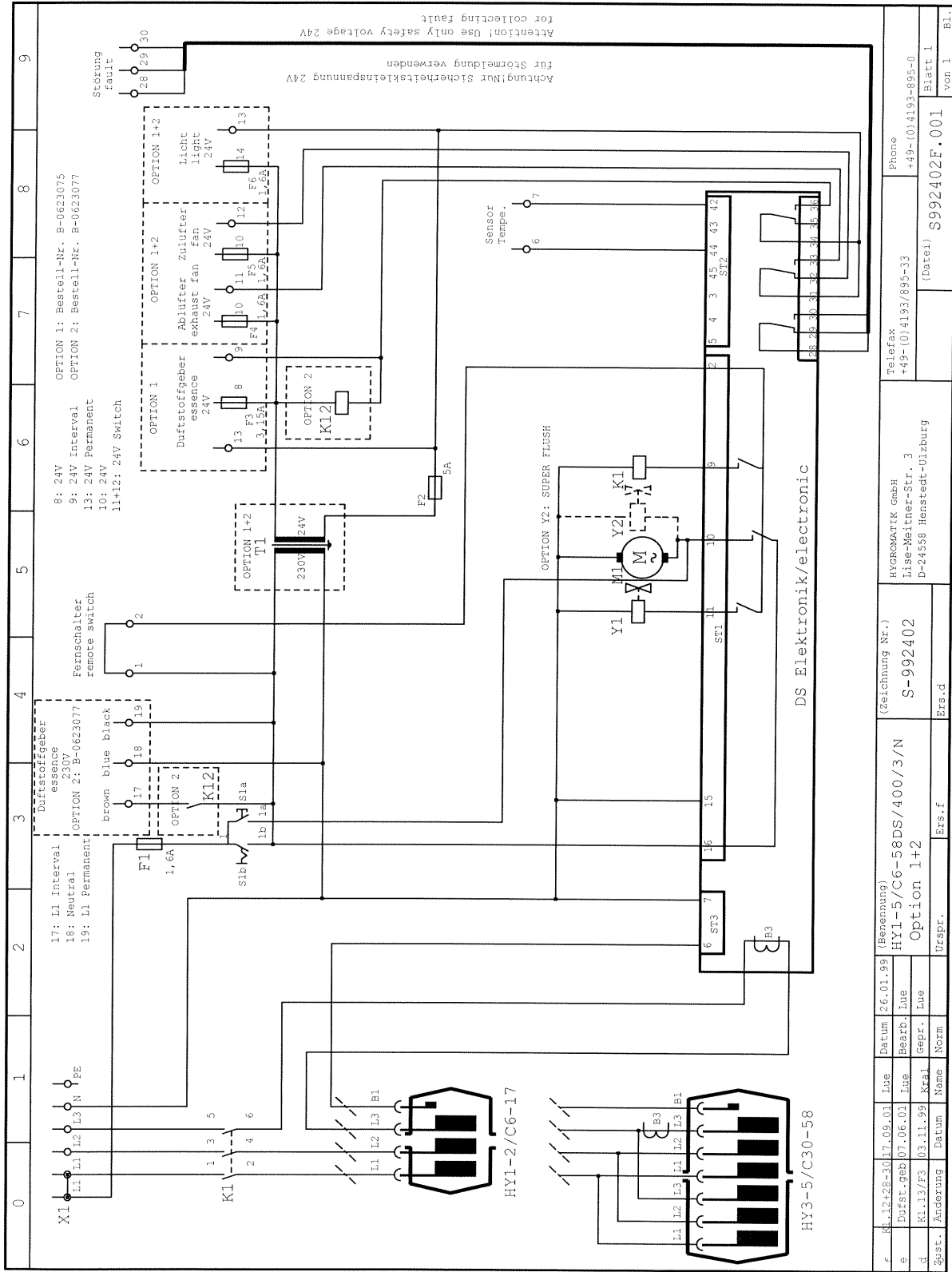
11. Face plan of Steam Generator terminal strip

Terminal	Connection	Terminal	Connection
M1	Blow-down pump	1 / 2	Terminals for remote switch
S1	Control switch ON/OFF	6 / 7	Terminals for input signal Temperature sensor Ohm
Y1	Solenoid valve	8 / 9 / 13	Terminals for essence injector max. 70W / 24V / 3,15A
Y2	SUPER FLUSH (optional)	10 / 11	Terminals for steam extractor bath fan max. 40W / 24V / 1,6A
X1	Connector strip	10 / 12	Terminals for steam bath supply fan max. 40W / 24V / 1,6A
B1	Max.-fill condition electrode	13 / 14	Terminals for light 40W / 24V / 1,6A
B3	Transducer	17 / 18 / 19	Terminals for essence injector max. 70W / 230V / 300 mA
F1	Control fuse 1,6 A	20 / 21	Terminals for steam bath fan (extractor) max. 40W / 230V / 175 mA
F2	Fine-wire fuse for transformer T1 5A	20 / 22	Terminals for steam bath fan (supply) max. 40W / 230V / 175 mA
F3	Fine-wire fuse for essence injector 3,15 A	28 / 29 / 30	Collective fault, potential free
F4	Fine-wire fuse for extractor fan 1,6 A		
F5	Fine-wire fuse for supply fan 1,6 A		
F6	Fine-wire fuse for light 1,6 A		
K1	Main contactor		
L1-L3	Main terminals		
N	Neutral		
PE	Earth connection point		

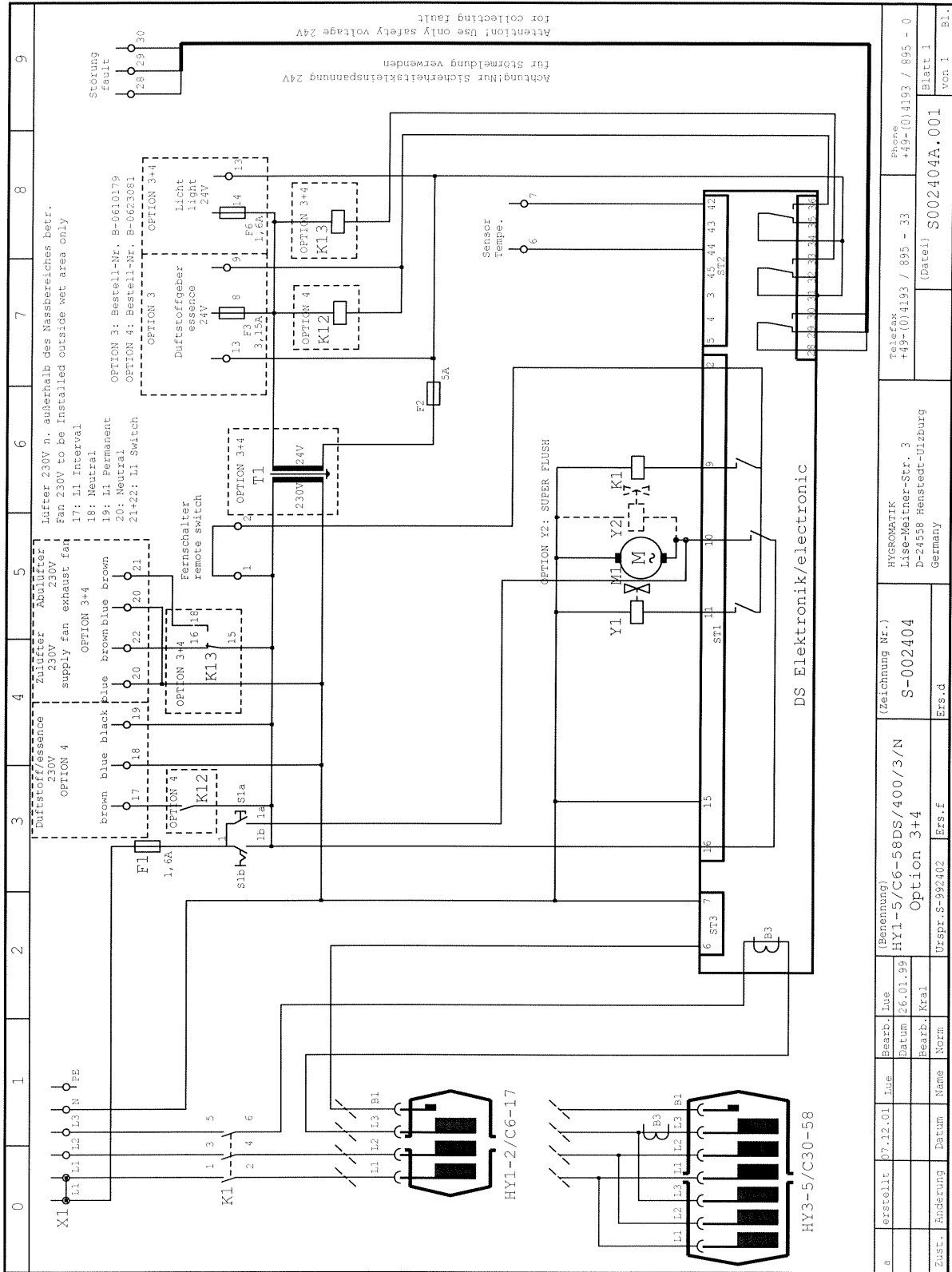
12. Wiring Diagram



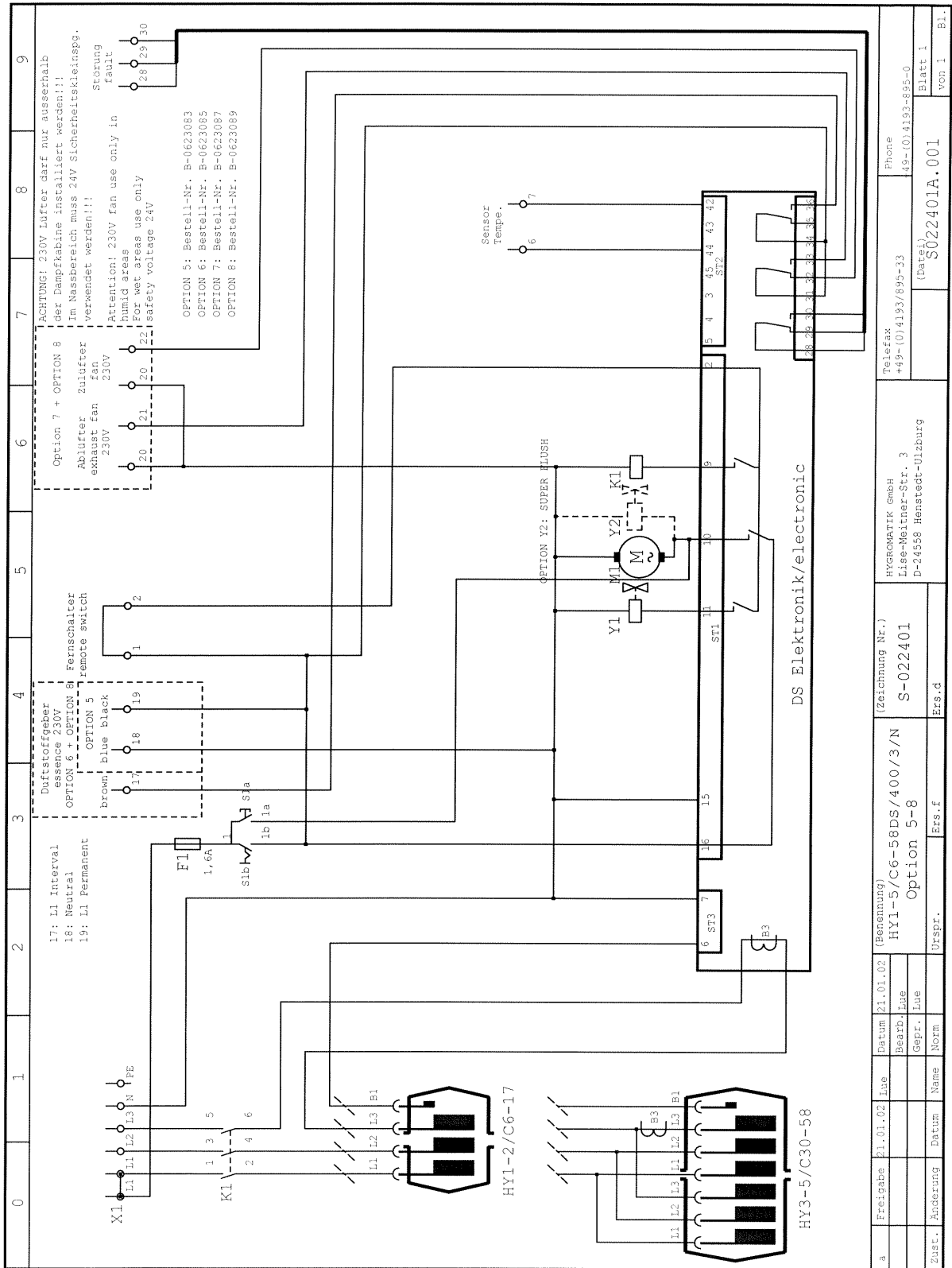
Freigeabe	08.03.99	Kral	Datum	17.09.01	(Benennung)	HY1-5/C6-58DS/400/3/N	HYGROMATIK	Telefax	+49-(0)4193 / 895 - 33	Phone	+49-(0)4193 / 895 - 0
Bearb.	17.09.01	Lue	Bearb.	Lue	Standard	S-992403	Lise-Meilner-Str. 3	(Date)	S-992403B.001	Blatt 1	von 1
Gepr.	Lue	Gepr.	Lue	Ers.f	Ers.d	Germany	Henstedt-Uibzburg				
Zust.	Änderung	Datum	Name	Norm	Urspr.						



f	K1, 12+28-30	17.09.01	Loe	Datum	26.01.99	(Benennung)	S-992402	HYGROMATIK GmbH Lise-Meitner-Str. 3 D-24558 Henstedt-Ulzburg	Telefax +49-(0)4193/895-33	Phone +49-(0)4193-895-0
e	Dufst.geb	07.06.01	Loe	Bearb.	Loe	Option 1+2	S-992402			
d	K1, 13/F3	03.11.99	Loe	Gepr.	Loe	Urspr.	Ers.d		(Datei)	S992402.F.001
g	Änderung	Datum	Name	Norm						von 1
										Blatt 1
										von 1
										Bl.



a	erstellt	07.12.01	Line	Bearb. Lue	(Benennung)	HY1-5/C6-58DS/400/3/N	HYGROMATIK	Telefax	Phase
				Datum	Option 3+4	Option 3+4	Lise-Maitner-Str. 3	+49-(0)4193 / 895 - 33	+49-(0)4193 / 895 - 0
				Bearb. Kral	Urspr. S-992402	Ers.f	Germany	(Datei)	Blatt 1
Zust.	Änderung	Datum	Name	Norm	Ers.d			S002404A.001	von 1



13. Simple-to-use Order Guide Line

Steam Generator with exact description (e.g. HY-Line: HY2.17DS)

+ optional connection (e.g. option 4: B-.....)

+ Steam Bath Accessories with name and part number (if required)

Which connections* does your Steam Generator require ?									
Essence Pump	24 Volt	X		X					
Steam Bath fan		X	X						
Light		X	X	X	X				
Transformer (only necessary for 24 V)		X	X	X	X				
Essence Pump	230 Volt		X		X		X		X
Steam Bath Fan				X	X			X	X
Essence Pump with Inte- grated Time Control						X			
When you order one of these options your unit comes with the connections as marked →		Option 1 B-0623075	Option 2 B-0623077	Option 3 B-0623079	Option 4 B-0623081	Option 5 B-0623083	Option 6 B-0623085	Option 7 B-0623087	Option 8 B-0623089

*)Optional connections for steam generators HyLine and CompactLine with DS control.

Steam Bath Accessories

- Peristaltic Pump, for aromatic essence 24 V B-2604073
- Peristaltic Pump, for aromatic essence 230 V B-2604071

- | | |
|----------------------------------|-----------|
| • Steam Bath Fan, 24 V , ø 98 mm | E-0611205 |
| • Exhaust Fan, 230 V, ø 98 mm | E-0611208 |

- | | |
|--|-----------|
| • T-piece for essence injection, stainless steel, 2xDN25 1x DN 6 | B-2604067 |
| • T-Piece for essence injection, stainless steel , 2xDN40 1xDN6 | B-2604069 |
| • Elbow 90 degree DN25, stainless steel | E-2604030 |
| • Elbow 90 degree DN40, stainless steel | E-2604036 |

- | | |
|--|-----------|
| • Steam Hose DN25 | E-2604012 |
| • Steam Hose DN40 | E-2604013 |
| • Drain Hose DN25 | E-2420425 |
| • Silicon Hose, 6 x 1,5, for essence injection | E-2604070 |

- | | |
|-------------------------|-----------|
| • Steam Hose Clamp DN6 | E-8501055 |
| • Steam Hose Clamp DN25 | E-2404004 |
| • Steam Hose Clamp DN40 | E-2604016 |

Spare Parts

- | | |
|-----------------------------------|-----------|
| • Spare Hose for Peristaltic Pump | E-2604072 |
|-----------------------------------|-----------|

14. Technical Data

Steam Generators Type CompactLine 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 Hz***					
Control Voltage	230V					

***other voltages and 60 Hz on request

**1,3 times power input after full blow-down. If expulsion fuses are used close to their specific limit we recommend to choose expulsion fuses with a higher range.

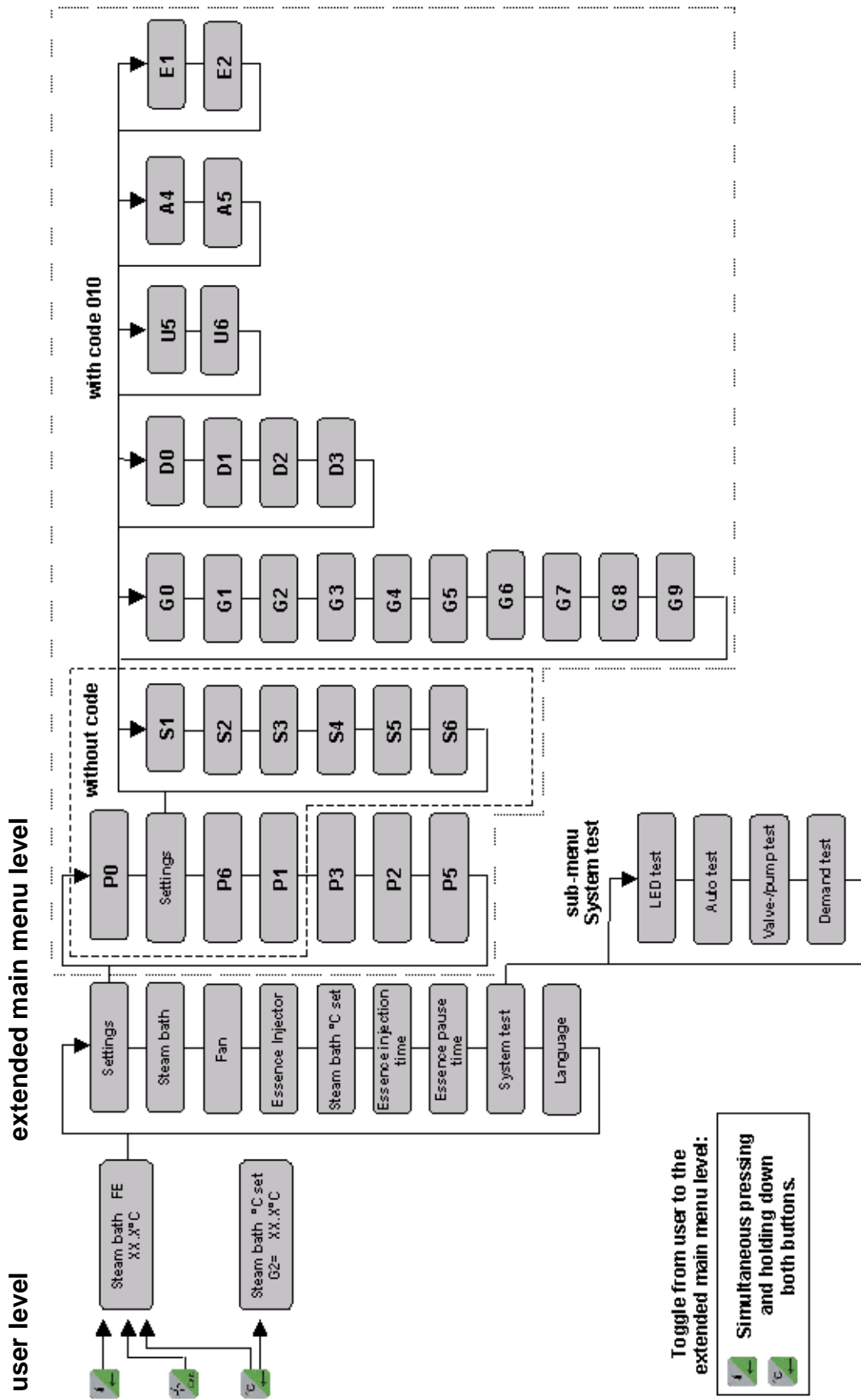
Steam Generators Type HY Line HY1DS- HY5DS							
Typ	HY1.05	HY1.08	HY2.13	HY2.17	HY3.23	HY4.30	HY5.45
Steam Output [kg/h]	5	8	13	17	23	30	45
Electrical Power [kW]	3,8	6,0	9,8	12,8	17,3	22,5	33,8
Current [A]	5,4	8,7	14,1	18,4	24,9	32,5	48,8
Fuse [A]**	3x6	3x10	3x16	3x20	3x35	3x35	3x63
Electrical Supply*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

***other voltages and 60 Hz on request

**1,3 times power input after full blow-down. If expulsion fuses are used close to their specific limit we recommend to choose expulsion fuses with a higher range.

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15. Menu-Survey



Toggle from user to the extended main menu level:

Simultaneous pressing and holding down both buttons.

16. Quick finder for Parameter

Search word	Parameter	[possibilities] factory adjustment	Chapter
Address for RS 485, long	A5	[3 digits] 0	8.4
Address for RS 485, short	P5	[0 to 9] 0	8.4
Blow-down without main contactor	U5	[on or off] on	8.4
Code input	P0	[3 digits]	8.2 8.3
Cylinder number	S1	read-only value	8.1
Essence hysteresis	G6	[0 K – 25 K] 25 K	4.3.1
Essence injection timing	G4	[0 sec. – 20 sec.] 2 sec.	4.3.1
Essence injector	D2	[automatic or off] automatic	3.2.3
Essence pause timing	G5	[0 min. – 25 min.] 5 min.	4.3.1
Fan hysteresis	G3	[0K - 5K] 1K	4.3.1
Fan run-on time (extractor)	G8	[0-255 min.] 0 min.	4.3.1
Hysteresis temperature controller	G1	[0K - 5K] 1K	4.3.1
Hysteresis temperature max.	G7	[0K-10K] 10K	4.3.1
Nominal steam output	S2	read-only value (kg/h)	8.1
Operation time counter	P6	read-only value days: hours	8.2
Output limitation	P1	[25% - 100%] 100%	4.3.8
PI-Controller, enhance	E1	[0 - 100%] 10%	8.4
PI-Controller, integral action time	E2	[0 - 255 sec.] 60 sec.	8.4
Power retention	G9	[0 – 50%] 0%	4.3.1 8.2
Reset service interval	P3	[yes or no] no	8.4
Serial number	S6	read-only value	8.1
Service interval steam amount	P2	[in 1000 kg steps] depends on unit type	8.4
Set value, direct access	D3	[yes or no] yes	4.3.6
Software version	S3	read-only value	8.1
Standby-draining	A4	[0 to 2550 min.] 0 min.	8.4
status display	D0	[with or without status] no status	4.3.3
Steam bath °C set value	G2	[20 - 55°C] 45°C	3.2.1 4.3.1
Steam bath fan (extractor) automatic	D1	[automatic or constant on] automatic	4.3.4
Temperature controller controls	U6	[1-step or int. PI-controller] 1-step	4.3.7 8.4
Temperature correction actual value	G0	[-5K to +5K] 0,0 K	4.3.1
Unit type	S4	read-only value	8.1
Year of manufacture	S5	read-only value	8.1