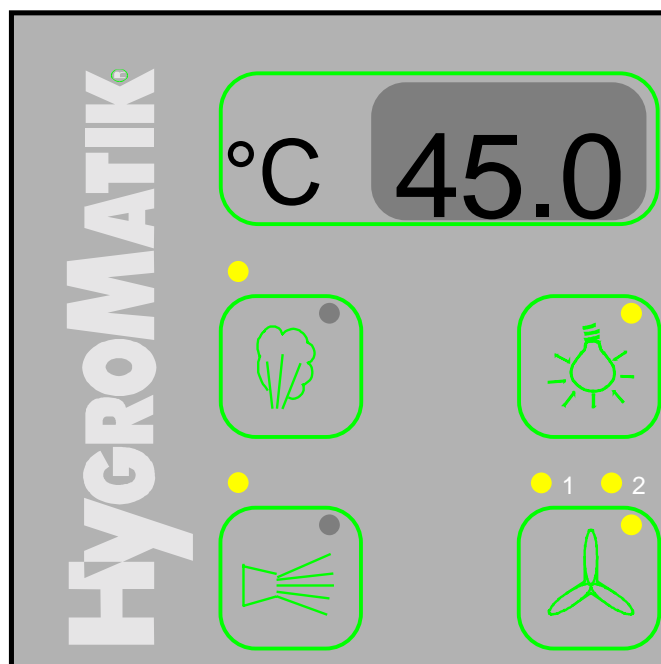


LD-Electronic

for Electrode-Steam Humidifiers for Steam bath

Technical Documentation



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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i L3-Electronic e 0008

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!

LD-Electronic Electrode Steam Humidifiers for Steam Bath

Operation Instructions

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1. Introduction

Dear customer,

The HYGROMATIK steam humidifier 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.

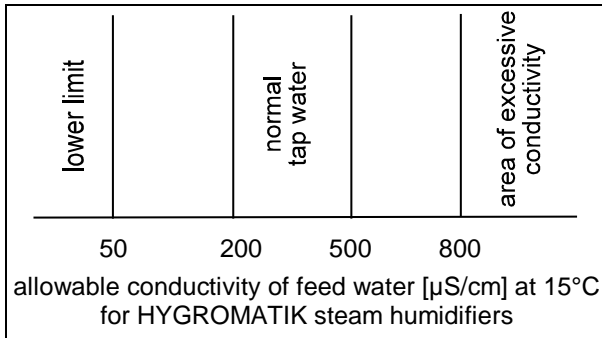
If you have any questions...please contact us:

Main office, Germany (0049)		
	to 30.09.1999	from 01.10.1999
Tel.:	(0)40/526833-0	(0)4193/895-0
Tel. Technical Hotline:	(0)40/526833-93	(0)4193/895-293
Fax.:	(0)40/526833-33	(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 µS/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 the Operation Instructions.

2. Function and Features

The HYGROMATIK-Steam Generator supplies the steam bath with the required steam for its operation. The temperature measured in the steam bath is utilised as the regulating factor for steam production. Default parameters are: steam bath: 100% humidity = approx. 45°C. A fan extracts warm air from the steam bath to ensure a continuous steam supply and stable temperatures. An essence injection is introduced into the steam bath at regular intervals.

Item	Description
1	Steam Bath
2	Fan
3	Temperature sensor
4	Essence
5	Hose essence container to Essence injection
6	Essence container
7	Hose essence container to solenoid valve
8	Solenoid valve essence container
9	Steam hose
10	Steam generator
11	Steam distributor

2.1 Installation Temperature sensor

In a Steam Bath a temperature sensor must be installed. The sensors measure the current values and communicate these values to the controller. The measured values are used by the controller to regulate the steam production.

Please note:

- do not install sensors near steam distributors.
- install sensors on walls and not in or under any structures.

If possible, always install sensors above the door

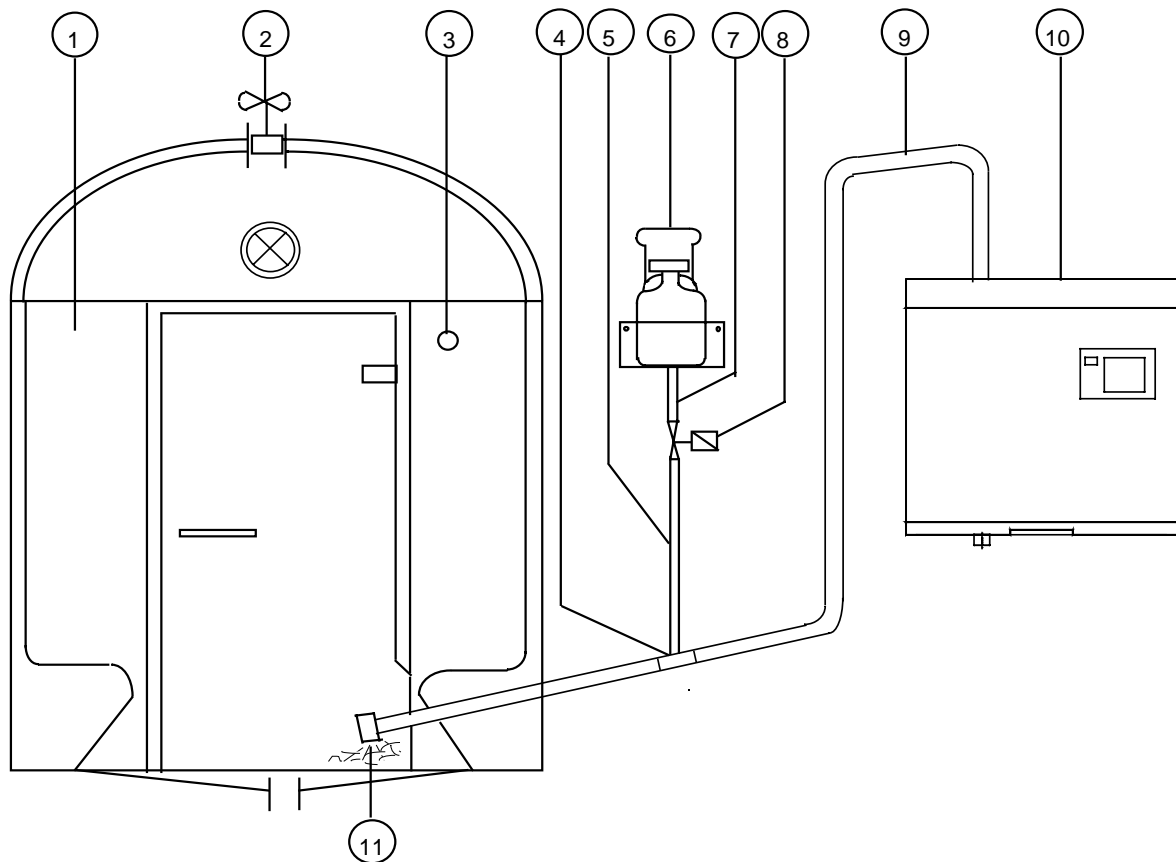
- this is the ideal sensor positioning - and
- here is the best protected position.



Note: do not attempt to manipulate steam production at the temperature sensor – e.g. by spraying with cold water or covering over.



Note: see sections 3.4 and 12. For electrical connections.



2.2 Installation: Essence Injector

The HYGROMATIK-essence injector supplies the steam bath with aromatic substances. The most important parts are: the essence container (7) and the solenoid valve (9). Essence injection timing and quantity can be set at the control unit. Essence is introduced only during steam production. The aromatic substance flows over the essence hose (8) into the steam hose without the use of pressure. A HYGROMATIK T-piece must be installed.

Please note:

- Position essence injector (4) as close as possible to the Steam Bath (1).
- Position essence container so that no aromatic substances can flow into the HYGROMATIK steam generator (10).
- Install the hoses from solenoid to essence injector (4) straight and upright and with a minimum length of 1.5 metres.
- Install hose from essence container to solenoid valve straight and upright.

Installation:

- » Install essence container (6) at suitable position .
- » Connect solenoid and essence container with hose (7).
- » Connect solenoid and essence injection with hose (5).



Note: see sections 3.5 and 12. For electrical connections.

2.3 Installation: Cabin Light

It is also possible to install a light in the cabin. (A toggle switch can also be incorporated in the Steam Bath control unit. The light can then be switched either over the control unit or over a switch in the cabin itself.



Note: see sections 3.6 and 12. For electrical connections.

2.4 Installation: Fan

The steam bath should contain an extractor fan (2). The fan extracts warm air from the steam bath in order to ensure a continuous steam supply and a stable temperature regulation.

The fan should be:

- installed high up and
- opposite the air supply opening inside the steam bath.

Supply air fan (optional):

To supply with fresh air a fan can optionally be installed. The fan is then on with the steam press button at the steam bath control and starts 5 minutes still further after shutdown.




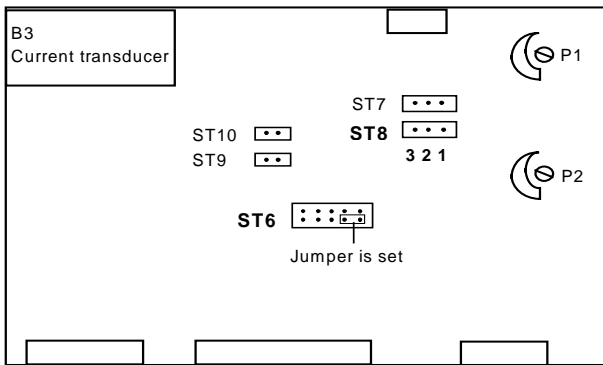
Note: see sections 3.7 and 12. For electrical connections.

3. Control

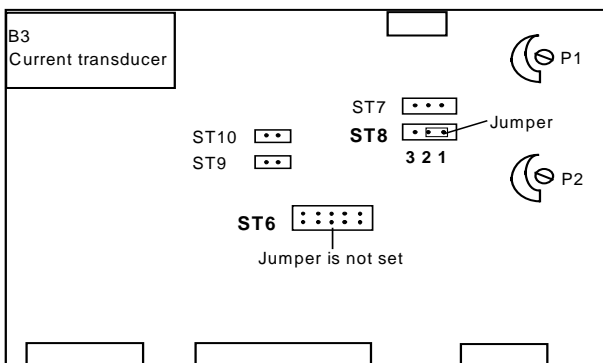
The steam generator model LD is equipped with a L-electronic. This electronic receives a feedback signal from the steam bath control and controls steam production on it there. The electronic can be controlled as follows:

Control L-Electronic
1-step
Proportional, 0(2) - 10V DC

 Jumpers **ST6** and **ST8** are set on the electronic as follows:



Adjusting for 1step control
Factory setting



Adjusting external control signal to 0(2) - 10 V DC

3.1 Limiting Steam Generation Output

Steam generation can be limited to an output between 25 and 100% of the nominal steam output by adjusting the potentiometer on the electronic pcb (refer also to chapter 10). The actual supplied steam delivery is still a function of the control signal, but limited to the adjusted output setting.

Limiting steam output can sometimes be useful for optimising unit control.

3.2 Control Connection



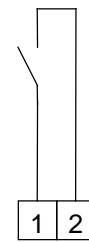
Note: set the regulator so that the steam generator is not switched on and off more than 4 times per minute (high frequency switching can cause main contactor damage).

3.3 Remote Switching

Connections 1 and 2 are reserved for remote on /off switching. If connections 1-2 are open, the steam generator or the sauna oven is switched off.



Note: The contacts which are to be connected to position 1-2 must be potential-free and designed for 230 Volts.



connector humidifier

3.4 Connection: Temperature Sensor

Connect the sensor cables to contacts 6 and 7 in the HYGROMATIK Steam generator.

The following table can be used for testing. The sensor is factory calibrated. A later calibration is possible (using a second sensor) in the spectrum of -5K to 5K.

Temperature - Resistance - Table			
Temp. in °C	Resistance in kOhm	Temp. in °C	Resistance in kOhm
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

3.5 Connection: Essence solenoid valve

Connect the wires of the solenoid valve with the terminals 7 and 8 of the steam generator.

3.6 Connection: Cabin light

Connect lighting cables to connectors 11 and 12 in the steam generator.

The cabin lighting has a 1.6 A fuse. Max. power 40 W. On/Off switching over a wall switch.

3.7 Connection: Fan

Connect fan cables to connectors 16 and 17 in the steam generator. The fan has a 1,6 A Fuse. Max. power 40 W.

A supply air fan can be connected optionally to the HYGROMATIK steam bath control. For this use terminals 9 and 10 in the Steam generator.

4. Floating Signal Outputs

The maximum contact load is 250V/5A.

Collective Fault

The PCB has a "Collective Fault" message facility. The potential-free contact is a changeover contact.

The terminals for the "Collective Fault" message are placed on the PCB. (NO contact: terminals 28 and 30; NC contact: terminals 28 and 29).

The message "Collective Fault" includes the fault-reports "Blow-down" and "Filling Fault" and also the service-report: "Cylinder full, delayed".

Humidification

The report „Humidification“ is available via the contacts 7 and 8 of the main contactor. Refer to the corresponding wiring diagram (chapter 12).

5. Commissioning



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

Switch Off Steam Humidifier

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

» Switch off the control switch on the cover.

» Close the water feed shut-off valve.

Switch On Steam Humidifier

» Open the water feed shut-off valve.

» Switch on the control switch on the cover.

» Switch on the steam bath control with .

The following functions are then operational:

- The yellow LED's "Humidification" and "Steam-button" is on. (The controller or hygrostat calls for humidity and the interlock system is closed.)
- The pump will run for a couple of seconds (to check pump function and partial water exchange when re-activating system).
- The solenoid inlet valve opens and admits water into the cylinder.
- As soon as the electrodes are immersed the current rises from 0 A to nominal. Nominal current is indicated on the unit nameplate. Note also the steam output limitation value (see also chapter 3.1). 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.

Further checking:

- 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.

6. Operation



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



Note: Not influence steam production by manipulation on the temperature sensor (e.g. cooling down with cold water)

Put the unit into operation as follows:

- » Turn on water supply
- » Switch on the control switch on the cover of the steam humidifier (position "I").

Now the unit proceeds as mentioned in chapter 5. "Commissioning".

7. Blow-Down

Partial Blow-Down:

The control system decides automatically when it is necessary to dilute the concentration of dissolved solids in the steam cylinder.

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 manually.

Note: The cylinder base is equipped with a hose for manual draining. See Technical Documentation, For the User, chapter "Functions", position 18.

7.1 Stand by - Blow-down (optional)



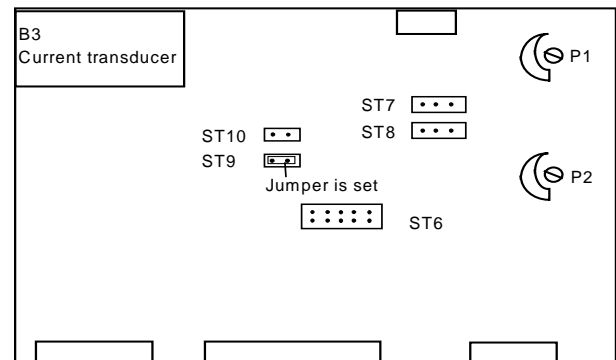
If the unit is on stand-by for an extended time period it can drain itself automatically. This prevents standing cylinder water. Normally this function is not activated. Standard setting is six hours. This function can be activated and set only by HYGROMATIK.

7.2 Main Contactor "Off" during Blow-down Process

The jumper ST9 determines the switching position of the main contactor during a blow-down process.

Main contactor On: Jumper ST9 is not set
(Factory setting)
Main contactor Off: Jumper ST9 is set

If the main contactor is switched off during a blow-down process the electrodes are disconnected from the power supply. This can be useful when the mains power is protected by a fault-current circuit breaker.



Adjusting main contactor "Off" during blow-down process

8. Steam Bath Controller

The LD steam bath controller controls the HYGROMATIK steam generator using temperature measured in the steam bath.

When the steam bath controller senses a temperature fall this is compensated for by increased steam production. Should the temperature in the steam bath go over the programmed "set temperature plus hysteresis regulation" point, the one-step operating system will switch off the steam production and the continuous operating system will reduce steam production accordingly (see figure:45,5°C).

Steam is only produced as long as the measured steam bath temperature is under "Set Temperature". Should the steam bath temperature remain above the set temperature for any lengthy period- during which time no steam is produced – causes should be:

- An extremely well insulated steam bath and/or
- Too low a level of air exchange in the steam bath
- Too much heat in the steam bath e.g. when using heated seating areas

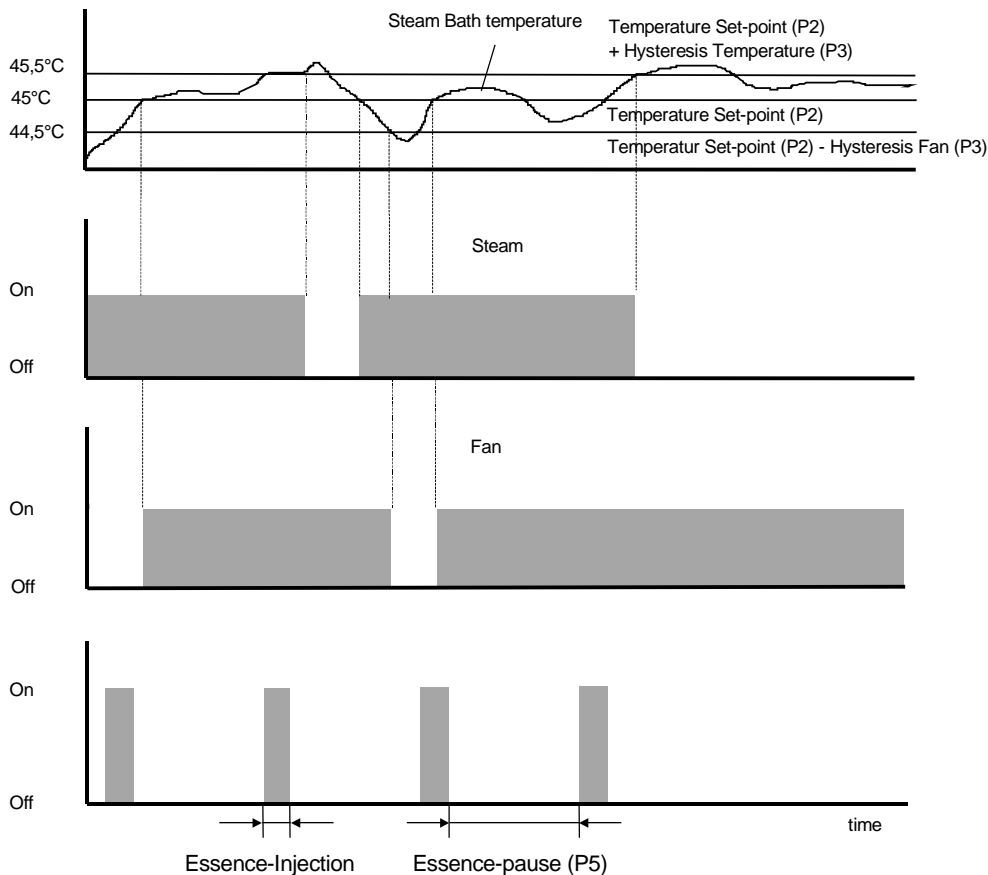
An extractor and/or a supply air fan assists air exchange in the steam bath, which has the effect of reducing the steam bath temperature under the set temperature more quickly. The temperature reduction is then compensated for by increased steam production. The fan or fans ensure an even and continuous steam production.

An essence injector, a light and an extractor fan can be attached to the steam bath controller.

A supply air fan can also be attached as an optional extra. This is switched on using the steam switch on the steam bath controller and runs on for a period of 5 minutes after the steam bath controller is switched off.

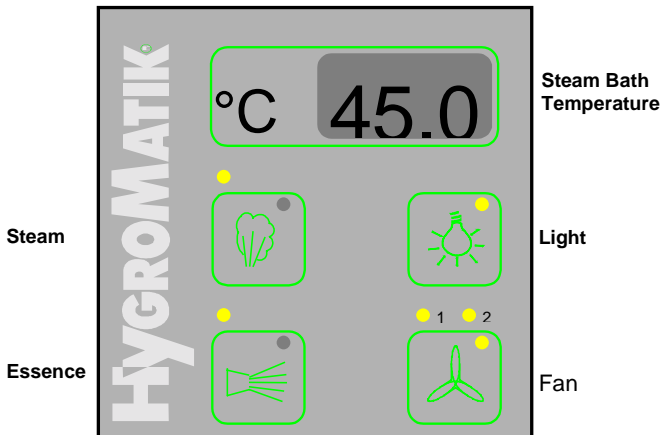
The steam bath controller switches the extractor fan on when the measured temperature in the steam bath exceeds the set temperature (see figure: 45 degrees centigrade). The controller switches the fan off when the steam bath temperature is below the "set temperature minus extractor fan hysteresis" point (see figure: 44.5 degrees centigrade).

The essence injection times are according to the programmed injection and pause timing.



8.1 LD Display and Operation Panel

The display and operating panel serves a local communication with the steam generator.



Standard display settings show the current measured steam bath temperature. The following values can also be read off and/or entered:

- Desired an current steam bath temperature (set and actual temperatures)
- Essence injection and interval time.
- Gain and integration time of the PI-controller.

The display and operating panel includes switches with which the steam production, the light, the aroma injection and the extractor fan can be switched on and off.

The following functions progress in accordance with subsequent display (LED lights up):

Display		Function
green LED Steam		Steam production Stand - by
yellow LED Steam		Steam is produced
yellow LED Light		Light on
green LED Essence		Essence injection Stand - by
yellow LED Essence		Essence is injected
yellow LED Fan		Exhaust air fan Stand - by
yellow LED 1 Fan		Exhaust air fan on
yellow LED 2 Fan		Fresh air on (optional) (green LED Steam must be on)

8.2 Programming Steam Bath Control

The following parameters can be changed. Parameter is access coded over code PO=88.

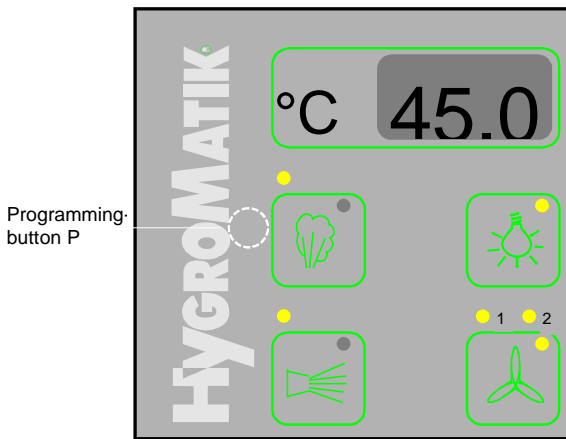
Parameter	Function	Display	Factory settings
P0	Steam Bath temperature		
P1*	Calibration temperature	-1K - 10K	0.0K
P2	Steam Bath temperature set point	20.0°C - 55.0°C	45.0°C
P3	Hysteresis Temperature-controller	0.0K - 10.0K	0.5K
P4	Essence Injection	1 sec. - 10 sec.	2 sec.
P5	Essence Interval	1 - 30 min	5 min.
P6	Hysteresis Fan	0.1K - 10K	0.5K
P7**	Gain PI-controller	0.0 - 100.0	25.0
P8**	Integration PI-controller	0 - 255 sec.	60 sec.
P9	Code access	C 0 - C99	C88

* Sensor is factory set. It is possible to set again in the range -1K to 10K with a second temperature measurement unit.

** See chapter 3 "controlling, continuous controller. (Parameter P8=0 sec. means zero reaction time adjustment)

HYGROMATIK®

The programming button P is located next to the HYGROMATIK logo and is not visible.



Button		Function
Light		Increase parameter number and value
Fan		Reduce parameter number and value
P-button		Confirm submenu and value

Read parameters:

» Press **P-button**.

» Using or selecting parameter.

» Confirm choice with **P-button**. Current values are displayed.

Programming values:

Example Set temperature is to be changed from 45°C to 48 °C.



Note: the controller automatically re-displays current temperature when no new settings are entered inside 10 seconds. If wrong settings have been entered simply wait for 10 seconds and correct settings anew.

Switch on steam generator using control switch.

» Press **P-button** –programming level is reached. The display shows: **P 0** .

» Press once – display shows

» Confirm value by pressing **P-button**. **P 9**
The display shows: **C 0**

» Press until the display shows **c 88** .

» Confirm code with **P-button** - display shows **P 9**

» Press three times- display shows **P 2**

» Confirm parameter choice with P-button. The temperature set value is displayed **45.0** .

» Increase the temperature set value to 48 °C using

» Confirm parameter value using **P-Button**. The display shows. **P 2**

The steam bath set temperature value is now set to 48 degrees centigrade. The controller switches to the operation level automatically if no new setting are entered inside 10 seconds. The display shows the current steam bath temperatures once more.



Note: Manual essence injection, lighting and extractor fan switching is not possible during programming phase.

Change other parameters as shown above.

9. Faults






If faults switch off the steam humidifier occurs immediately. Faults are only to be remedied by qualified personnel following the proper safety instructions.

Fault	Causes	Measures
<p>Cylinder full The red LED is on. The unit is operating. After one hour the unit will be switched off automatically. Then the red LED is flashing.</p>	<ul style="list-style-type: none"> • Cylinder is filled up to maximum water level sensor without rated current or rated steam output being reached. • This may happen when: <ul style="list-style-type: none"> –starting from cold, –restarting after a full blow-down –water conductivity is low or subject to considerable fluctuation • Cylinder is full of scale deposits, which limits the active immersion depth of the electrodes. • Electrodes are worn. • One phase is missing (external safety fuse is defective). • Phase L3 has not been passed through the current transducer on the pcb. 	<p>As a result of continuing vaporization gradually increasing the water conductivity, the signal is cancelled after a prolonged operating period and the rated output is restored automatically. Check water quality (conductivity, carbonate and total hardness) and contact HYGROMATIK.</p> <p>Clean cylinder.</p> <p>Replace electrodes.</p> <p>Replace safety fuses.</p> <p>Pass phase L3 through the current transducer.</p>
<p>Blow-down Fault The red LED is flashing continuously. The unit has been switched off automatically.</p>	<ul style="list-style-type: none"> • Cylinder outlet, blow-down pump and/or draining system are blocked by scale preventing operation. • Blow-down pump is not receiving electrical power. • Solenoid valve has not closed fully. Water level in the steam cylinder is only decreasing very slowly, although the pump is running. 	<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>Filling Fault The red LED is flashing continuously. The unit has been switched off automatically.</p>	<ul style="list-style-type: none"> • Water shut-off valve is not open. • Solenoid valve or water supply pipe is blocked. • Solenoid valve is not receiving electrical power. • Coil is defective. • Main contactor does not operate. 	<p>Open water inlet.</p> <p>Clean or exchange solenoid valve. Flush water supply pipe, if necessary</p> <p>Check cable connections.</p> <p>Measure the coil and exchange the solenoid valve. Check main contactor and exchange if necessary.</p>

Fault	Causes	Measures
<p>Filling Fault The red LED is flashing continuously.</p> <p>The unit has been switched off automatically.</p>	<ul style="list-style-type: none"> Water is being drained permanently from the outlet. Pump is not operating. <ul style="list-style-type: none"> –Steam hose installed sags. –Pressure in air duct too high. – (Maximum duct pressure 1500 Pa) 	<p>Remove blockage in steam hose. See "Installation Examples" *.</p> <p>Lengthen drain hoses. Contact HYGROMATIK if necessary</p>
<p>No steam production, although the unit is switched on. Green LED and yellow LED are on.</p>	<ul style="list-style-type: none"> See description Filling Fault. 	<p>See measures Filling Fault.</p>
<p>No steam production, although the unit is switched on. Green LED is on. Yellow LED is not on.</p>	<ul style="list-style-type: none"> If steam bath temperature exceeds programmed set value (parameter P2) then there is no steam production demand. Not enough air exchange, steam bath temperature exceeds programmed set value for lengthy period. Unit has been switched off by remote control. If no safety chain installed, then the absence of a bridge between connectors 1 and 2 prevents the unit from operating 	<p>Check parameter (P2). See chapter 8.2</p> <p>Install extractor or supply fan for air exchange.</p> <p>Switch unit on.</p> <p>Install bridge.</p>
<p>No steam production, although the unit is switched on. No LED's are on.</p>	<ul style="list-style-type: none"> The control fuse F1 1.6 A is defective. Phase L1 is missing (external safety fuse is defective). The micro fuse 1.25 A on the pcb is defective. 	<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 L3-Electronic" in this manual.</p>
<p>Humidity level too low</p>	<ul style="list-style-type: none"> Steam output limiting function of the unit is preventing full output. Cylinder is operates in the "Cylinder full" condition. A long steam hose passing through cold and draft rooms can lead to increased condensation levels. 	<p>Check potentiometer on the pcb.</p> <p>See message: Cylinder full.</p> <p>Reposition humidifier, insulate hose.</p>

Fault	Causes	Measures
The adjusted temperature is not achieved	<ul style="list-style-type: none"> • Steam output limiting function of the unit is preventing full output. • Steam humidifier operates in the "Cylinder full" condition. • Despite full output being attained the humidity cannot be achieved due to incorrect output parameters. • If one phase is missing the desired output is reduced. 	<p>Check parameter P1 "Output limitation". See chapter "Parameter Settings without using Code".</p> <p>See fault Service.</p> <p>Check steam output data.</p> <p>Check if one phase is missing</p>
The blow-down pump is operating but no water is being drained.	<ul style="list-style-type: none"> • Cylinder outlet is blocked. 	Clean cylinder outlet.
Cylinder is completely drained after a blow-down although the pump has stopped.	<ul style="list-style-type: none"> • Vent pipe in the drain hose is blocked. 	Clean or replace vent pipe. See chapter "Functions" *, pos. 3.
Water collecting on base plate of steam humidifier	<ul style="list-style-type: none"> • Cylinder is incorrectly inserted into the base. • The cylinder was reassembled incorrectly after maintenance: <ul style="list-style-type: none"> –O-ring seal damaged or not replaced. –The flange itself is damaged. –Scale has collected in the flange. –The flange is clamped with insufficient or unevenly spaced clamps. • Discharged water can not flow freely. 	<p>Insert cylinder correctly with a new O-ring in cylinder base.</p> <p>Look for faults and eliminate</p> <p>Insure properly draining. See chapter "Water Discharge" *.</p>
Water leaks from top part of the cylinder.	<ul style="list-style-type: none"> • Hose clamps for the steam and condensate hose are not tightened. • Electrodes are improperly secured. • Adapter for the steam hose has not been fitted correctly or the o-ring was not exchanged during maintenance. • If the condensate is not being returned to the cylinder then a condensate-sealing cap is used. • Main contactor does not operate. (No "Cylinder full" signal) 	<p>Tighten clamps.</p> <p>Tighten hand nuts.</p> <p>See chapter "Cleaning the Steam Cylinder" *.</p> <p>Insure that condensate-sealing cup is fitted.</p> <p>Replace main contactor.</p>

Fault	Causes	Measures
Intermittent electrical malfunction	<ul style="list-style-type: none"> External sources of electrical interference. 	Switch off control switch and after a short time switch on again.
No steam from steam distributor Permanently there is water being drained from the outlet (pump is not operating).	<ul style="list-style-type: none"> Steam hose installed sags. Pressure in air duct too high. (Maximum duct pressure: 1500 Pa) 	<p>Remove blockage in steam hose. See "Installation Examples" *.</p> <p>Lengthen drain hoses. Contact HYGROMATIK if necessary.</p>
Uneven electrode wear	<p>Electrode has not been supplied with power.</p> <ul style="list-style-type: none"> Fuses have been triggered. Main contactor is defective. Phases are not symmetrically loaded. Immersion depth of electrodes uneven. Unit has not been installed in a level position. 	<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>
Display shows: 	<ul style="list-style-type: none"> Temperature sensor wiring is broken (Resistance infinite) 	<p>Check wiring</p> <p>Check connecting</p> <p>Replace temperature sensor</p>
Display shows: 	<ul style="list-style-type: none"> Short circuit temperature sensor wiring (No resistance) 	<p>Check wiring</p> <p>Check connecting</p> <p>Replace temperature sensor</p>
No or not sufficient essence injection Only at mode Steam Bath	<ul style="list-style-type: none"> Essence receptacle empty Essence injection is switched off To short injection time To long injection time Essence injection blocked Fuse or relay output of essence injection damaged 	<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 LD electronic (check voltage at essence injection valve)</p>
To much essence injection Steam Bath	<ul style="list-style-type: none"> To long injection time To short injection time Permanently essence injection. 	<p>Decrease injection time</p> <p>Increase injection time</p> <p>Clean essence injection valve</p>

Fault	Causes	Measures
<p>Attention: Electrical arcing/flashs in the cylinder</p> 	<p>Electrical arcing/flashs 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"> • Blow-down pump is operating incorrectly. 	<p>Switch unit off immediately, the unit could be damaged.</p> <p>Inspect steam cylinder:</p> <ul style="list-style-type: none"> –Exchange electrodes. –Clean steam cylinder. –Check water quality (conductivity). See chapter 1.1 <p>Increase pumping time.</p> <p>Check function of blow-down pump. Exchange blow-down pump if necessary See also Filling Fault.</p>

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

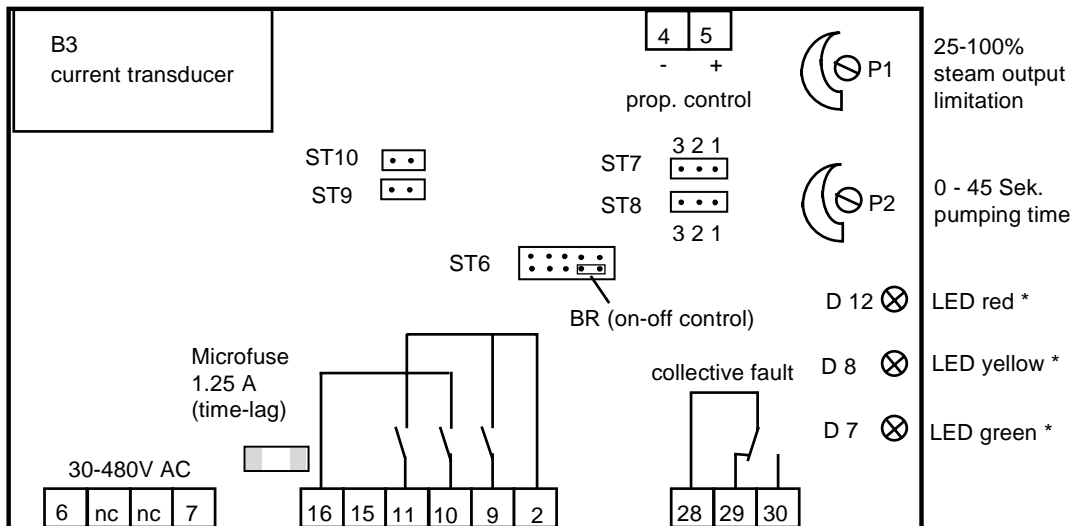
10. Description L3-Electronic

Electronic L		Steam Humidifier	
B3	Current transducer	B1	Sensor electrode
D7	LED Stand-by (green)	F1	Control fuse 1,6 A
D8	LED Humidification (yellow)	K1	Main contactor
D12	LED Cylinder full (red, continuously on) LED Collective fault (red, blinking)	L1-L3	Main terminals
P1	Potentiometer steam output limitation	M1	Blow-down pump
P2	Potentiometer pumping time	M2	Motor fan (only MiniSteam)
4-5	External control signal	S1	Control switch Off, Pos. "0" On, Pos. "I" Manual draining, Pos. "II"
6-7	Input sensor electrode	Y1	Solenoid inlet valve
9	Output main contactor	Y2	Solenoid valve SUPER FLUSH
10	Output blow-down pump	1-2	Terminals for hygrostat and safety interlock
11	Output solenoid inlet valve	4-5	Terminals for external control signal
15-16	Supply electronic	28-30	Terminals for collective fault
16	Supply blow-down pump		
28-30	Collective fault		
ST6	Adjustment Control 1step external control signal		
ST8	Adjustment external control signal - 0(2)-10 V DC - 0(4)-20 mA - programmed control signal standard setting 0 -140 Ohm		
ST9	Switching position main contactor during blow-down process On / Off		

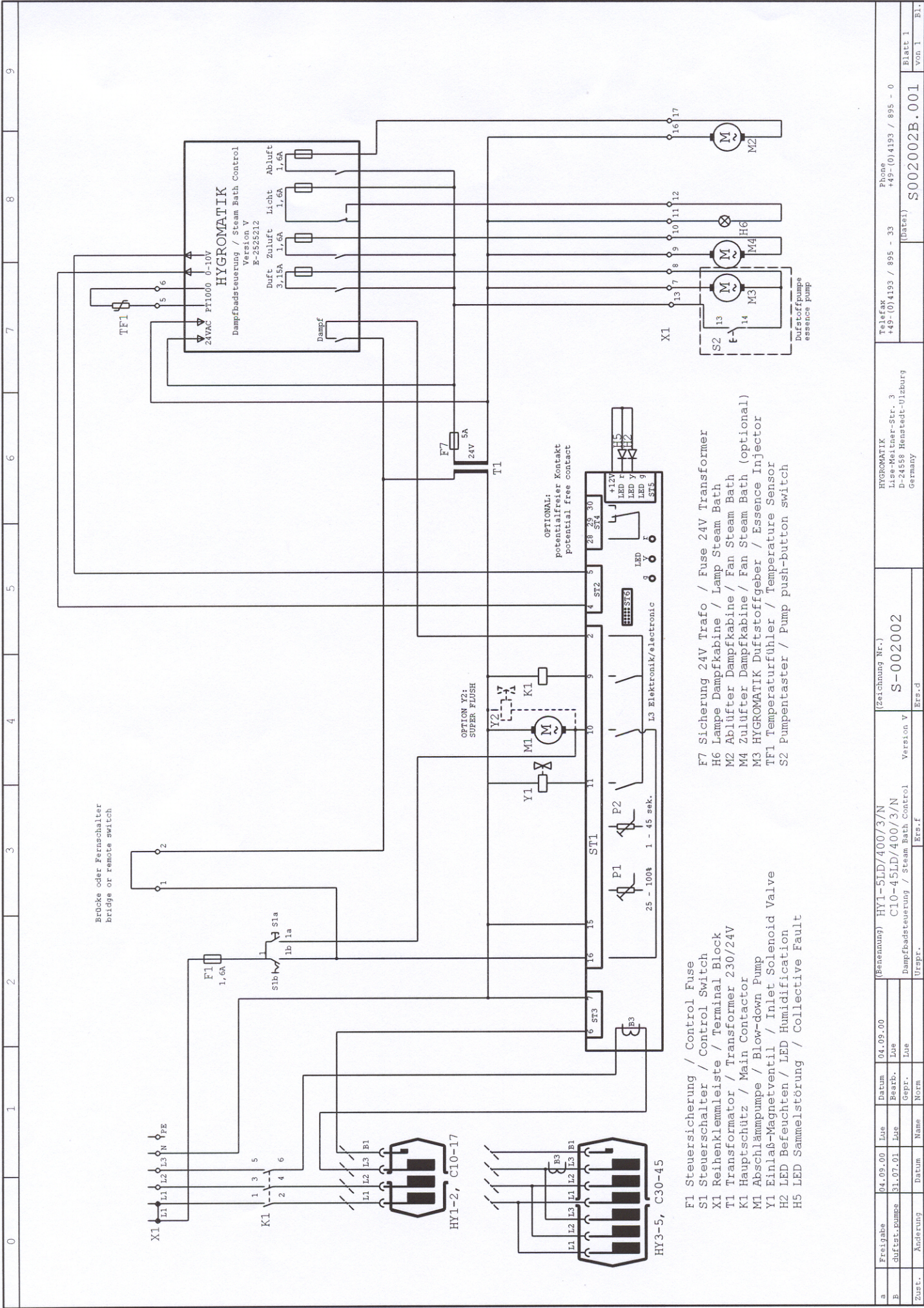


Attention: The factory setting of jumpers ST7 and ST10 as well as the pumping time may not be set.

11. Connections L3-Electronic



The LED's are located on the reverse of the PCB. .



Brücke oder Fernschalter
bridge or remote switch

- F7 Sicherung 24V Trafo / Fuse 24V Transformer
- H6 Lampe Dampfkabine / Lamp Steam Bath
- M2 Ablüfter Dampfkabine / Fan Steam Bath
- M4 Zulufter Dampfkabine / Fan Steam Bath (optional)
- M3 HYGROMATIK Dufstoffgeber / Essence Injector
- TF1 Temperaturfühler / Temperature Sensor
- S2 Pumpentaster / Pump push-button switch

- F1 Steuersicherung / Control Fuse
- S1 Steuerschalter / Control Switch
- X1 Reihenklemmleiste / Terminal Block
- T1 Transformator / Transformer 230/24V
- K1 Hauptschutz / Main Contactor
- M1 Abschlämpumpe / Blow-down Pump
- Y1 Einlaß-Magnetventil / Inlet Solenoid Valve
- H2 LED Befeuchten / LED Humidification
- H5 LED Sammelstörung / Collective Fault

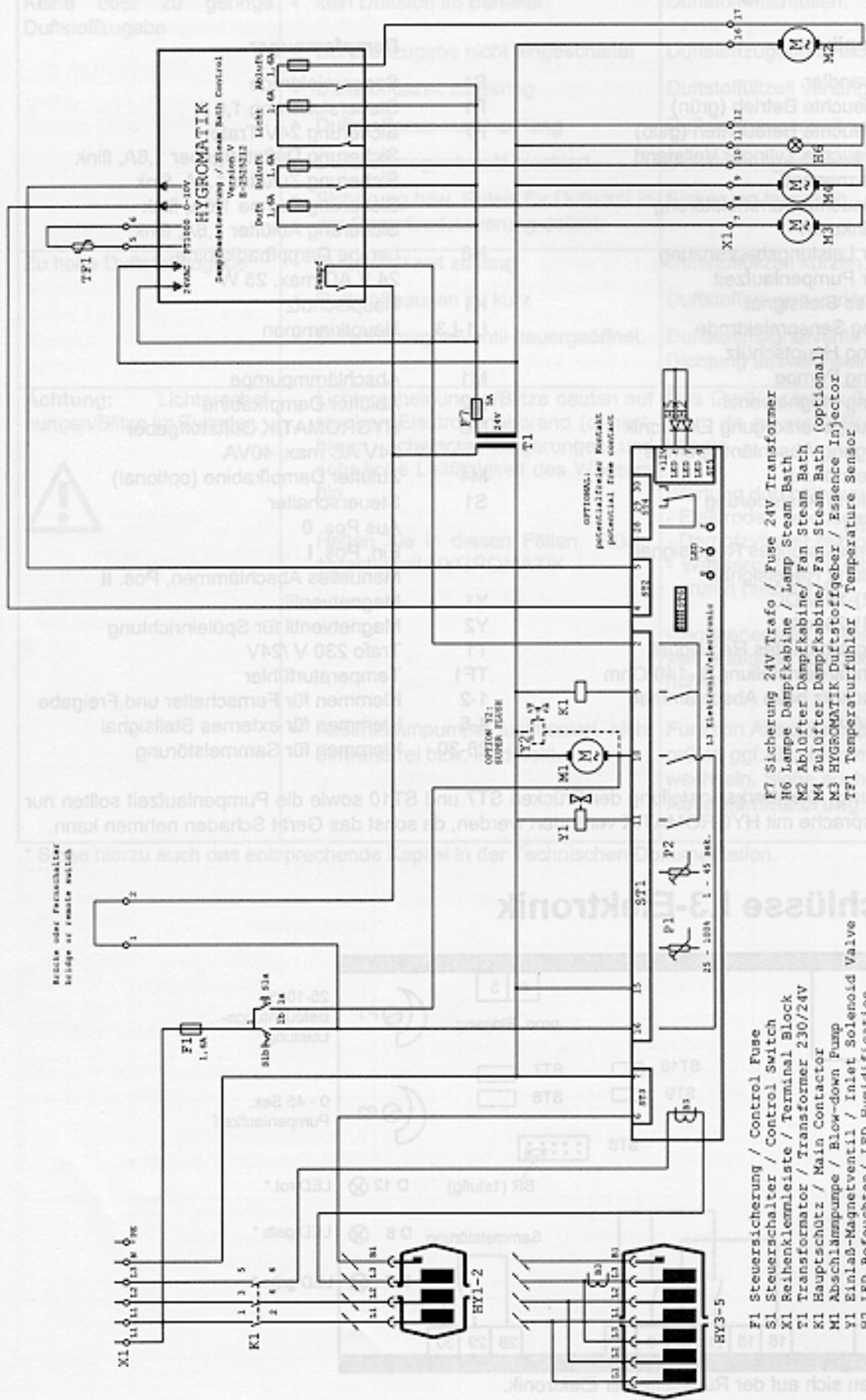
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E	duftst.pumpe	31.07.01	Lue	Bearb.	Lue	Dampfbadsteuerung / Steam Bath Control	C10-45LD/400/3/N	Version V	S-002002	Lise-Meitner-Str. 3	+49-(0)4193 / 895 - 33
			Lue	Gepr.	Lue	Dampfbadsteuerung / Steam Bath Control				D-24558 Henstedt-Utzburg	+49-(0)4193 / 895 - 0
Zust.	Änderung	Datum	Name	Norm	Urspr.	Ers.f				Germany	(Date)
						Ers.d					

S002002B.001

Blatt 1

Von 1

Bl.



BRÜCKE ODER FERNSCHALTER
BRIDGE OR REMOTE SWITCH

HYGROMATIK
Dampfheizsteuerung / Steam Bath Control
Version V
BESITZHEITER

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S1

X1

K1

M1

M2

M3

M4

T1

Y1

T71

ST1

HS

F7

H6

M2

M4

M3

T71

HS

HS

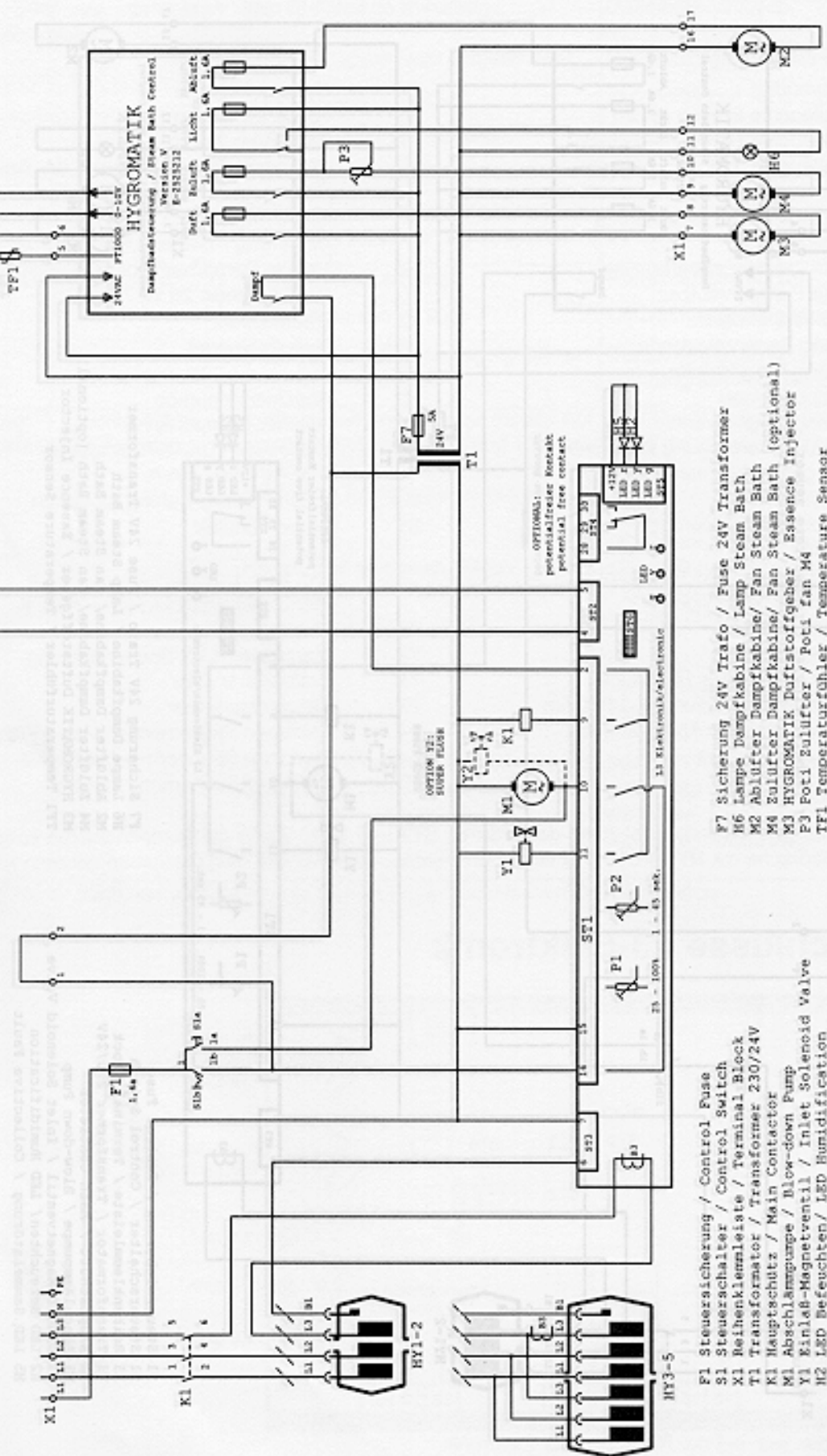
HS

HS

- F7 Sicherung 24V Trafo / Fuse 24V Transformer
 H6 Lampe Dampfkabine / Lamp Steam Bath
 M2 Ablöfter Dampfkabine/ Fan Steam Bath
 M4 Ablöfter Dampfkabine/ Fan Steam Bath (optional)
 M3 HYGROMATIK Duftstoffgeber / Essence Injector
 T71 Temperaturfühler / Temperature Sensor

- F1 Steuersicherung / Control Fuse
 S1 Steuerschalter / Control Switch
 X1 Reihenkleinleiste / Terminal Block
 T1 Transformator / Transformer 230/24V
 K1 Hauptschütz / Main Contactor
 M1 Abschlämpumpe / Blow-down Pump
 Y1 Einlaß-Magnetventil / Inlet Solenoid Valve
 H2 LED Befeuhten/ LED Humidification
 HS LED Sammelstörung / Collective Fault

Brücke oder Fernschalter
bridge or remote switch



- F1 Steuersicherung / Control Fuse
- S1 Steuerschalter / Control Switch
- X1 Reihenklemsste / Terminal Block
- T1 Transformator / Transformer 230/24V
- K1 Hauptschütz / Main Contactor
- M1 Abschlämmpumpe / Blow-down Pump
- Y1 Einlaß-Magnetventil / Inlet Solenoid Valve
- H2 LED Befeuchten/ LED Humidification
- H5 LED Sammelstörung / Collective Fault

- F7 Sicherung 24V Trafo / Fuse 24V Transformer
- H6 Lampe Dampfkabine / Lamp Steam Bath
- M2 Ablüfter Dampfkabine/ Fan Steam Bath
- M4 Zuluflüter Dampfkabine/ Fan Steam Bath (optional)
- M3 HYGROMATIK Duftstoffgeber / Essence Injector
- P3 Poti Zuluflüter / Poti fan M4
- TF1 Temperaturfühler / Temperature Sensor

HYGROMATIK
Version V
E-2525232
Dampfhaubeheizung / Steam Bath Control

Soft Relais Licht Abschalt
1.6A 1.6A 1.6A 1.6A

Prüfung	3.3.97	KPL	Datum	13.06.97	Bezeichnung	HY1-5LD/400/3	Zeichnung Nr.:	HYGROMATIK	
Beauftragter						Dampfhaubeheizung / Steam Bath Control		0ststr. 55 22844 Nordstedt	
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Electronic Type LD for Electrode-Steam Humidifiers

Technical Data

Technical Data Steam Humidifiers HY1LD - HY5LD							
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*	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 [kW]	400V/3/N/50-60Hz						
Control Voltage	230V/50-60Hz						

* Other voltages on request.

Technical Data Steam Humidifiers C6LD – C45LD					
Type	C6	C10	C17	C30	C45
Steam Output [kg/h]	6,0	10,0	17,0	30,0	45,0
Electrical Power*	4,5	7,5	12,8	22,5	33,8
Current [A]	6,5	10,8	18,4	32,5	48,8
Fuse [A]	3x10	3x16	3x20	3x35	3x63
Electrical Supply [kW]	400V/3/N 50-60Hz				
Control Voltage	230V/50-60Hz				

* Other voltages on request.

HYGROMATIK-Lufttechnischer Apparatebau GmbH

Postfach 1219 • D-24549 Henstedt-Ulzburg • Lise-Meitner-Str. 3 • D-24558 Henstedt-Ulzburg
Tel.: +49-(0)4193/895-0, Fax +49-(0)4193/895-33

Ein Unternehmen der **SpiraxSarco** Gruppe