HYGROMATIK SPA

FlexLine Spa

Control

Manual

FL-TSPA.EN
E-8881168

⚠WARNING

Risk of electrical shock!
Hazardous electrical high voltage!
All electrical work to be performed by certified expert staff (electricians or expert personnel with eqivalent training) only.

1. Introduction

Dear Customer,

Thank you for choosing a HygroMatik steam generator.

HygroMatik steam generators represent the latest in humidification technology.

In order to operate your HygroMatik steam generator safely, properly and efficiently, please read these operating instructions.

Employ your steam generator only in sound condition and as directed. Consider potential hazards and safety issues and follow all the recommendations in these instructions.

If you have additional questions, please contact your expert dealer.

For all technical questions or spare parts orders, please be prepared to provide unit type and serial number (see name plate on the unit).

1.1 Typographic Distinctions

- Preceded by a bullet: general specifications

» Preceded by an arrow: procedures for servicing or maintenance which should or must be performed in the indicated order

☑ Installation step which must be checked off.

italics Terms used with graphics or drawings

1.2 Documentation

Validity:

This documentation is valid for the control built in the FlexLine unit series with the following designations:

FLExx-TSPA
Flexline unit type: Electrode Steam Humidifier (ELDB)

FLHxx-TSPA
Flexline unit type: Heater Steam Humidifier (HKDB)

Retention

Please retain these operating instructions in a secure, always accessible location. If the product is resold, turn the documentation over to the new operator. If the documentation is lost, please contact HygroMatik.

Versions in Other Languages

These operating instructions are available in several languages. If interested, please contact HygroMatik or your HygroMatik dealer.

1.3 Symbols in Use

1.3.1 Specific Symbols related to Safety Instructions

According to ANSI Z535.6 the following signal words are used within this document:

⚠DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

1.3.2 General Symbols

Please note

This symbol is used whenever a situation requires special attention beyond the scope of safety instructions.

Intended Use

The control described is an integral part of a HygroMatik steam generator. Use for other applications is not permitted. All instructions on intended use, which are given in connection with the basic device, apply.

Proper usage also comprises the adherence to the conditions specified by HygroMatik for:

- installation
- dismantling
- reassembly
- commissioning
- operation
- maintenance
- disposal

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 Instructions and especially the chapter 2. „Safety Notes“. Additionally, operating personnel must be informed of any possible dangers. You should place a copy of the Operation and Maintenance Instructions at the unit‘s operational location (or near the unit).

By construction, HygroMatik steam generators are not qualified for exterior application.

⚠WARNING

Risk of scalding!
Steam with a temperature of up to 100 °C is produced.
Do not inhalate steam directly!

2. Safety Instructions

These safety instructions are required by law. They promote workplace safety and accident prevention.

2.1 Guidelines for Safe Operation

2.1.1 Scope

Comply with the accident prevention regulation „DGUV Regulation 3“ to prevent injury to yourself and others. Beyond that, national regulations apply without restrictions.

2.1.2 Unit control

Do not perform any work which compromises the safety of the unit. Obey all safety instructions and warnings present on the unit.

In case of a malfunction or electrical power disruption, switch off the unit immediately and prevent a restart. Repair malfunctions promptly.

⚠WARNING

Restricted use.
IEC 60335-1 stipulates as follows:
This device may be used by children of eight years of age and above as well as by persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge so long as they are supervised or have been instructed regarding the safe use of the device and understand the hazards that may result from it. Cleaning and user maintenance of the unit must not be undertaken by children without supervision.

2.1.3 Unit Operation

⚠WARNING

Risk of scalding!
Uncontrolled hot steam escape in case of leaking or defective components possible.
Switch off unit immediately.

NOTICE

Risk of material damage!

The unit may be damaged if switched on repeatedly following a malfunction without prior repair.

Rectify defects immediately!

The unit must not be operated on a DC power supply.

The unit may only be used connected to a steam pipe that safely transports the steam.

Regularly check that all safety and monitoring devices are functioning normally. Do not remove or disable safety devices.

2.1.4 Mounting, dismantling, maintenance and repair of the unit

NOTICE

The HygroMatik steam humidifier is IP20 protected. Make sure that the unit is not object to dripping water in the mounting location.

Installing a humidifier in a room without water discharge requires safety devices to protect against water leakages.

- Use genuine spare parts only
- After any repair work, have qualified personnel check the safe operation of the unit
- Attaching or installing of **additional components** is permitted only with the **written consent** of the manufacturer

2.1.5 Electrical

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage!

Any work on the electrical system to be performed by certified expert staff (electricians or expert personnel with comparable training) only.

Disconnect unit components from electrical power supply prior to work.

After electrical installation or repair work, test all safety mechanisms (such as grounding resistance).

NOTICE

Use only original fuses with the appropriate amperage rating.

Regularly check the unit‘s electrical equipment. Promptly repair any damage such as loose connections or burned wiring.

Responsibility for intrinsically safe installation of the HygroMatik steam humidifiers is incumbent on the installing specialist company.

2.2 Disposal after dismantling

NOTICE

The operator is responsible for the disposal of unit components as required by law.

3. Overview of the operation and layout of a steam bath

The HygroMatik steam generator provides the steam bath with the steam required for operation. The temperature measured in the steam bath is the only control variable used to control the steam production. When standard settings are used, the steam bath reaches approx. 45 °C at 100% humidity. One or, if required, two supply fans introduce fresh air to the steam bath, one or two exhaust fans extract warm air from the steam bath to ensure a continuous supply of steam and stable temperature control. The steam generator can control up to 4 essence injectors.

Heating-up phase:

Steam is supplied to the steam bath, which is still cold. As a result, the relative humidity increases first to 100%, while the temperature remains almost constant. A further supply of steam then increases the temperature; the relative humidity remains at 100%.

Operational phase:

When the set point temperature value + switch-off temperature difference has been reached, steam production is interrupted. If the steam bath temperature sinks below the adjustable set point temperature, steam is again introduced into the cabin.

Please note

Controls for lights, fans and essences are optional accessories. The HygroMatik steam bath functions are optionally available in 24 V or 230 V versions.

⚠WARNING

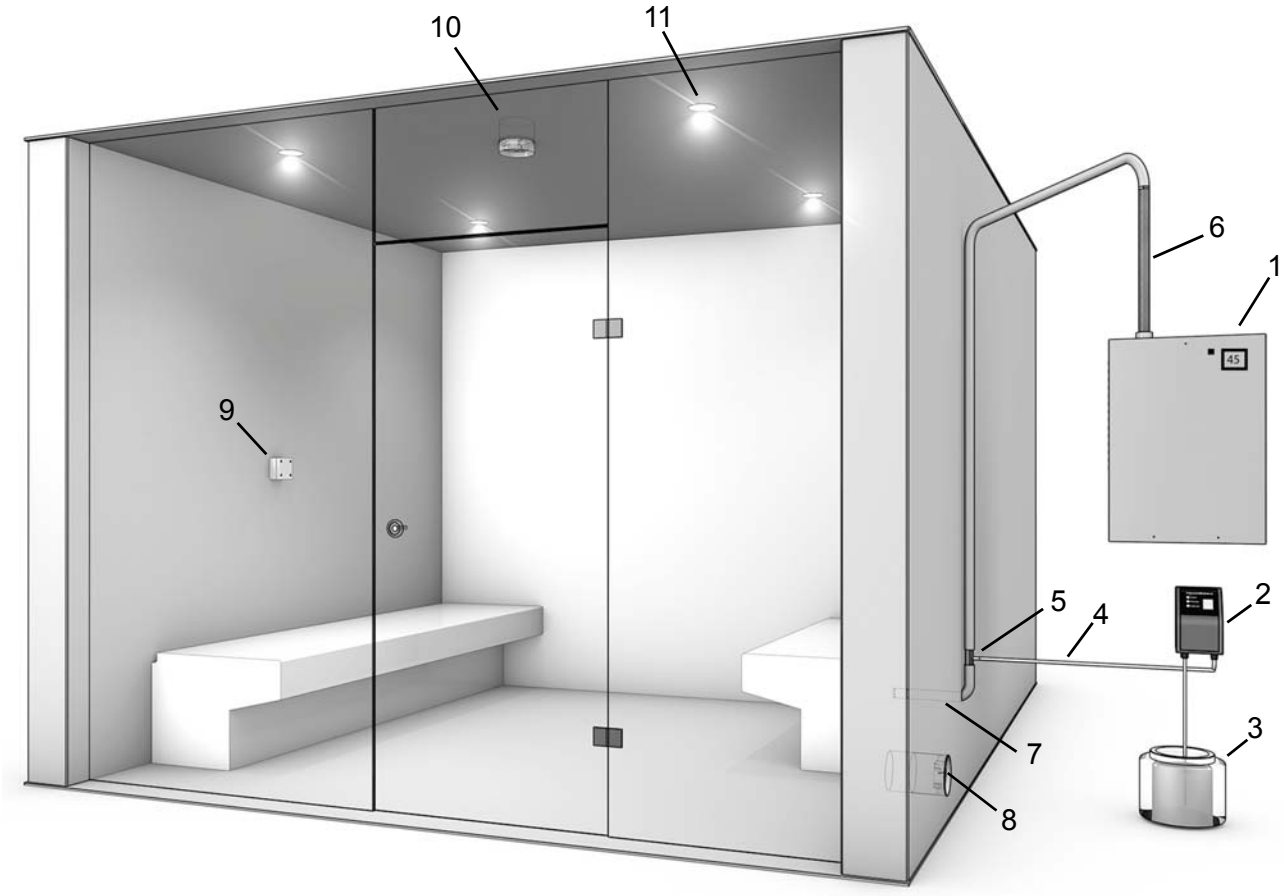
There is a danger of electric shock due in case of non-observance!

Only safety extra-low voltage (24 V) may be used in the steam cabin for fans and lights.

3.1 Layout of steam bath (schematic diagram)

Position	Designation
1	Steam generator
2	Essence peristaltic pump
3	Essence container
4	Essence line to steam hose
5	T-piece for essence injection into steam hose
6	Steam hose
7	Steam manifold in steam bath
8	Supply fan
9	Temperature sensor
10	Exhaust fan
11	Cabin light

Please note The following figure shows a simplified diagram of a steam bath - it is not an installation instruction!



3.2 Temperature sensor usage

A temperature sensor must be installed in the cabin for a steam bath. The sensor measures the actual temperature and transmits the measurement value to the control. The temperature serves as the controlled variable for controlling the steam production.

3.2.1 Installation of the temperature sensor

The best mounting position of the temperature sensor is 800 to 1000 mm (31 to 39 inch) above the seating surface (and thus in the height of head of the persons in the steam bath cabin). The sensor must be mounted directly to the wall surface. Installation under a panelling would falsify the measurement result.

Please note

The sensor must not be mounted directly above the steam entrance into the cabin.

⚠WARNING

Risk of scalding when steam bath temperature rises due to temperature sensor manipulation!

Do not cover the temperature sensor or pour over cold water.

3.2.2 Connection of the temperature sensor

The connection cable of the temperature sensor is to be wired to terminals 4 and 7 of the FlexLine SPA control. The sensor has been adjusted ex-factory. Verifying of the measurement value can be made by using the temperature/resistance table following below. Readjustment of the sensor can be made in a +/- 5 K range, if required. In this case, an additional temperature measurement device is required for referencing.

Temperature/resistance-table	
Temperature in °C	Resistance in kΩ
10	28,5
20	18,5
30	12,3
40	8,3
50	5,8
60	4,1
70	2,9
80	2,1

3.3 Steam bath temperature control

The steam output of the HygroMatik steam generator is controlled by the FlexLine SPA control according to the measured temperature. The **relative humidity** is not measured because it is **always 100%** after the heating-up phase. Essence injectors, lights and supply and exhaust fans, which are available as order options, can be connected to the steam generator.

The functioning of the temperature control is illustrated by the sample diagram in section 3.5, which is based on the following default values:

Steam bath temperature set value: **45 °C**
ΔTemp._steam_on/off: **1K**

(Temp._set value + Temp._steam_on/off) = 45 °C + 1K = **46 °C**

- When 46 °C has been reached, steam production is switched off in 1 step operation, during continuous operation (with the internal PI controller), it is reduced
- If the temperature in the steam bath drops below the set value 45 °C, steam production is resumed (1 step operation) or ramped up (continuous operation)

3.4 Fan control

The influences of the fan control of the supply and exhaust fans (both in automatic mode) are also illustrated in the sample diagram.

3.4.1 Supply fan

The supply fan is switched on by the control, as long as the steam bath temperature has not reached the set value. It switches off at (Temp._set value + supply fan 1_ΔTemp.) In the example:

Temperature set value: **45 °C**
Supply fan 1_ΔTemp.: **1K**

- The supply fan 1 switches off at 45 °C + 1K = **46 °C**
- Supply fan 1 switches back on again if the temperature falls below the temperature set value

If a second supply fan is used or if the supply fan has a 2nd power level, both supply fans are switched on until the temperature set value is reached. Analogous to supply fan 1, supply fan 2 is switched off when (Temp._set value + supply fan 2_ΔTemp.) is reached.

This mechanism is not illustrated in the sample diagram. Numerically, it could be represented as follows:

Temperature set value: **45 °C**
Supply fan 1_ΔTemp.: **2K**
Supply fan 2_ΔTemp.: **0.5 K**

- Supply fan 1 switches off at 45 °C + 2 K = **47 °C**
- Supply fan 2 switches off at 45°C + 0.5 K = **45.5 °C**

3.4.2 Exhaust fan

The exhaust fan is switched on if the temperature set value is exceeded. The exhaust fan switches off when the temperature falls below (Temp._set value - exhaust fan 1_ΔTemp.). In the example:

Temperature set value: **45 °C**
Exhaust fan 1_ΔTemp.: **1K**

- The exhaust fan switches off at 45 °C - 1K = **44 °C**

If a second exhaust fan is used or if the exhaust fan has a 2nd power level, this additionally switches on if (set temperature value + exhaust fan 2_ΔTemp.) has been reached. This mechanism is not illustrated in the sample diagram. Numerically, it could be represented as follows:

Temperature set value: **45 °C**
Exhaust fan 1_ΔTemp.: **1K**
Exhaust fan 2_ΔTemp.: **0.5 K**

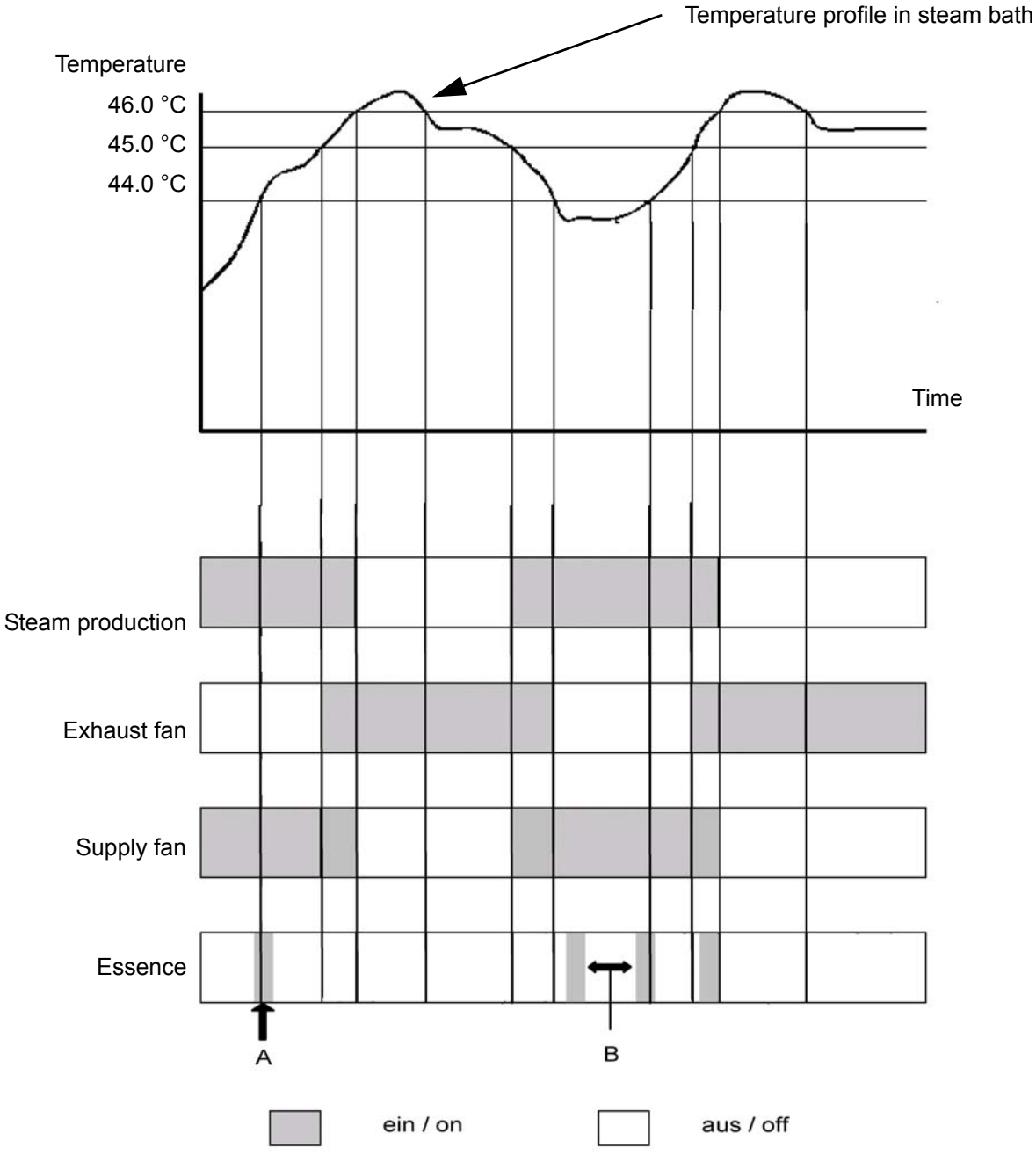
- Exhaust fan 1 switches on at **45 °C**
- Exhaust fan 2 additionally switches on at **45.5 °C**
- Both exhaust fans switch off at **44 °C**

Steam is only produced as long as the temperature in the steam bath is below the set temperature. If the temperature in the steam bath remains above the set temperature for a long time, i.e. **no visible steam** is produced, the reason for this can be:

- A high additional heat supply, e.g. due to heated benches
- Excessive insulation of steam bath
- Insufficient ventilation in the steam bath

An exhaust fan promotes the air exchange in the steam bath, leading to a faster temperature reduction in the steam bath. The temperature drop is compensated by renewed steam production. In this way, the fan ensures that there is a steady, constant production of steam and visible vapour in the cabin a result.

3.5 Sample diagram for temperature profile in steam bath



A = essence injection time
B = essence pause time

4. Description of control

4.1 General description

The control is integrated into the steam humidifier and is operated via a 3.5" graphic display on the front of the unit.

An additional operating element on the front of the unit is a control switch, whose positions are assigned as follows:

Pos. "0": The unit is switched off

Pos. "I": The unit is switched on

Pos. "II": The cylinder water is pumped off without the participation of the control. The control is not active, the display remains dark.

Control switch

By changing the parameters, the user/operator can adapt the control to the system specifications and the special characteristics relating to the use of the unit.

The operation of the unit is described in Section 6.

4.2 Layout of control

The control consists of the 3.5" screen and the mainboard. The mainboard can be extended for additional functions with one or 2 relay boards (with 3 relays each) and additional optional relays in DIN rail format.

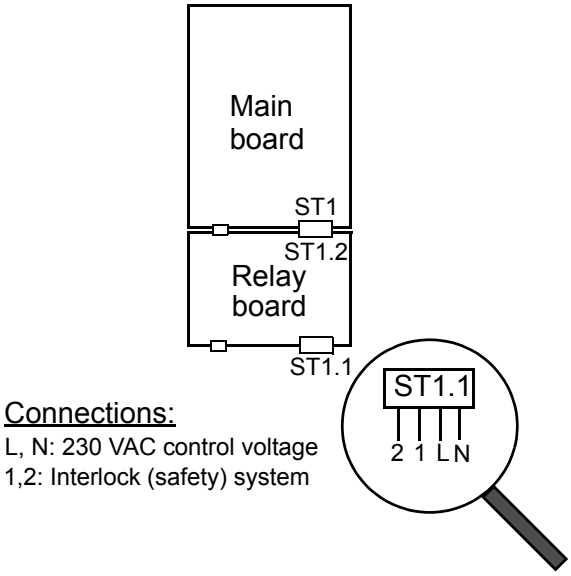
The relay boards are connected to the mainboard via a plug system.

The DIN rail relays are connected via cables with plug. 2 additional relay modules can be used, with 2 relays each.

For use with double cylinder units, an extension board is added to the mainboard.

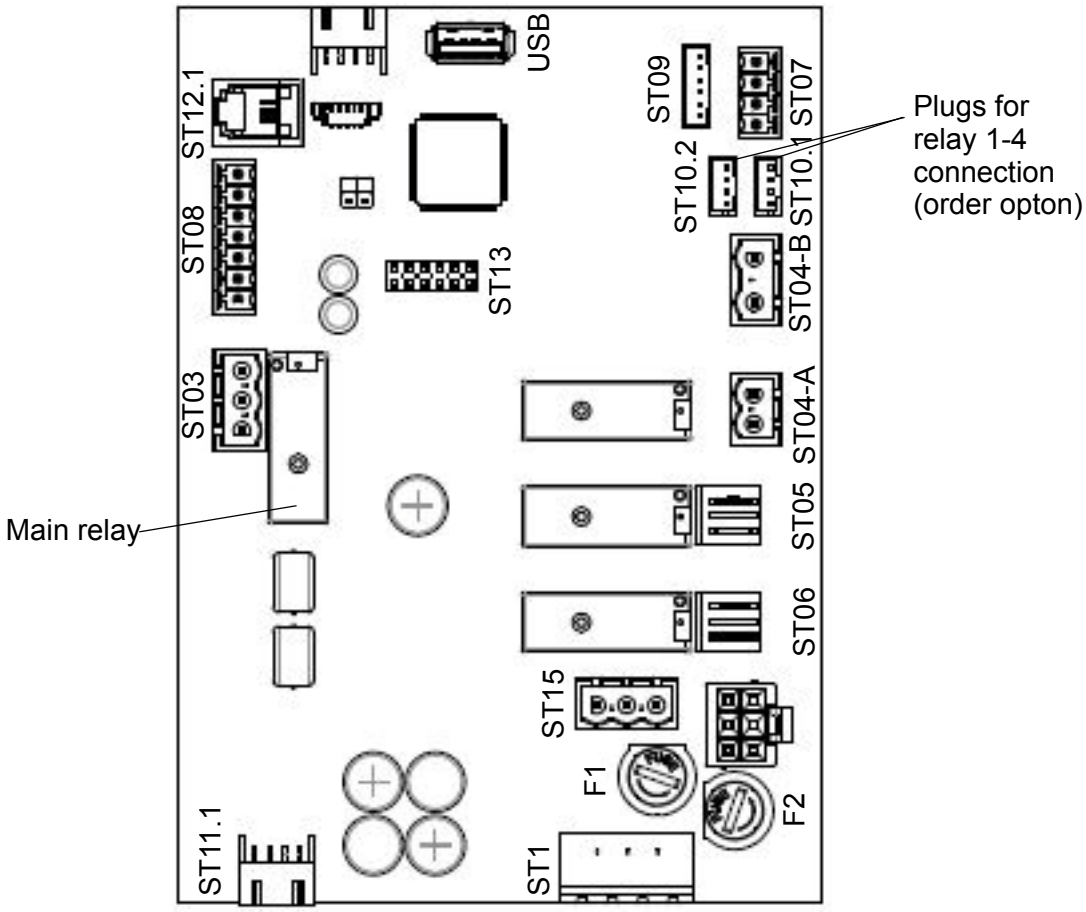
The fuse protection of the control voltage for all boards with 2 x 2.5 A Flink (F1, F2) takes place on the mainboard.

The external circuitry for the control voltage and the interlock (safety) system are connected directly to the mainboard on plug ST1. If additional boards are connected, the connection moves from the mainboard to the outermost board (see sketch).



4.3 Mainboard

The mainboard is "the heart" of the control. All logic functions and control operations for the steam humidifier take place here.
The relays for the control of the main contactor, inlet solenoid valve and blow-down pump are arranged directly on the mainboard.



4.3.1 Connections on the mainboard

The use of the connections is illustrated by the wiring diagrams (see Chapter 8)

4.3.1.1 Customer-side computer interfaces

Inputs

ST08:

- Input for control signal of temperature sensor
- Configurable digital input 12 VDC

Outputs

ST03:

- Potential free break/make contacts NC and NO, programmable, relay assigned to "Collective fault" in factory setting

ST10.1/ST10.2:

- Connection options for an optional relay each in DIN rail version with wiring harness (order option)

ST07:

Control output 0...10 VDC (max. 8 mA)

ST08:

- +20 VDC supply voltage (max. 20 mA) for humidity sensors (can be used as auxiliary voltage for digital input)

ST15:

- Tap for 1,2 and N (max. 2.5 A) for customer use

USB:

Connection for USB stick for use as a data logger and for parameter or software updates

4.3.1.2 System-side interfaces

ST1:

- 4-pin screw / plug connection for the connection of L1 and N and the interlock (safety) system

ST11.1:

- +12 V, GND, CAN-Bus

Inputs

ST09:

- Input for current transformer for ELDB (= Electrode steam humidifier) / level control for HKDB (heater steam humidifier) with automatic detection (for explanation of terms see Glossary, Index 7)

ST04-B:

- Galvanically isolated input (optical coupler) for sensor electrode for ELDB

Outputs

ST04-A:

- Main contactor

ST05:

- Blow-down pump

ST06:

- Inlet solenoid valve

Bi-directional

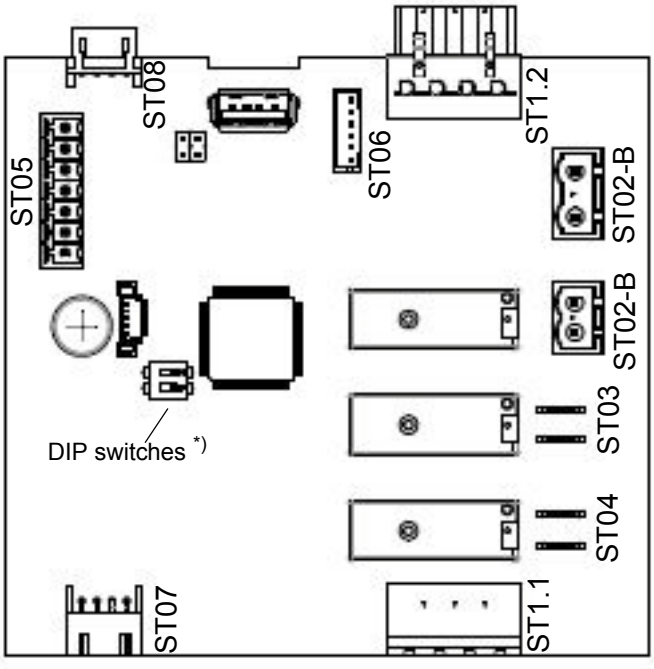
ST12.1:

- Serial interface for screen connection

ST 13:

- Base for adapter board with RS485 interface

4.4 Extension board (only for double cylinder units)



*) The DIP switches are for CAN-Bus address setting. They are factory preset according to the unit configuration.

4.4.1 Connections on the extension board

4.4.1.1 Customer-side computer interfaces

Inputs/outputs

ST05:

Not used

4.4.1.2 System-side interfaces

ST1.1:

- 4-pin screw / plug connection for the connection of L1 and N and the inter-lock (safety) system

ST1.2:

- Loop-through of ST1.1

ST07:

- +12 V, GND, CAN-Bus

ST08:

Loop-through of ST07

Inputs

ST06:

- Input for current transformer (ELDB) / level control (HKDB) with automatic detection

Outputs

ST02-A:

- Main contactor

ST03:

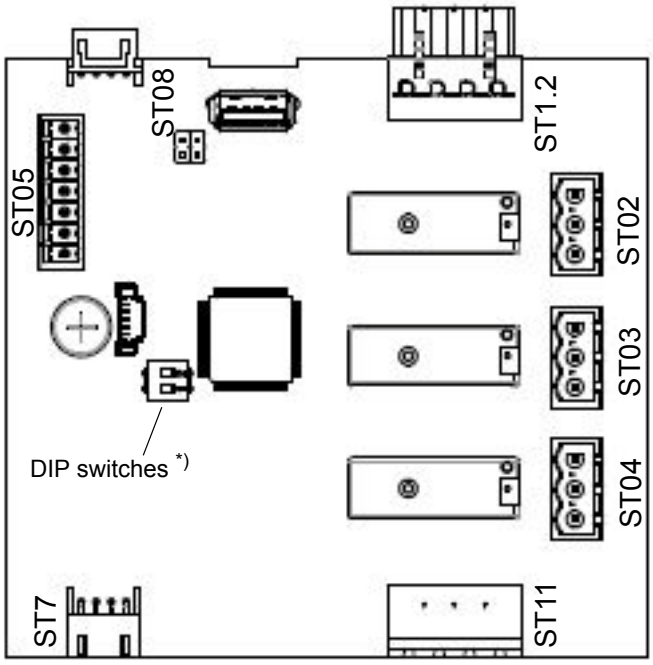
- Blow-down pump

ST04:

Inlet solenoid valve

4.5 Relay board (optional)

The relay board has three additional relays with potential free break/make contacts (contact load 250 VAC/8 A) for switching or controlling of additional functional units or options. A maximum of 2 relay boards can be installed.



*)The DIP switches are for CAN-Bus address setting. They are factory preset according to the unit configuration

4.5.1 Connections on the relay board

4.5.1.1 Customer-side computer interfaces

Inputs

ST05:

- Configurable digital input 12 VDC

Outputs

ST02:

- Potential free break/make contacts NC and NO, programmable

ST03:

- Potential free break/make contacts NC and NO, programmable

ST04:

- Potential free break/make contacts NC and NO, programmable

4.5.1.2 System-side interfaces

ST11:

- 4-pin screw / plug connection for the connection of L1 and N and the interlock (safety) system

ST1.2:

- Loop-through of ST11

ST08:

- +12 V, GND, CAN-Bus

ST07:

- Loop-through of ST08

4.6 Electrical connection

⚠WARNING

Danger of electric shock!
Dangerous electric voltage!
All work relating to the electrical installation may only be carried out by designated specialist personnel (electrician or qualified person with equivalent training).

Please note

The customer / operator is responsible for monitoring the qualifications of the specialist personnel.

NOTICE

Potential component damage due to electrostatic discharge!
To protect the sensitive electronic components, measures to prevent damage due to electrostatic discharge must be taken before the start of the installation work.

4.6.1 Connection of control voltage

The control voltage of 230 VAC is to be applied to the board which is closet to the cable gland on the underside of the housing. The plug designation differs depending on the level of expansion:

Type of board	Plug designation
Mainboard	ST1
Extension board	ST1.1
Relay board	ST11

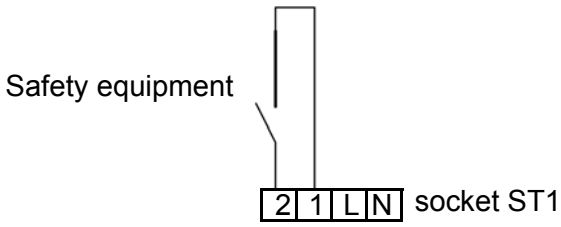
The pin assignment is identical for all plugs. L and N are labelled on the plugs.

4.6.2 Connection of interlock (safety) system

⚠WARNING

Danger of electric shock!
Dangerous electric voltage!
After the initial operation of the unit, a 230 VAC voltage is present at terminal 1 when standard wiring is used.

The so-called interlock (safety) system is located between terminals 1 and 2. Safety equipment can be wired into the interlock (safety) system. If the interlock (safety) system is open, the humidifier is not operational or the operation is interrupted.



Terminals 1/2 on the mainboard (socket ST1) for connection of the interlock (safety) system

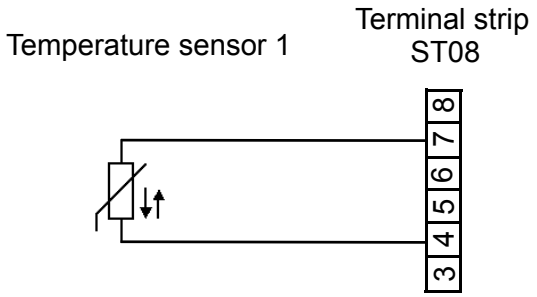
Please note

The interlock (safety) system is not closed when delivered ex-factory!

Please note

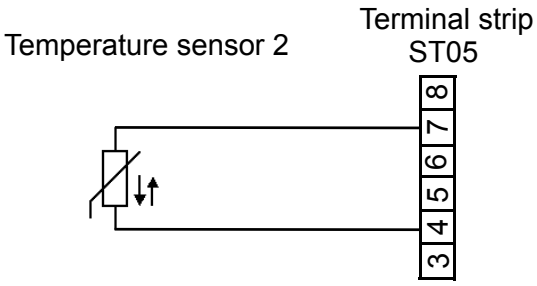
The contacts, which are connected to terminals 1 and 2 must be potential free and suitable for switching of 230 VAC.

4.6.3 Connection of the temperature sensor(s)



Connection of temperature sensor 1 to the mainboard

If a 2nd temperature sensor is used, this is to be connected to the extension board or to relay board 1 (if several relay boards are present):

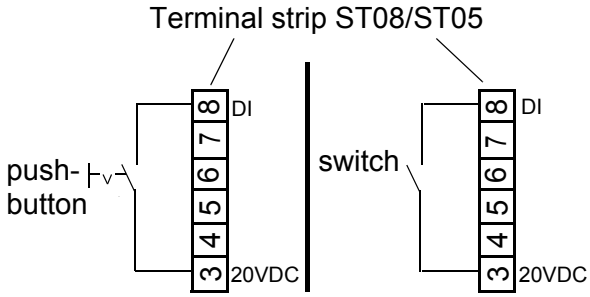


Connection of temperature sensor 2 to extension board or relay board 1 (if an extension board is not present)

4.6.4 Connecting the digital input (DI)

The digital input on the mainboard can be used for switching functions.
The digital input must be wired on-site in accordance with its use, e.g. with as push-button or a switch (also see chapter 6.8.8 „Function parameters“ / „Function_digital_input“).

Wiring the **digital input (DI)**:

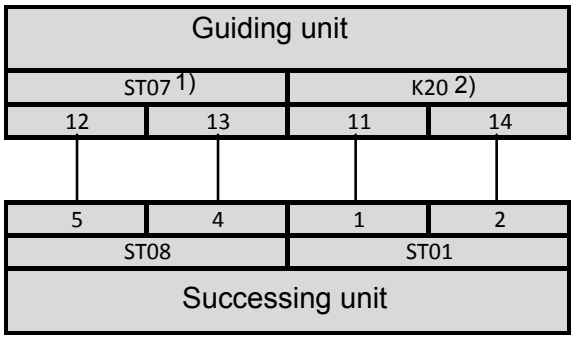


Terminals 3/8 provided for connecting the digital input
- mainboard (terminal strip ST08)
- extension board/relay board (terminal strip ST05

4.6.5 Connection of the control signal and the release signal in case of multiple units

In case of multiple units, separate steam generators work together. The control signal and the release signal are connected to the master unit, as described above. In addition, connecting cables are established between the master unit and the slave unit(s) (provided on-site). This is used by the master unit to provide the slave unit with an actuator signal and the transmitted (potential free) release signal.

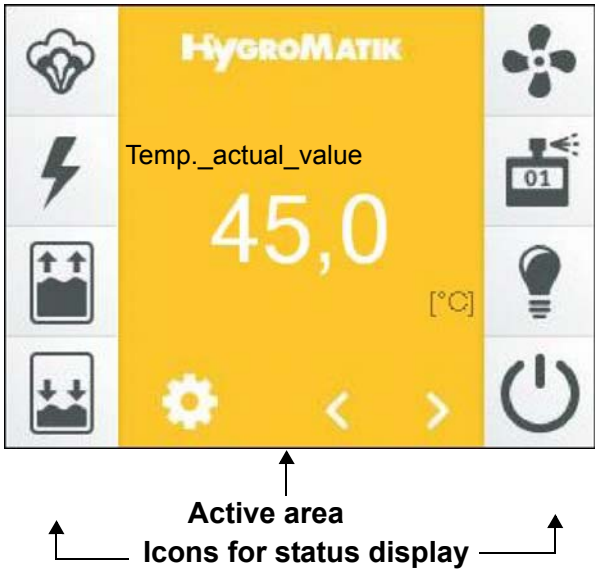
The electrical connection for the control signal and release signal must be implemented as follows for multiple units:

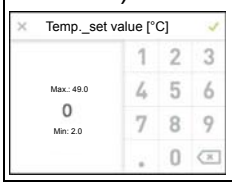


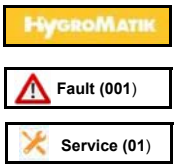
[1] „ST07“ designates the connector plug on the mainboard

[2] „K20“ is the relay used for the connection of the successing unit with the installed option (CN-07-10012) or the enclosed option (CN-07-10002)

5. The display



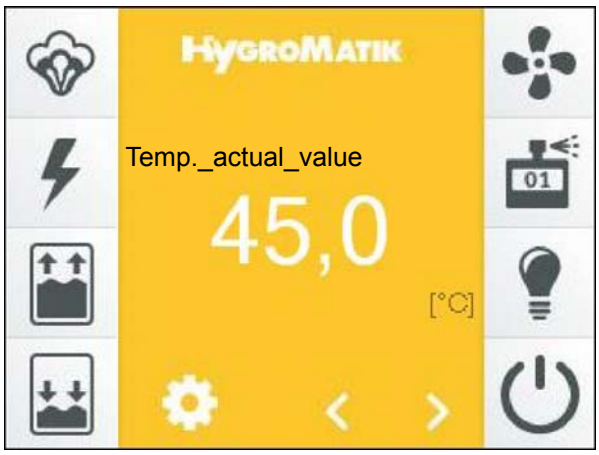
Active display area	Use
	**Main display** for operating values, navigation using the scroll icons. In the event of a fault or a service message, the HygroMatik logo changes to a display field which describes the fault or the service requirement.
	Scroll keys, used to display the following operating values: • Temp._actual value [°C] • **Temp._set value [°C]**, can be changed using the on-screen keyboard*) **after tapping on it**[1)] • Steam_actual_unit [kg/h] • Steam_output_max. [%] • Demand [%] • Control_signal_internal [%] • Output signal [V] • Current_actual_Cyl. 1[A] (only for electrode steam humidifier ELDB) • Current_actual_Cyl. 2 [A] (only for ELDB double cylinder units) • Water_level_cyl. [mm] (only for heater steam humidifier HKDB) • Water_level_cyl. 2 [mm] (only for HKDB double cylinder units) • Essence_selection1 (1... 4, if enabled) [1)] the display and option to change the temperature set value is not available with weekly timer operation; with the following exception: If "ECO" is selected for the steam generation, the temperature set value display is also available in the weekly timer operation.
*) 	On-screen keyboard for changing the Temp._set value; is displayed after tapping on the temperature set value display and is used for the direct input of the set value Confirm the input and save using the check mark in the top right, cancel using the "X" in the top left

Active display area	Use
	Icon to open set-up mode (via password prompt). Password "000" -> operating functions of user level (see Section 6.5) Password "010" -> operating functions of operator level (see Section 6.7)
	In the event of a fault or a service message, the relevant display field is shown instead of the HygroMatik logo. Tapping on it opens the unit info screen (see Section 6.9).
	Unit info screen (see Section 6.9) for the display of fault and service messages in plain text. Is displayed by touching the fault or service message.

Icon	Status	Meaning
	dark bright flashes	Steam generation active No steam generation Fault steam generation
	dark bright flashes	Main contactor switched Main contactor not switched Fault main contactor
	dark bright flashes	Filling active No filling Fault filling
	dark bright flashes	Blow-down active No blow-down Fault blow-down <u>Manual blow-down</u> A manual blow-down can be triggered by tapping on the icon. Touching the icon again stops the manual blow-down.
	dark bright	Fan active Fan not active
	dark bright	Essence active Essence not active
	dark bright	Light active Light not active
	dark flashes	Operating mode display Unit is in the initialisation phase

6. Operation of control

6.1 Operation basics



Operation takes place via the built-in touch-sensitive 3.5 inch display. It is used for all operating steps which are required for the settings and operation of the unit. In addition to operating the unit directly, it is possible to control it remotely via the building technology control system or a PLC, using the communication interface. Supplementary documentation is available from HygroMatik for this type of application.

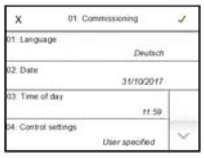
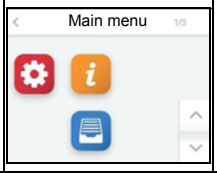
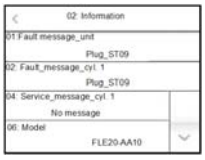
Screen views

The operating structure uses several screens, which are schematically displayed in the table below.

User guidance

In the user guidance, a distinction is made between the "user level" and "operator level". While the user level only makes it possible to carry out basic device operations, the operator level also makes it possible to make comprehensive parameter and unit settings. The possible operating functions of the two levels are presented in the following sections.

Overview of the screens

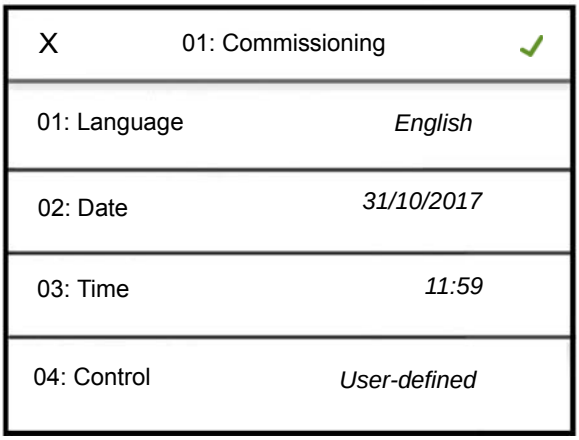
	Content of screen page	Presentation	Sec.
Screen 1 Commissioning	Used for the basic unit settings (e.g. user language) after the unit is switched on for the first time. This page is then closed. To do so, use the confirmation tick to exit it.		6.2
Screen 2 Main screen	Displays the current operating values and unit status information (status icons).		6.3
Screen 3 Main menu (user level)	Allows access to submenus for comprehensive unit settings, reading values and history.		6.5
Screen 3 Main menu (operator level)	Allows access to submenus for comprehensive unit settings, reading values, parameter settings, service settings and history.		6.7
Screen 4 Unit information	Is only displayed after a fault or a service message has occurred; provides information on device data, statistics, faults that have occurred and service requirements.		6.9

Operating ranges at the user/operator level

Level	Permits
User level	• Display of the reading values of the main screen • Setting the temperature set value in the main screen • Display of the unit information after a fault or status message • After password entry: Display of the complete list of reading values and adjustment options for some service parameters
Operator level	• All functions of the user level • Advanced settings options for operation and service parameters

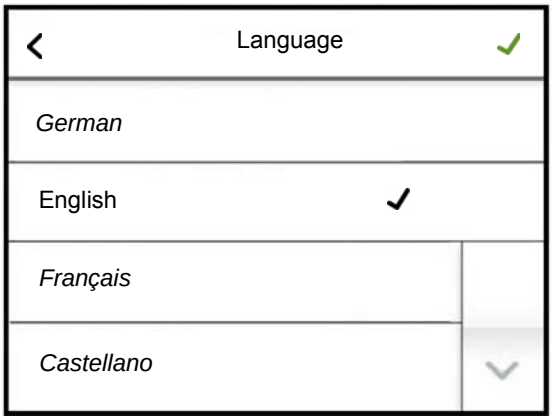
6.2 Screen 1 - Commissioning

After connection to the mains supply and initial actuation of the control switch, the commissioning screen for the basic device settings appears on the display once the self-test of the control has been completed:



6.2.1 Setting the language

» Tap on the line with parameter "01: Language". The following screen is displayed:



x The currently selected language is marked with a tick in the relevant line. By tapping on the scroll-down icon, the 2nd page of the screen is displayed if required

» Change the language by tapping on the language selection

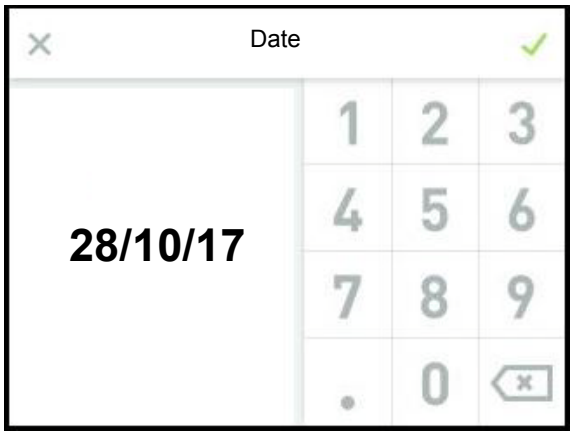
» Confirm the input and return to the "Commissioning" screen with the green tick in the top right (cancel by tapping on "X" in the top left)

6.2.2 Input of date and time of day

The parameters "02: Date" and "03: Time of day" require digits to be entered. To do so, a screen with a keyboard and an input field in the date or time format will be displayed after tapping on the relevant line.

As an example, the date input is described below:

» Tap on line "02: Date". The following screen is displayed:



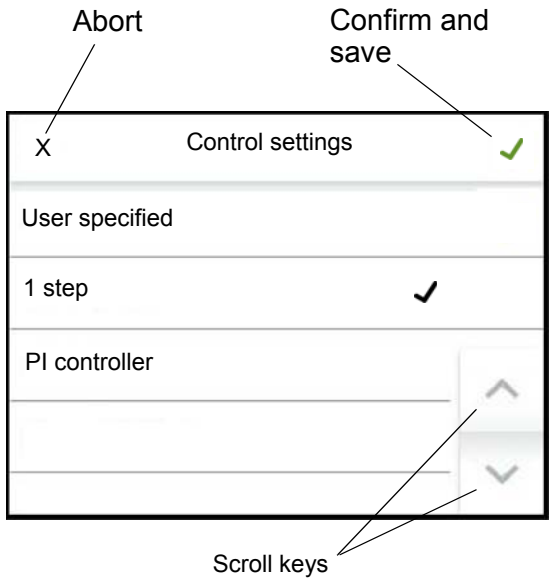
» Enter the date in the format DD/MM/YY (D = day, M = month, Y= year) as digits only (the forward slashes are added automatically)

» Confirm the input and return to the "Commissioning" screen with the green tick in the top right (cancel by tapping on "X" in the top left)

6.2.3 Control settings

The control behaviour of the control is set in the next step. The following variants are offered for selection on the screen: 1 step operation (on/off control) or the use of the internal PI controller. If the unit was already factory-preset according to customer requirements, the selection tick appears in the "User-defined" line.

The parameters are displayed in blocks on a screen page, which include a maximum of 4 entries. Scroll icons are used to switch between the individual display blocks.



» Confirm the input and return to the "Commissioning" screen with the green tick in the top right (cancel by tapping on "X").

» Tapping the green tick in the top right again saves the entries and exits the commissioning screen (cancel by pressing the "X" in the top left).

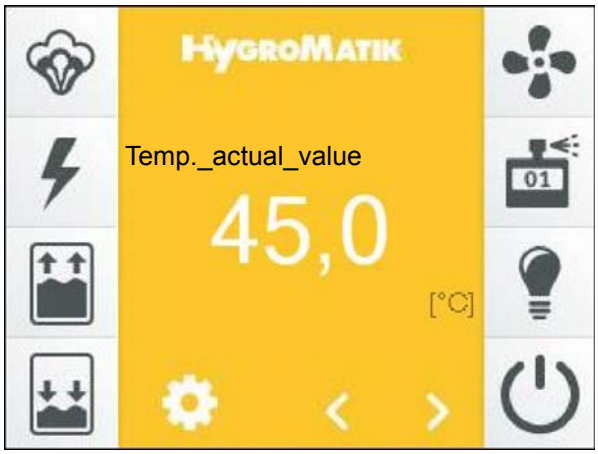
The commissioning is now complete. If the commissioning screen was exited with the confirmation tick, the main screen is now shown in the display.

The commissioning screen is no longer displayed in future. Changes which are made at a later stage to the parameters listed during commissioning must then be performed at the operator level in the "Settings" and "Control" submenus.

Line-up the commissioning parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold**	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
01	**Language**		Selection	Selection of language
		0	**Deutsch**	German
		1	English	English
		2	Francais	French
		3	Castellano	Spanish
		4	ﾆﾎﾝｺﾞ	Japanese
		5	Italiano	Italian
		6	Русский	Russian
02	**Date**			Date setting in DD.MM.YY format
03	**Time_of_day**			Clock setting in HH:MM format
04	**Control_settings**		Selection	Clock setting in HH:MM format
		0	User_specified	The selection was carried out separately during initial operation according to control type, signal type and area. This is a read value only
		7	1-step	1 step operation [44]
		10	PI controller	Control with internal PI controller [96]

6.3 Screen 2 - Main screen



The main screen is shown in the display after the unit is switched on, unless the unit is being switched on for initial commissioning (see Section 6.2). In the main screen, current operating values are represented as numerical information, as well as status information in the form of icons. The display elements were described in the Section "The display". A flashing icon always indicates a fault.

The left row of icons refers to the operational conditions of the unit. The right row of icons indicates the status of releases. For steam production to take place, all icons on the right side of the display must be active.

The scroll icons and allow the user to move through the list of display values on the main display (see Section 5, "The display"). With the exception of the temperature set value, these are reading values only. The values displayed are listed and explained in the table in the following section.

If a fault has occurred or a service message is issued, a display field with the relevant message is displayed instead of the HygroMatik logo. The user can access the unit info screen by tapping on this field.

The brightness of the main screen is reduced after a preset time (display brightness is dimmed). The two scroll icons and the settings icon are also hidden at this point. The original state is restored by tapping on the display.

The values for the normal display brightness and the dimmed state can be adjusted by the user, as well as the time after which the main display is dimmed.

The main menu of the user level and the operator level (screen 3 „Main menu“) are accessed by tapping on the icon .

6.3.1 Changing the set point temperature

» Select the "Temp._set value [°C]" using or

» Tap on the Temp._set value display

» Enter the value of the intended temperature set value using the on-screen keyboard which has opened

» Confirm the input and save using the check mark in the top right, cancel using the "X" in the top left

Table of the reading values available in the main display and the set value of the steam bath

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold min max FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
3	**Temp._actual_value**		Reading value	The actual value [1] of the steam bath temperature
4	**Temp._set_value**		20.0 49.0 **45.0**	The set value [3] of the steam bath temperature
7	**Steam_actual_unit**		Reading value	The current steam output [4] in kg/h
9	**Steam_output_max.**		Reading value	The set value of the maximum steam output [43] as a percentage of the nominal output [99]
10	**Demand**		Reading value	The current demand [5] as a percentage of the maximum level
11	**Control_sig._internal**		Reading value	The internal actuator signal [42] controls the power element [100] of the unit
12	**Output_signal**		Reading value	The output signal [69] can be used to control additional units
13	**Current_actual_cyl. 1**		Reading value	The current amperage (only for ELDB [77])
14	**Current_actual_cyl. 2**		Reading value	The current amperage (only for ELDB [77] double cylinder units)
15	**Water_level_cyl. 1**		Reading value	The water level in level control in mm (only for HKDB [78])
16	**Water_level_cyl. 2**		Reading value	The water level in level control in mm (only for HKDN [78] double cylinder units)
19	**Essences_selection**		Reading value	The selected essence pump from No. 1 to No. 4

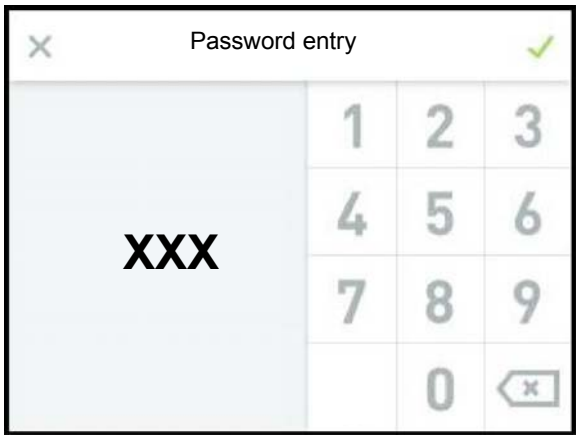
6.4 Password entry

The password determines if the main menu of the user level or the operator level is displayed. The password codes in use are:

Code 000: The main menu of the **user level** becomes accessible. However, it is sufficient to leave the password prompt with the green tick, without explicitly entering the code.

Code 010: The main menu of the **operator level** becomes accessible.

The password entry is called up in the main screen by tapping on the icon . An on-screen keyboard is displayed for entering the password:



The operator level is accessed through the sequential input of the code digits "0", "1" and "0" and confirming them with the green tick (top right).

6.5 Screen 3 - Main menu (user level)

After selecting the user level (code 000), the icons of the submenus which are available to the user are displayed:

6.6 User level submenus

Icon	Opening of submenu
	Settings
	Reading values
	History

By tapping on the respective icon, the user accesses the screen page where the parameters of the respective group are displayed for selection, viewing or for making changes.

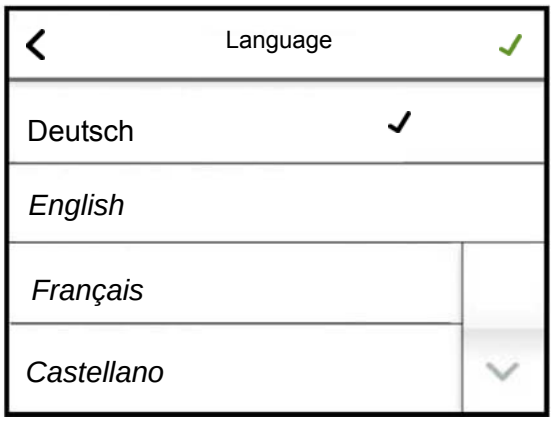
Layout of screen pages

The input fields in which changes can be made are shown in *italics*. Depending on the parameter, the input has to be made by:

- Selection from predefined offers (multiple choice, see example 1)
- Entry of numeric values using an on-screen keyboard (see example 2).

Example 1: Selection of user language:

Call up the language selection on the screen by tapping on the "Settings" icon and then on "Language":

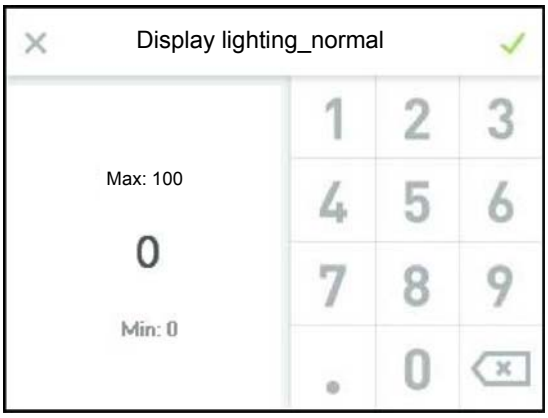


By tapping on the language required, the black tick is displayed in the corresponding row. Using the green tick (top right), the selection is saved and the display returns to the parent screen.

If the settings are to remain unchanged, it is possible to return straight away using the icon ‹ in the top left.

Example 2: Setting the display brightness

Tap on "Display lighting_normal" on the screen to call up the input mask:



The display brightness which is set is displayed and can be changed using the keyboard. Save and return with the green tick, leave the input mask without changes using the "X" in the top left.

The screens are hidden after an adjustable period of time. The main screen is then displayed.

If a submenu is to be called up again after a screen has been closed automatically by a time-out, this can only be done through the settings icon in the main screen. This also means that the password has to be re-entered. As long as the user continues their work in the area of the main menu, the existing access remains, i.e. no renewed password entry is required.

6.6.1 Settings submenu

Table of settings parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold**			Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Language**		Selection			Language selection
		0	**Deutsch**			German
		1	English			English
		2	Francais			French
		3	Castellano			Spanish
		4	ﾆﾎﾝｺﾞ			Japanese
		5	Italiano			Italian
		6	Русский			Russian
2	**Date**		DD/MM/YY			Set date
3	**Time_of_day**		HH:MM			Set time
			min	max	**FP**	
4	**Display_lighting_normal**		0	100	**100**	Screen backlight in undimmed state
5	**Delay_present_page**		0	3600	**300**	display duration for a certain screen page before return to the main screen in min
6	**Display_lighting_dimmed**		0	100	**50**	Screen brightness for dimmed state
7	**Display_dim_after**		0	3600	**120**	Switching of screen brightness of main screen to dimmed value after ... seconds. If an error has occurred or a status message is displayed, the main screen is not dimmed

6.6.2 Reading values submenu

Read values table (visible on the user and the operator level)

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max **FP**	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Status_unit**			Operating condition of unit
		0	Initialization	Control performs initialisation [10]
		1	Safety_interlock_open	Unit is ready for steam production, but the interlock (safetF) system [11] is open
		2	No_Demand	Unit is ready for steam production, but there is no demand [5]
		3	Humidification	Humidifying [47]
		4	Runtime_limitation	Unit has switched off after limitation of operating time was reached [32]
		5	Remote_off	Unit was switched off via a software command [12] for opening the interlock (safety) system [83] via the communication interface [13]
		7	Standby_heating_heating	The standby heating [16] is in the heating phase
		8	Standby_heating_interval	The standby heating [16] is in the resting phase
		9	No_demand_ECO	There is no demand [5] in ECO mode [17]
		10	Humidification_ECO	Humidifying in ECO mode [17]
		11	Timer_steam_off	Steam is not produced after the timer [18] has expired
		90	Diagnosis	Unit is performing diagnostics [15]
		99	Fault	An error has occurred; steam production was stopped
2	**Status_cyl. 1**			Status of cylinder 1
		0	Initialization	Unit is in initialization phase →[10]
		1	Safety_interlock_open	Cyl. 1 is ready for steam production, but the interlock (safety) system [11] is open
		2	No_Demand	Cyl. 1 is ready for steam production, but there is no demand [5]
		3	Humidification	Humidifying [47]
		30	Filling_valve 1	Filling via solenoid valve 1 [19]
		32	Filling_valve 1 a. 2	Filling via solenoid valve 1 and solenoid valve 2 [19]
		60	Start_blow-down	At the start of operation, the unit performs a start blow-down [20]
		61	Part._blow-down	A partial blow-down [21] is performed
		62	Full_blow-down	A full blow-down [22] is performed
		63	Dilution	The unit performs a dilution [23] of the cylinder water (only ELDB [77])
		64	Max._current_blow-down	The unit performs an overcurrent blow-down [24] because the measured current is too high (only for ELDB [77])
		65	Max._level_blow-down	The unit performs a max. level blow-down [25] because the water level is too high (only for HKDB [78])
		66	Standby_blow-down	The unit performs a Standby blow-down [26], because the maximum duration without demand [5] has been reached
		67	Dead_leg_flushing	A dead-end line flushing is performed [27]
		68	Manual_blow-down	A manual blow-down [28] was triggered
		81	Part._blow-down_pending	A partial blow-down [21] is performed before the next filling process
		82	Full_blow-down_pending	A full blow-down [22] is performed before the next filling process
		90	Cylinder_full	The sensor electrode reports when the maximum water level in the cylinder has been reached (only for ELDB [77])
		270	Service_message	A service message is present. For a more detailed specification see "Read values 8" for cyl. 1 or "Read values 9" for cyl. 2
		900	Diagnosis	The unit is in diagnostic mode [15]
		999	Fault	There is an error
3	**Status_cyl. 2**			Status of cylinder 2 (as cylinder 1)
4	**Fault_message_unit**			List of possible unit error messages
		0	No_fault	No fault
		1	Plug_ST09	The plug for the current transformer (ELDB) [77] or the level control (HKDB) [78] is not attached
		2	Cylinder_extension 1	There is a problem with the expansion board
		6	Relay_extension 1	There is a problem with relay board 1
		7	Relay_extension 2	There is a problem with relay board 2
		29	Internal	system error
		30	Filling_valve 1	Fault solenoid valve 1 [19]
		32	Filling_valve 1 a. 2	Fault solenoid valve 1 and solenoid valve 2 [19]
		61	Part._blow-down	Partial blow-down [21] not successful
		62	Full_blow-down	Full blow-down [22] not successful
		63	Dilution	The unit performs a dilution [23] of the cylinder water (only ELDB [77])
		64	Max._current_blow-down	The unit performs an overcurrent blow-down [24] because the measured current is too high (only for ELDB [77])
		65	Max._level_blow-down	The unit performs a max. level blow-down [25] because the water level is too high (only for HKDB [78])
		66	Standby_blow-down	The unit performs a Standby blow-down [26], because the maximum duration without request [5] has been reached
		67	Dead_leg_flushing	A dead-end line flushing is performed [27]

Continuation of reading value table (1)

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max **FP**	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
		90	Cylinder_full	Sensor electrode reports cylinder full status [38] for 60 min (only for ELDB [77])
		91	Current_measurement	Value provided by current measurement not plausible (only for ELDB [77])
		92	Main_contactor_current	A current is measured for at least 15 s, even though the main contactor [72] is not actuated (only for ELDB [77])
		93	Main_contactor_cyl._full	A cylinder full status [38] was detected for at least 15 s, even though the main contactor [72] is not actuated (only for ELDB [77])
		120	Thermoswitch	A thermo sensor [31] has been triggered (only for HKDB [78])
		121	Water_level_sensor	Value provided by level control [39] not plausible (only for HKDB [78])
		122	Max.-level	Max. level [40] was reached 5 times in a row during filling (only for HKDB [78])
		123	Steam_down_time	Despite a current feed to the radiators, the water level has not changed in the period specified →[53] (only for HKDB [78])
		124	Relay_main_contactor	The relay for the control of the main contactor is not functioning correctly
		240	Temp._sensor_miss	Temperature sensor, cable or input stage defective with error pattern "High resistance" (cable break)
		241	Temp._sensor_broken	Temperature sensor, cable, or input stage defective with error pattern "Short circuit"
		242	Temperature_max	Max. temperature [41] exceeded
5	**Fault_message_cyl. 1**			List of possible fault messages for cylinder 1 (see Fault_message_unit)
6	**Fault_message_cyl. 2**			List of possible fault messages for cylinder 2 (see Fault_message_unit)
		7	Operating_time	The number of operating hours preset has bee reached
8	**Service_message_cyl. 1**			List of service messages for cylinder 1
		0	No_service_msg.	A service is not required
		1	Steam_amount_counter	A unit service is required due to the steam volume counter
		2	Cycles_main_contactor 1	The maximum number of operating cycles for K1 has been reached and a Service_main_contactor [34] is required
		3	Cycles_main_contactor 2	The maximum number of operating cycles for K2 has been reached and a Service_main_contactor [34] is required
		12	Warning_electrodes	The condition of the electrodes will require a replacement shortly (only for ELDB [77]) →[95]
		13	Warning_pump	In the area of the blow-down pump and/or the piping, there are indications that maintenance requirements are starting to develop →[95]
		14	Warning_solenoid_valve	At a solenoid valve and/or the piping, there are indications that maintenance requirements are starting to develop →[95]
9	**Service_message_cyl. 2**			List of service messages for cylinder 2
		0	No_service_msg.	A service is not required
		1	Steam_amount_counter	A unit service is required due to the steam volume counter
		4	Cycles_main_contactor 3	The maximum number of operating cycles for K3 has been reached and a Service_main_contactor [34] is required
		5	Cycles_main_contactor 4	The maximum number of operating cycles for K4 has been reached and a Service_main_contactor [34] is required
		6	Cycles_main_contactor 5	The maximum number of operating cycles for K5 has been reached and a Service_main_contactor [34] is required
		12	Warning_electrodes	The condition of the electrodes will require a replacement shortly (only for ELDB [77]) →[95]
		13	Warning_pump	In the area of the blow-down pump and/or the piping, there are indications that maintenance requirements are starting to develop →[95]
		14	Warning_solenoid_valve	At a solenoid valve and/or the piping, there are indications that maintenance requirements are starting to develop →[95]
10	**Steam_actual_unit**		Reading value	Current steam output of the unit [4]
11	**Steam_actual_cyl. 1**		Reading value	Current steam output [4] of cylinder 1 (for double cylinder units)
12	**Steam_actual_cyl. 2**		Reading value	Current steam output [4] of cylinder 2 (for double cylinder units)
16	**Steam_output_max.**		Reading value	Set value of maximum output power [43]
17	**Demand**		Reading value	The demand [5] is the control signal from which the internal actuator signal [42] is created
18	**Control_sig._internal**		Reading value	Internal actuator signal [42] as a percentage of the actuator signal for the nominal output
19	**Output_signal**		Reading value	Output signal [69] on terminals 12, 13 proportional to input signal
20	**Safety_interlock**			Status of the interlock (Safety) system [11]
		0	Off	The interlock (safety) system is open
		1	On	The interlock (safety) system is closed
21	**Safety_interlock_virtual**			Status of the virtual interlock (safety) system [86]
		0	Off	The interlock (safety) system is open
		1	On	The interlock (safety) system is closed

Continuation of reading value table (2)

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max **FP**	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
22	**Current_actual_cyl. 1**		Reading value	The current power consumption of cylinder 1 (only for ELDB [77])
23	**Current_actual_cyl. 2**		Reading value	The current power consumption of cylinder 2 (only for ELDB [77] double cylinder units)
24	**Water_level_cyl. 1**		Reading value	Water level in cylinder 1 in mm (only for HKDB [78])
25	**Water_level_cyl. 2**		Reading value	Water level in cylinder 2 in mm (only for HKDB [78] double cylinder units)
28	**Model**		Reading value	Type designation of unit
29	**Unit_name**		Reading value	Unit name [90], can be selected by the customer, if required
30	**Serial_number**		Reading value	Serial number
31	**Date_of_manufacturing**		Reading value	Date of manufacture
32	**Controller_series**		Reading value	Type of control
33	**Software_version**		Reading value	Software version of control
38	**Temp._set_value**		Reading value	Set value [3] of temperature in °C
39	**Temp._actual_value**		Reading value	Actual value [1] of temperature in °C
40	**Temp._actual_value 1**		Reading value	Actual value [1] of temperature in °C as measured by temperature sensor 1 when 2 temperature sensors are in use
41	**Temp._actual_value 2**		Reading value	Actual value [1] of temperature in °C as measured bF temperature sensor 2 when 2 temperature sensors are in use
46	**Steam_amount_total_cyl. 1**		Reading value	Entire steam volume of cylinder 1 [kg] produced since initial operation
47	**Steam_amount_total_cyl. 2**		Reading value	Entire steam volume of cylinder 2 [kg] produced since initial operation (double cylinder units only)

6.6.3 History submenu

This submenu is identical on the user and the operator level.

6.6.3.1 Explanation of history management

The control stores fault messages on a rolling basis. Once there are 10 fault messages, the oldest is overwritten by a current entry. A fault message set consists of the following entries:

1. Date of fault message
2. Contents of fault message
3. Frequency of fault message

If an identical fault occurs several times in a row, the first entry relating to this fault is updated with the date of the most recent occurrence and the frequency is incremented. A new fault message is not recorded.

The situation is different if a particular fault occurs multiple times, but not in direct succession. In this case, a new fault message is written for each instance.

The table below shows the layout of the history management.

Table of history layout

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold	Meaning/comment
1	**1st fault_entry_date**			1. Memory entry: Date/time
2	**1st fault_entry_message**			1. Memory entry: Fault message (for explanation see "Read values 4 / Fault_message_unit")
		0	No_fault	
		1	Plug_ST09	
		2	Cylinder_extension 1	
		6	Relay_extension 1	
		7	Relay_extension 2	
		29	Internal	
		30	Filling_valve 1	
		32	Filling_valve 1 a. 2	
		61	Part._blow-down	
		62	Full_blow-down	
		63	Blow-down_dilution	
		64	Max._current_blow-down	
		65	Max._level_blow-down	
		66	Standby_blow-down	
		67	Start_blow-down	
		90	Cylinder_full	
		91	Current_measurement	
		92	Main_contactor_current	
		93	Main_contactor_cyl._full	
		120	Thermoswitch	
		121	Water_level_sensor	
		122	Max.-level	
		123	Steam_down_time	
		124	Relay_main_contactor	
		240	Temp._sensor_miss	
		241	Temp._sensor_broken	
		242	Temperature_max	
		243	Temp._sensor 2_miss	
		244	Temp._Sensor 2_broken	
		245	Temp._deviation	
3	**1st fault_entry_rate**			1. Memory entry: Frequency of occurrence (since initial operation)
4	**2nd fault_entry_date**			2. Memory entry: Date/time
5	**2nd fault_entry_message**			2. Memory entry: Error message, see above
6	**2nd fault_entry_rate**			2. Memory entry: Frequency of occurrence (since initial operation)
7	**3rd fault_entry_date**			3. Memory entry: Date/time
8	**3rd fault_entry_message**			3. Memory entry: Error message see above
9	**3rd fault_entry_rate**			3. Memory entry: Frequency of occurrence (since initial operation)

Continuation of history layout

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold	Meaning/comment
10	**4th fault_entry_date**			4. Memory entry: Date/time
11	**4th fault_entry_message**			4. Memory entry: Error message see above
12	**4th fault_entry_rate**			4. Memory entry: Frequency of occurrence (since initial operation)
13	**5th fault_entry_date**			5. Memory entry: Date/time
14	**5th fault_entry_message**			5. Memory entry: Error message see above
15	**5th fault_entry_rate**			5. Memory entry: Frequency of occurrence (since initial operation)
16	**6th fault_entry_date**			6. Memory entry: Date/time
17	**6th fault_entry_message**			6. Memory entry: Error message see above
18	**6th fault_entry_rate**			6. Memory entry: Frequency of occurrence (since initial operation)
19	**7th fault_entry_date**			7. Memory entry: Date/time
20	**7th fault_entry_message**			7. Memory entry: Error message see above
21	**7th fault_entry_rate**			7. Memory entry: Frequency of occurrence (since initial operation)
22	**8th fault_entry_date**			8. Memory entry: Date/time
23	**8th fault_entry_message**			8. Memory entry: Error message see above
24	**8th fault_entry_rate**			8. Memory entry: Frequency of occurrence (since initial operation)
25	**9th fault_entry_date**			9. Memory entry: Date/time
26	**9th fault_entry_message**			9. Memory entry: Error message see above
27	**9th fault_entry_rate**			9. Memory entry: Frequency of occurrence (since initial operation)
28	**10th fault_entry_date**			10. Memory entry: Date/time
29	**10th fault_entry_message**			10. Memory entry: Error message see above
30	**10th fault_entry_rate**			10. Memory entry: Frequency of occurrence (since initial operation)

6.7 Screen 3 - Main menu (operator level)

After the operator level has been selected by entering the corresponding password (code 010), the main menu is displayed. It spans multiple screen pages and scroll icons are used to navigate between them.

Screen page 1 (of 3)

Screen page 2 (of 3)

Screen page 3

6.8 Operator level submenus

By tapping on the respective icon, the user accesses the screen page where the parameters of the respective group are available for selection, viewing or for making changes.

	Opening of submenu
	Settings
	Reading values
	Control
	Service
	Archive
	Blow-down
	Filling
	Functions
	Communication interface
	Weekly timer
	SPA
	Essence
	Recording
	Relay extension 1 (visible only if a relay board is present)
	Relay extension 2 (visible only if 2nd relay board is present)

The parameters available in the submenus are described in table form below (for explanations on the individual parameters see Section "Glossary").

6.8.1 Settings submenu

Table of settings parameters (operator level)

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold**			Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Language**		Selection			Language selection
		0	**Deutsch**			German
		1	English			English
		2	Francais			French
		3	Castellano			Spanish
		4	ﾆﾎﾝｺﾞ			Japanese
		5	Italiano			Italian
		6	Русский			Russian
2	**Date**		DD/MM/YY			Set date
3	**Time_of_day**		HH:MM			Set time
			min	max	**FP**	
4	**Display_lighting_normal**		0	100	**100**	Screen backlight in undimmed state
5	**Delay_present_page**		0	3600	**300**	display duration for a certain screen page before return to the main screen in min
6	**Display_lighting_dimmed**		0	100	**50**	Screen brightness for dimmed state
7	**Display_dim_after**		0	3600	**120**	Switching of screen brightness of main screen to dimmed value after ... seconds. If an error has occurred or a status message is displayed, the main screen is not dimmed
8	**Units**					Selection of system of units
		0	**SI**			Units are displayed in the format of the SI system of units [8]
		1	Imperial			Units are displayed in the format of the imperial system of units [9]

6.8.2 Reading values submenu

The reading values submenu is no different to that of the user level. The reading values listed in table format in Section 6.6.2 are also available at the operator level.

6.8.3 Control submenu

Table of control parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold			Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Control_settings**					Combinations of control type and input signal type/range
		0	User_specified			The selection was carried out separately during initial operation according to control type, signal type and area. This is a read value only
		7	1-step			1 step operation [44]
		10	PI controller			Control with internal PI controller [96]
			min	max	**FP**	
2	**Steam_output_max.**		25,0	100,0	**100**	The maximum output power [43] can be limited to between 25 and 100%
3	**Δ Power_reduction**		0	50,0	**0**	Reduction of the maximum steam output for the purpose of load shedding [101]
4	**Output_signal**					Mapping of the output signal [69] to an internal value
		0	**Off**			No mapping
		2	Control_sig._internal			Output signal is proportional to the internal actuator signal [42]
		4	Control_signal_slave			Output is used to control a slave [94]

6.8.4 Service submenu

6.8.4.1 Monitoring and service messages

The components of the unit which wear due to operational reasons, including the steam cylinder(s), are monitored continuously when the unit is in operation. When a limit value is reached, the corresponding service message is displayed with reference to the cylinder. The service messages need to be reset after component replacement or cylinder maintenance.

The following **service messages** are set:

Steam amount

A steam amount in kg is specified in the "Steam amount_service" parameter and after this is reached, the message "Steam amount_counter" is issued.
In case of double cylinder units, the parameter entry applies to both cylinders. The service message differentiates between cylinder 1 and cylinder 2.

After the service has been carried out, the message has to be reset with "Service reset_cyl. 1" or "Service reset_cyl. 2" (or both).

For the assessment of the remaining steam amount until the next service is required, the reading values "Steam amount_until_service_cyl. 1" and "Steam_amount_until_service_cyl. 2" (only for double cylinder units) are used.

Main contactors

For main contactors, the maximum number of switching cycles is specified by the manufacturer. When a limit value is reached, the corresponding service message is displayed. The main contactor must then be replaced and the message has to be reset by setting the "Main_contactor Kx_Reset" (x = 1...5) parameter.

Please note

When the service message was triggered for one of the main contactors, it is advisable to check the meter reading for the remaining main contactors using the "Kx_switching cycles_until msg" (x = 1...5) reading values.

Monitoring

The FlexLine control continuously monitors the proper functionality of the electrodes (only for ELDB), the blow-down pump(s) and the solenoid valve(s). If the preset functionality alarm thresholds are exceeded, messages regarding the status

- of the **electrodes** (only for ELDB) ("Warning_cyl. full") or
- the **blow-down pump(s)** ("Warning_pump") or
- the **solenoid valve(s)** ("Warning_valve")

are created.

Three sensitivity values can be selected for each of the alarm thresholds, where "Sensitivity 3" (factory setting) triggers the warning messages at the earliest point.

After the cause is resolved (e.g. cleaning the input filter of the solenoid valve when a "Warning_valve" message appears), the warning message disappears.

The three above-mentioned messages can also be turned off (see subsequent Section "Table of service parameters", parameters 22, 23, 24).

Table of service parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Steam_amount_service**			Preset steam volume (see [33]) in kg until service message is triggered. For double cylinder units, this setting applies to both cylinders
4	**Service-reset_cyl. 1**			Reset steam volume counter for cylinder 1 →[33]
		0	**Off**	No
		1	On	Yes
5	**Steam_until_msg._cyl. 1**			Remaining steam volume for cyl. 1 until service message →[33] is triggered
7	**Service-reset_cyl. 2**			Reset steam volume counter for cylinder 2 →[33], double cylinder units only
		0	**Off**	No
		1	On	Yes
8	**Steam_until_msg._cyl. 2**			Remaining steam volume for cyl. 2 until service message→[33] is triggered
12	**Main_contactor 1_reset**			Reset K1 counter for main contactor operating cycles?→[34]
		0	**Off**	No
		1	On	Yes
13	**K1_switching_cycles_until_msg.**			Remaining operating cycles for K1 until service message →[34] is triggered
14	**Main_contactor 2_reset**			Reset K2 counter for main contactor operating cycles?→[34]
		0	**Off**	No
		1	On	Yes
15	**K2_switching_cycles_until_msg.**			Remaining operating cycles for K2 until service message →[34] is triggered
16	**Main_contactor 3_reset**			Reset K3 counter for. main contactor operating cycles? →[34] (double cyl. units only)
		0	**Off**	No
		1	On	Yes
17	**K3_switching_cycles_until_msg.**			Remaining operating cycles for K3 until service message →[34] is triggered
18	**Main_contactor 4_reset**			Reset K4 counter for main contactor operating cycles? →[34] (double cyl. units only)
		0	**Off**	No
		1	On	Yes
19	**K4_switching_cycles_until_msg.**			Remaining operating cycles for K4 until service message →[34] is triggered
20	**Main_contactor 5_reset**			Reset K5 counter for main contactor operating cycles? →[34] (double cyl. units only)
		0	**Off**	No
		1	On	Yes
21	**K5_switching_cycles_until_msg.**			Remaining operating cycles for K5 until service message →[34] is triggered
22	**Warning_cyl._full**			Warning message about electrode burn-off (only for ELDB [77]) →[95]
		0	Off	No message
		1	Sensitivity 1	Threshold value 1 for message (lowest sensitivity)
		2	Sensitivity 2	Threshold value 2 for message (medium sensitivity)
		3	**Sensitivity 3**	Threshold value 3 for message (highest sensitivity)
23	**Warning_pump**			Warning message about functional performance of blow-down pump →[95]
		0	Off	No message
		1	Sensitivity 1	Threshold value 1 for message (lowest sensitivity)
		2	Sensitivity 2	Threshold value 2 for message (medium sensitivity)
		3	**Sensitivity 3**	Threshold value 3 for message (highest sensitivity)
24	**Warning_valve**			Warning message about functional performance of solenoid valves →[95]
		0	Off	No message
		1	Sensitivity 1	Threshold value 1 for message (lowest sensitivity)
		2	Sensitivity 2	Threshold value 2 for message (medium sensitivity)
		3	**Sensitivity 3**	Threshold value 3 for message (highest sensitivity)
26	**Update_function**			Status of update function [7]
		0	**USB-stick_insert**	USB stick is not inserted
		1	Loading	The parameter set which is saved on the stick is loaded
		2	Checking	The loaded parameter set is checked
		3	Update	The parameter set is updated
		4	Successful	The update was successful
		5		USB stick does not contain a parameter set or parameter set is not compatible
31	**Main_relay_on/off**			Targeted function test
		0	**Off**	
		1	On	

6.8.4.2 Procedure for parameter update

The information below explains how to work with the "Update_function" parameter (see parameter row 26 in the table above).

The update function makes it possible to overwrite parameter settings with a parameter set which is saved on an external USB stick. As a result, the operator can make a change without having to change the parameters by themselves. The modified parameter set can be provided by HygroMatik.

The procedure is as follows:

» With the unit switched on, insert the USB stick into the socket on the mainboard.

» Call up the "Update function" in the services submenu.

The status of the update process is displayed (see table). Its successful completion is indicated by the "Update successful" status message.

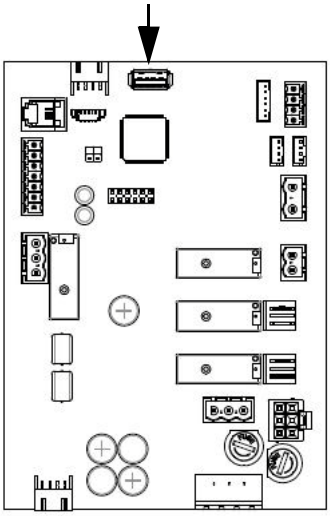
» Switch the unit off and on again. The parameter set which has been loaded is activated.

» To reload the parameter set at a later date if required (e.g. after a factory reset), the "ImportDone.txt" file on your USB stick must be deleted beforehand. To do so, the USB stick must be inserted in an external device (e.g. PC).

If the status "Invalid data" is output after the update operation, a compatible parameter set is not available on the USB stick.

The parameter set that is stored on a USB stick is always linked with a unit serial number and can only be used for this unit.

USB connection on mainboard



6.8.5 History submenu

The fault message history was already described for the user level in Section 6.6.3. There are no differences at the operator level.

6.8.6 Blow-down submenu

Table of blow-down parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold min	max	FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Full_blow-down_correction**		-5	5	**0**	Correction value for frequency of full blow-down ("+" = more frequently, "-" = less frequently) →[55]
2	**Part._blow-down_correction**		-5	5	**0**	Correction value for frequency of partial blow-down ("+" = more frequently, "-" = less frequently) →[55]
3	**Standby_blow-down**					Full blow-down [58] for hygiene reasons, if there was no steam production →[26] for an extended period
		0	**Off**			No stand-by blow-down
		1	On			Blow-down after waiting period
4	**Standby_blow-down_interval**					After the waiting period specified, the remaining water is pumped off if the interlock (safety) system [11] was opened during this period of time, i.e. no steam production took place →[26]
5	**Blow-down_without_K1**					Pumps without main contactor [75] in order to avoid triggering of residual current detector →[56]
		0	**Off**			Main contactor [75] switched on during pumping
		1	On			Main contactor [75] switched off during pumping

6.8.7 Fill parameters submenu

Table of fill parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold min	max	FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Filling_pulsed**					The filling process is not continuous, but intermittent →[54]
		0	**Off**			Activated
		1	On			Not activated
2	**Filling_pulsed_interval**		1	10	**2**	Time interval in s, during which filling does not take place (filling pause)
3	**Filling_pulsed_active**		1	600	**10**	Duration of filling time in s until filling pause

6.8.8 Functions submenu

Table of function parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Standby-heating**			The standby heating [16] keeps the water in the cylinder warm if no demand [5] is present
		0	**Off**	Standby heating [16] switched off
		1	On	Standby heating [16] switched on
2	**Standby-heating_interval**			Pause time of standby heating in [min]
3	**Standby-heating_active**			Heating time of standby heating [16] in [s]
4	**Dead_leg_flushing**			The solenoid valves of the water input and blow-down pump are switched on and off simultaneously with the flushing of the dead-end line [27]
		0	**Deactivated**	Flushing of dead-end line [27] is not carried out
		1	Activated	Facilitate flushing of dead-end line [27]
5	**Dead_leg_flushing_interval**			Waiting period until start of flushing of dead-end line [27] in [min]
6	**Dead_leg_flushing_active**			Duration of flushing of dead-end line [27] in [s]
7	**Runtime_limitation**			Steam production is stopped after the time interval specified [min]
8	**Weekly_timer**			Activation of weekly timer
				Steam production runs continously with the parameters preset
				Steam production is only active in time periods preset in the "Weekly timer" submenu
9	**Timer_mode**			The timer function [18] is triggered with an external button
		0	**Off**	The timer function [18] is not available
		1	Steam_off	Steam production stops after the timer has elapsed
		2	ECO	The unit reverts to ECO mode [61] after the timer has elapsed
10	**Timer_running_time**			The runtime of the timer is given in seconds
11	**Password_remote**			Storage of a password with a maximum of 4 digits for remote access via the communication interface, input using the keyboard screen
12	**Function_digital_input**			Mapping of digital input function [98] to mainboard
		0	**Off**	Not used
		1	Push_button_light 1	Activated digital input [97] by a pushbutton [106] switches on light 1
		2	Push_button_light 2	Activated digital input [97] by a pushbutton [106] switches on light 2
		3	Push_button_light 3	Activated digital input [97] by a pushbutton [106] switches on light 3
		4	Push_button_light 4	Activated digital input [97] by a pushbutton [106] switches on light 4
		10	ECO	Activated digital input [97] by a pushbutton [106] switches ECO mode on
		20	Steam_boost	Activated digital input [97] by a pushbutton [106] triggers steam jet [60]
		30	Timer_start	Activated digital input [97] by a pushbutton [106] starts timer function [18]
		40	Power_limitation	Activated digital input [97] by a switch (NO) switches power limitation on for load shedding [101]
13	**Power_retention**		0 50 **0**	Reduction of humidifier performance after target temperature has been reached, to proportion of maximum performance [%] entered here as power retention [66]
14	**Control_curve**			Behaviour during cold start or specification for special applications (only ELDB [77]), see [68]
		0	Energie-optimized	Current during cold start is 128% of rated current for fast heating
		1	**Load-optimized**	Current during cold start is 113% of the nominal current, to avoid overloading the supply network despite fast heating
		2	Process-optimized	Particularly fine control for critical applications
15	**Delay_humidificat._notif.**			Delay of "Humidifying" message in [s] (see [74])
				[68]
		0	Energie-optimized	Current during cold start is 128% of rated current for fast heating
		1	**Load-optimized**	Current during cold start is 113% of the nominal current, to avoid overloading the supply network despite fast heating
		2	Process-optimized	Particularly fine control for critical applications
15	**Delay_humidificat._notif.**			Delay of "Humidifying" message in [s] (see [74])

Continuation of function parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
16	**Assignment_main_relay**			The relay is energised if ...
		0	**Collective_fault**	There is any kind of error
		1	Safety_interlock_open	The interlock (safety) system [11] is open
		2	No_Demand	No demand [5] is present
		3	Humidification	Steam production is in progress
		4	Runtime_limitation	The unit has switched off steam production after the limitation of operating time was reached [32]
		5	Remote_off	A remote shutdown was carried out via software command [12]
		6	Safety_interlock_ELV	The interlock (safety) system [11] is switched via an additional relay
		7	Safety_interlock_closed	The interlock (safety) system [11] is switched as standard
		8	Humdification_off_delay	A dropout delay [74] is to be generated following humidification
		30	Soleniod_valves_off	None of the solenoid valves are actuated
		31	Soleniod_valves_on	One of the solenoid valves is actuated
		32	Soleniod_valve 1	Solenoid valve 1 is actuated
		33	Soleniod_valve 2	Solenoid valve 2 is actuated
		36	HyFlush	The superflush SV is switched via the contacts of this relay
		60	Pump_off	The blow-down pump is not actuated
		61	Pump_on	The blow-down pump is actuated
		62	Part._blow-down	A partial blow-down [21] is taking place
		63	Full_blow-down	A full blow-down [22] is taking place
		64	Dilution	A dilution [23] is taking place (only for ELDB [77])
		65	Max._current_blow-down	An overcurrent blow-down [24] is taking place (only for ELDB [77])
		66	Max._level_blow-down	A max. level blow-down [25] is taking place (only for HKDB [78])
		67	Standby_blow-down	A standby blow-down [26] is taking place
		68	Dead_leg_flushing	An additionally installed relay is to be actuated, which switches the input solenoid valve for flushing the dead-end line if the interlock (safety) system is not closed
		69	Start_blow-down	A start blow-down [20] is taking place
		120	Cylinder_1_step_1	Power level [63] 1 of cylinder 1 is active (only for HKDB [78])
		121	Cylinder_1_step_2	Power level [63] 2 of cylinder 1 is active (only for HKDB [78])
		122	Cylinder_2_step_1	Power level [63] 1 of cylinder 2 is active (only for HKDB double cylinder units)
		123	Cylinder_2_step_2	Power level [63] 2 of cylinder 2 is active (only for HKDB double cylinder units)
		240	Light 1	Light 1 is to be switched directly
		241	Light 2	Light 2 is to be switched directly
		242	Light 3	Light 3 is to be switched directly
		243	Light 4	Light 4 is to be switched directly
		244	Exhauts_fan 1	Steam bath fan 1 is active
		245	Exhaust_fan 2	Steam bath fan 2 is active
		246	Supply_fan 1	Steam bath fan 3 is active
		247	Supply_fan 2	Steam bath fan 4 is active
		248	Essence 1	Essence pump 1 is active
		249	Essence 2	Essence pump 2 is active
		250	Essence 3	Essence pump 3 is active
		251	Essence 4	Essence pump 4 is active
		252	ECO_active	Steam bath target temperature is switched to ECO mode [61]
		253	Steam_boost_active	A steam jet [60] is triggered
		254	Steam_boost_blocked	A further steam jet is blocked →[60]
		255	Temp._threshold	The preset temperature threshold value [88] has been reached
		270	Collective_service	A general service message is generated
		271	Service_solenoid_valve	A service for one of the solenoid valves is required
		272	Service_blow-down_pump	A service for the blow-down pump is required
		273	Service_steam_amount_cnt.	A service is required after the steam volume counter which is relevant for the service was reached
		274	Service_main_contactor K1	A service is required after the max. operating cycles for K1 have been reached
		275	Service_main_contactor K2	A service is required after the max. operating cycles for K2 have been reached (only for double cylinder units)
		276	Service_main_contactor K3	A service is required after the max. operating cycles for K3 have been reached (only for double cylinder units)
		277	Service_main_contactor K4	A service is required after the max. operating cycles for K4 have been reached (only for double cylinder units)
		278	Service_main_contactor K5	A service is required after the max. operating cycles for K5 have been reached (only for double cylinder units)
17	**Assignment_relay 1**		see above	Relay 1 is one of the top-hat rail relays connected to the ST10.1 connector on the mainboard; assignment is same as for base relay
18	**Assignment_relay 2**		see above	Relay 2 is the second of the top-hat rail relays connected to the ST10.1 connector on the mainboard; assignment is same as for base relay
19	**Assignment_relay 3**		see above	Relay 3 is one of the top-hat rail relays connected to the ST10.2 connector on the mainboard; assignment is same as for base relay
20	**Assignment_relay 4**		see above	Relay 4 is the second of the top-hat rail relays connected to the ST10.2 connector on the mainboard; assignment is same as for base relay
				*) when this is the ex factory setting, no other assignment is possible for the base relay

6.8.9 Communication interface sub-menu

The communication interface is a serial RS485 computer interface for the remote control of the steam humidifier. With this computer interface, all control operations which can be carried out on the display can also be carried out by the building technology control system, for example.

Table of communication interface parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold			Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Address**		0	255	**1**	Address of the communication interface [13]
2	**Baud_rate**					Setting the baud rate
		0	1200			1200
		1	2400			2400
		2	4800			4800
		3	9600			9600
		4	19200			19200
		5	28800			26800
		6	38400			38400
		7	57600			57600
3	**Parity**					Parity setting
		0	**None**			Without parity bit
		1	Odd			Odd parity bit
		2	Even			Even parity bit
4	**Stop_bits**					Number of stop bits
		0	**1**			1 stop bit
		1	2			2 stop bits
5	**Modbus_timeout**		0	60	**20**	Timeout in s for software control commands [12] through communication interface [13]

6.8.10 Weekly timer submenu

The weekly timer is used to program two switching time ranges per day of the week, each defined by "Start time" and "End time". A set point temperature value and an essence can be assigned to each switching time range.

The activation of the timer can be carried out in the "Functions" submenu using parameter no. 8 ("Weekly timer"). The setting options are "On" and "Off".

Please note

When operating the control in weekly timer mode, the display of the temperature set value in the main display disappears during normal steam generation. In ECO mode, however, the set value specification remains visible.Table of weekly timer parameters

Table of weekly timer parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold**			Meaning/comment [ ] explains the term in the glossarF →[ ] refers to a related term explanation
			min	max	**FP**	
1	**Mon_start_time 1**		00:00	23:59	**08:00**	Start time 1 for Monday (1st period) →[91]
2	**Mon_stop_time 1**		00:00	23:59	**12:00**	End time 1 for Monday
3	**Mon_essence 1**					Essence selection for the 1st period on Monday
		0	Off			No essence
		1	**Essence 1**			Essence 1
		2	Essence 2			Essence 2
		3	Essence 3			Essence 3
		4	Essence 4			Essence 4
4	**Mon_temp. 1**		20.0	49.0	**45.0**	Steam bath target temperature [°C] for the 1st period on Monday
6	**Mon_start_time 2**		00:00	23:59	**13:00**	Start time 2 for Monday (2nd period) →[91]
7	**Mon_stop_time 2**		00:00	23:59	**20:00**	End time 2 for Monday
8	**Mon_essence 2**					Essence selection for the 2nd period on Monday
		0	Off			No essence
		1	Essence 1			Essence 1
		2	Essence 2			Essence 2
		3	Essence 3			Essence 3
		4	Essence 4			Essence 4
9	**Mon_temp. 2**		20.0	49.0	**45.0**	Steam bath target temperature for the 2nd period on Monday

The table only shows the possible parameter settings for Monday. The paramters for the rest of the weekdays (Tuesday to Sunday) can be programmed in the same way.

6.8.11 SPA submenu

Table of SPA parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold**			Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
			min	max	FP	
1	**Temp._set_value**		20.0	49.0	**45.0**	Set value [3] of steam bath temperature
2	**Temp._set_value**		68	120,2	**68,0**	Set value [3] of steam bath temperature
3	**ΔTemp._steam_on/off**		.1	5.0	**.5**	The steam production is switched off when (temperature set value + Δtemp. _steam_off) has been reached.
4	**ΔTemp._max.**		1.0	10.0	**10.0**	Temperature set value [3] plus Δ temp._max. results in absolute max. temperature [41], at which the unit switches off for safety reasons
5	**Steam_boost_blocking**		60	600	**60**	Interval until the next steam jet is possible after a steam jet →[60]
6	**Steam_boost_duration**		0	300	**20**	Duration of a steam jet →[60]
7	**? Temp._steam_boost**		1.0	5.0	**1.0**	Target temperature increase at steam jet activation →[60]
8	**Light 1_initial_state**					Determines the initial state of light 1 when unit is switched on
		0	**Off**			Light switched off
		1	On			Light switched on
9	**Light 2_initial_state**					Determines the initial state of light 2 when unit is switched on
		0	**Off**			Light switched off
		1	On			Light switched on
10	**Light 3_initial_state**					Determines the initial state of light 3 when unit is switched on
		0	**Off**			Light switched off
		1	On			Light switched on
11	**Light 4_initial_state**					Determines the initial state of light 4 when unit is switched on
		0	**Off**			Light switched off
		1	On			Light switched on
			min	max	FP	
12	**Fan_run-on**		0	120	**0**	Delay time [82] of all steam bath fans in automatic mode in min
13	**Exhaust_fan1_mode**					Operating mode of steam bath fan 1
		0	**Off**			Off
		1	On			Continuous operation, if unit control switch is in pos. "I"
		2	Automatic			Steam bath fan is switched on when the target temperature has been reached [3] and switched off again when (target temperature - steam bath fan 1_ΔTemp.) has been reached
			min	max	FP	
14	**Exhauts_fan1_Δ temp.**		0	5,0	**0,5**	Steam bath fan 1 is switched off when target temperature [3] + steam bath fan 1_Δ Temp. has been reached
15	**Exhaust_fan2_mode**					Operating mode of steam bath fan 2
		0	**Off**			Off
		1	On			Continuous operation, if unit control switch is in pos. "I"
		2	Automatic			The steam bath fan is switched on when the target temperature has been reached [3] and switched off again when (target temperature + steam bath fan 2_ΔTemp.) has been reached
			min	max	FP	
16	**Exhauts_fan2_Δ temp.**		0	5.0	**.5**	Steam bath fan 2 is switched off when target temperature [3] + steam bath fan 2_Δ Temp. has been reached
17	**Supply_fan1_mode**					Operating mode of steam bath fan 1
		0	**Off**			Off
		1	On			Continuous operation, if unit control switch is in pos. "I"
		2	Automatic			temperature + steam bath fan 1_ΔTemp.) has been reached
			min	max	FP	
18	**Supply_fan1_Δ temp.**		0	5.0	**.5**	Temperature difference above set value which must be achieved for steam bath fan 1 to be switched off

Continuation of SPA parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min	max	FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
19	**Supply_fan2_mode**					Operating mode of steam bath fan 2
		0	**Off**			Off
		1	On			Continuous operation, if unit control switch is in pos. "I"
		2	Automatic			Steam bath fan 2 runs during steam production and is switched off when (steam bath target temperature + steam bath fan 2_ΔTemp.) has been reached
			min	max	FP	
20	**Supply_fan2_Δ temp.**		0	5.0	**.5**	Temperature difference which must be achieved for steam bath fan 2 to be switched off
21	**ΔTemp._ECO**		0	20.0	**10.0**	The temperature set value [3] is lowered by the amount entered in ΔTemp._ECO [52] when ECO is enabled
22	**Correction_°C-signal**		0	5.0	**0**	Used for the adjustment of the temperature sensor
23	**Temperature_notification**		0	90.0	**45.0**	Used to specify a temperature threshold value [88] in °C. When this is reached, a relay is energised
24	**Temperature_notification**		0	134	**113**	Used to specify a temperature threshold value [88] in °F. When this is reached, a relay is energised
25	**Sensor 2_connection**					Selection of the input for the connection of 2nd temperature sensor [45]→
		0	**Off**			Only 1 temperature sensor connected
		1	Cylinder_extension			2nd temperature sensor connected to the expansion board
		2	Relay_extension 1			2nd temperature sensor connected to the relay board
26	**Temperature_measurement**					Type of measurement processing → [45]
		0	Average			Averaging the measurements of both temperature sensors
		1	Deviation			Error message in case of deviation
27	**Sensor 1_weighting**		0	100		Weighting of the measurements of both temperature sensors → [45]
28	**Sensors_deviation**		1.0	10.0		Specification of the deviation of temperature measurement 2 from temperature measurement 1, at which an error message is to be triggered → [45]

6.8.12 Essence submenu

Table of essence parameters

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold min	max	FP	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Essences_selection**					Selection of essence pump
		0	**Off**			No essence
		1	Essence 1			Essence pump 1
		2	Essence 2			Essence pump 2
		3	Essence 3			Essence pump 3
		4	Essence 4			Essence pump 3
2	**Intensity_essence 1**		0	10	**5**	Intensity [80] of the essence injection of essence pump 1
3	**Intensity_essence 2**		0	10	**5**	Intensity [80] of the essence injection of essence pump 2
4	**Intensity_essence 3**		0	10	**5**	Intensity [80] of the essence injection of essence pump 3
5	**Intensity_essence 4**		0	10	**5**	Intensity [80] of the essence injection of essence pump 4
14	**Δ Temp._essence**		1.0	30.0	**25.0**	Essence injection is enabled at steam bath temperature = (temperature set value - ΔTemp._essence)
16	**Essence_status**					Status of essence injection (read values)
		0	Off			No essence injection
		1	Essence 1			Essence injection via pump 1
		2	Essence 2			Essence injection via pump 2
		3	Essence 3			Essence injection via pump 3
		4	Essence 4			Essence injection via pump 4
		14	Dispensing_Pause			The essence injection is in a pause interval
		17	Wait_temperature			Injection only takes place when the target temperature has been reached
		19	Wait_steam			Injection only takes place when steam is also produced
17	**Essence_pause**					The pause time between the essence injection operations
18	**Essence_active**					The duration of an essence injection process

6.8.13 Recording submenu

The control can record 10 data sets internally on a rolling basis ("Recording" submenu, parameter 1 set to "ON"). Snapshots of the unit status are carried out at intervals of 10 s, which can be helpful for troubleshooting. When all memory slots are filled, a new data set overrides the oldest entry. A stored data set is retained for maximum of 7 days.

The complete recording [93] can be saved to a USB stick with NTFS formatting.

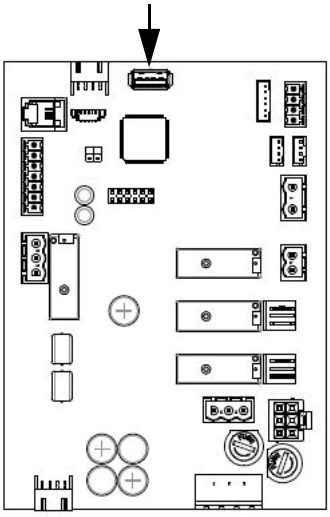
The procedure is as follows:

» Open the "Recording" submenu.

» Set the "Save recording" parameter (2) to "On".

Insert the USB stick into the socket on the mainboard (see diagram below). Saving starts automatically. Afterwards, the setting of the "Save recording" parameter reverts to "Off".

USB connection on mainboard



The **status** can be checked by calling up the "Saving status" parameter (4). “Enabled" means that the write operation is active.

The entire storage can be **deleted** using the "Delete recording" parameter (5).

A data set consists of the following values:

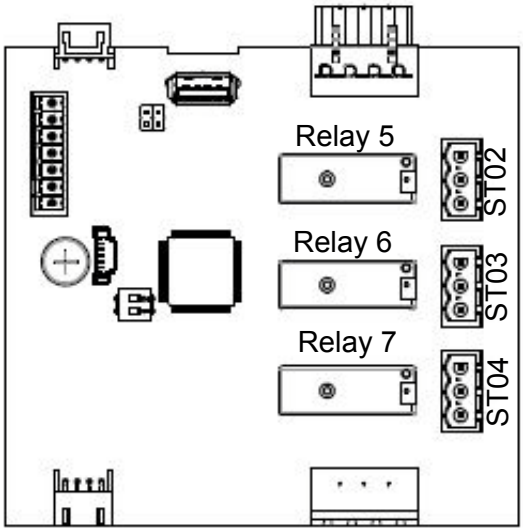
No.	Value	only
1	Steam_actual_unit	
2	Steam_actual_Cyl. 1	DZG
3	Steam_actual_Cyl. 2	DZG
4	Status_unit	
5	Status_cyl. 1	
6	Status_cyl. 2	DZG
7	Fault message_unit	
8	Fault message_cyl. 1	
9	Fault message_cyl. 2	DZG
10	Safety interlock_open	
11	Demand	
12	Steam_output_max.	
13	Current_actual_Cyl. 1	ELDB
14	Current_actual_Cyl. 2	ELDB DZG
15	Water_level_cyl. 1	HKDB
16	Water_level_cyl. 2	HKDB DZG
21	Temp._actual value	
22	Temp._actual_value 1	2S
23	Temp._actual_value 2	2S
24	Temp._set value	
Legend:		
ELDB = Electrode Steam Humidifier		
HKDB = Heater Element Steam Humidifier		
DZG = Double Cylinder Unit		
2S = Device featuring 2 Temperature Sensors		

Table of recording functions

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Recording**			Recording [93] of parameter sets
		0	**Deactivated**	No recording
		1	Activated	Start recording
2	**Saving_start**			Saving of the existing recording on a USB stick
		0	**Off**	No action
		1	On	Start saving process
3	**Saving_abort**			Cancel saving
		0	**Off**	No action
		1	On	Cancel saving process
4	**Saving_status**			Status of saving process
		0	**Deactivated**	Saving not possible
		1	Activated	Saving is enabled
5	**Recording_delete**			Delete recording
		0	**Off**	No action
		1	On	Delete recording

6.8.14 Relay extension 1 submenu

This icon is only visible in the main menu if relay extension 1 has been enabled in the "Functions" submenu. The assignment of the respective relays and the function definition of the digital input present on the relay board can be made here.



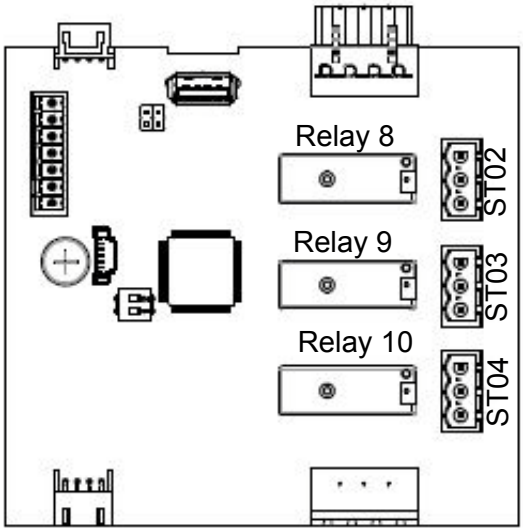
Relay designations on the Relay extension 1 p.c.b.

Table of possible assignments

No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Assignment_relay 5**		as base relay	Occupancy selection as for basic relay (see submenu "Functions", 15)
2	**Assignment_relay 7**		as base relay	Occupancy selection as for basic relay (see submenu "Functions", 15)
3	**Signal_type_V_range**		as base relay	Occupancy selection as for basic relay (see submenu "Functions", 15)
4	**Signal_type_mA_range**			Mapping of the digital input function [98] to relay board 1
		0	**Off**	Not used
		1	Push_button_light 1	Activated digital input [97] by a pushbutton [106] switches on light 1
		2	Push_button_light 2	Activated digital input [97] by a pushbutton [106] switches on light 2
		3	Push_button_light 3	Activated digital input [97] by a pushbutton [106] switches on light 3
		4	Push_button_light 4	Activated digital input [97] by a pushbutton [106] switches on light 4
		10	ECO	Activated digital input [97] by a pushbutton [106] switches ECO mode on
		20	Steam_boost	Activated digital input [97] by a pushbutton [106] triggers steam jet [60]
		30	Timer_start	Activated digital input [97] by a pushbutton [106] starts timer function [18]
		40	Power_limitation	Activated digital input [97] by a switch (NO) switches power limitation on for load shedding [101]

6.8.15 Relay extension 2 submenu

This icon is only visible in the main menu if relay extension 2 has been enabled in the "Functions" submenu. The assignment of the respective relays and the function definition of the digital input present on the relay board can be made here.



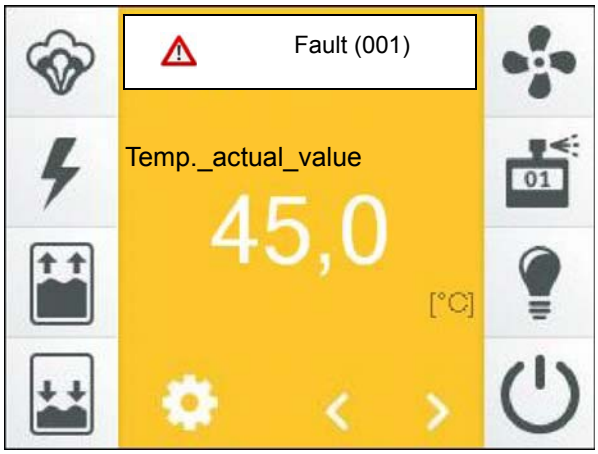
Relay designations on the Relay extension 2 p.c.b.

Table of possible assignments

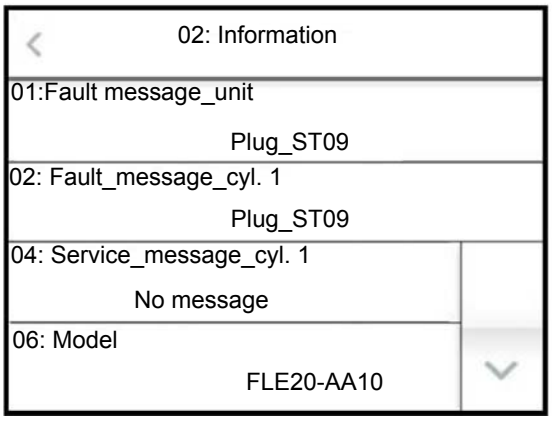
No.	Parameter	No.	Adjustment/value range Factory presets (FP) bold	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Assignment_relay 5**		as base relay	Occupancy selection as for basic relay (see submenu "Functions", 15)
2	**Assignment_relay 7**		as base relay	Occupancy selection as for basic relay (see submenu "Functions", 15)
3	**Signal_type_V_range**		as base relay	Occupancy selection as for basic relay (see submenu "Functions", 15)
4	**Signal_type_mA_range**			Mapping of the digital input function [98] to relay board 1
		0	**Off**	Not used
		1	Push_button_light 1	Activated digital input [97] by a pushbutton [106] switches on light 1
		2	Push_button_light 2	Activated digital input [97] by a pushbutton [106] switches on light 2
		3	Push_button_light 3	Activated digital input [97] by a pushbutton [106] switches on light 3
		4	Push_button_light 4	Activated digital input [97] by a pushbutton [106] switches on light 4
		10	ECO	Activated digital input [97] by a pushbutton [106] switches ECO mode on
		20	Steam_boost	Activated digital input [97] by a pushbutton [106] triggers steam jet [60]
		30	Timer_start	Activated digital input [97] by a pushbutton [106] starts timer function [18]
		40	Power_limitation	Activated digital input [97] by a switch (NO) switches power limitation on for load shedding [101]

6.9 Screen 4 - Unit information

After a fault or a service message has occurred, a display which provides information about the type of message appears in the main display instead of the HygroMatik logo. The content of the messages is described in Section 7.



Tapping on this display field calls up the unit info page which extends over several screen pages and contains comprehensive unit data. As an example, one possible first screen page is shown here:



The content of the screen pages is provided in the table in the next section.

Entries on the unit info screen

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max **FP**	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
1	**Fault_message_unit**			Fault messages
		0	No_fault	No error
		1	Plug_ST09	The plug for the current transformer (ELDB [77]) or the level control (HKDB [78]) is not attached
		2	Cylinder_extension 1	There is a problem with the expansion board (double cylinder units only)
		6	Relay_extension 1	There is a problem with relay board 1
		7	Relay_extension 2	There is a problem with relay board 2
		29	Internal	System error
		30	Filling_valve 1	Fault solenoide valve 1 [19]
		32	Filling_valve 1 a. 2	Fault solenoide valve 1 and solenoide valve 2 [19]
		61	Part._blow-down	Partial blow-down [21] not successful
		62	Full_blow-down	Full blow-down [22] not successful
		63	Blow-down_dilution	Dilution [23] was not successful (only for ELDB [77])
		64	Max._current_blow-down	Overcurrent blow-down [24] was not successful (only for ELDB [77])
		65	Max._level_blow-down	Max. level blow-down [25] was not successful (only for HKDB [78])
		66	Standby_blow-down	Stand-by blow-down [26] not successful
		67	Start_blow-down	Start blow-down [20] not successful
		90	Cylinder_full	Sensor electrode reports cylinder full status [38] for 60 min (only for ELDB [77])
		91	Current_measurement	Value provided by current measurement not plausible (only for ELDB [77])
		92	Main_contactor_current	A current is measured for at least 15 s, even though the main contactor [72] is not actuated (only for ELDB [77])
		93	Main_contactor_cyl._full	A cylinder full status [38] was detected for at least 15 s, even though the main contactor [72] is not actuated (only for ELDB [77])
		120	Thermoswitch	A thermo sensor [31] has been triggered (only for HKDB [78])
		121	Water_level_sensor	Value provided by level control [39] not plausible (only for HKDB [78])
		122	Max.-level	Max. level [40] was reached 5 times in a row during filling (HKDB [78] only)
		123	Steam_down_time	Despite a current feed to the radiators, the water level has not changed in the period specified →[53] (only for HKDB [78])
		124	Relay_main_contactor	The relay for the control of the main contactor is not functioning correctly
		240	Temp._sensor_miss	Temperature sensor, cable or input level defective with error pattern "High resistance"
		241	Temp._sensor_broken	Temperature sensor, cable, or input level defective with error pattern "Short circuit"
		242	Temperature_max	Max. temperature [41] exceeded
		243	Temp._sensor 2_miss	Temperature sensor 2, cable or input level defective with error pattern "High resistance"
		244	Temp._Sensor 2_broken	Temperature sensor 2, cable or input level defective with error pattern "Short circuit"
		245	Temp._deviation	The two temperature sensors report different results
2	**Fault_message_cyl. 1**			see above
3	**Fault_message_cyl. 2**			see above
5	**Service_message_cyl. 1**			Cylinder 1 service message
		0	No_service_msg.	A service is not required
		1	Steam_amount_counter	A unit service is required due to the steam volume counter
		2	Cycles_main_contactor 1	The maximum number of operating cycles for K1 has been reached and a Service_main_contactor [34] is required
		3	Cycles_main_contactor 2	The maximum number of operating cycles for K2 has been reached and a Service_main_contactor [34] is required (only double cylinder units)
		12	Warning_electrodes	The electrode wear is very advanced (only for ELDB [77])
		13	Warning_pump	A loss of functional performance has occurred in the area of the blow-down pump(s)
		14	Warning_solenoid_valve	A loss of functional performance has occurred in the area of the solenoid valve(s)
6	**Service_message_cyl. 2**		Text	Cylinder 2 service message (double cylinder units only)
		0	No_service_msg.	A service is not required
		1	Steam_amount_counter	A unit service is required due to the steam volume counter
		4	Cycles_main_contactor 3	The maximum number of operating cycles for K3 has been reached and a Service_main_contactor [34] is required
		5	Cycles_main_contactor 4	The maximum number of operating cycles for K4 has been reached and a Service_main_contactor [34] is required
		6	Cycles_main_contactor 5	The maximum number of operating cycles for K5 has been reached and a Service_main_contactor [34] is required
		12	Warning_electrodes	The electrode wear is very advanced (only for ELDB [77])
		13	Warning_pump	A loss of functional performance has occurred in the area of the blow-down pump(s)
		14	Warning_solenoid_valve	A loss of functional performance has occurred in the area of the solenoid valve(s)

Entries on the unit info page (ctd.)

No.	Parameter	No.	Adjustment/value range Factory presets (FP) **bold** min max **FP**	Meaning/comment [ ] explains the term in the glossary →[ ] refers to a related term explanation
7	**Model**		Reading value	Type designation of unit
8	**Unit_name**		**Unit 1**	Freely selectable text ex-factory. "System 1" is entered if this is not specified in the order. Entry can be overwritten in the field using the service tool.
9	**Serial_number**		Reading value	Serial number
10	**Date_of_manufacturing**		Reading value	Total operating time of unit since initial operation (specified in s)
11	**Software_version**		Reading value	Software version
12	**Production_total_time**		Reading value	Total duration of steam production since initial operation (specified in s)
13	**Unit_total_runtime**		Reading value	The total runtime of the unit since its first connection to the power supply
14	**Steam_amount_total_cyl. 1**		Reading value	Steam volume of cylinder 1 produced since initial operation
16	**Steam_amount_total_cyl. 1**		Reading value	Steam volume of cylinder 2 produced since initial operation (only for double cylinder units)

7. Faults and service messages

7.1 Fault handling

In case of a fault, steam production stops. Instead of the HygroMatik logo in the main display, a display panel appears with a warning sign, the message "Fault" and the fault codes in brackets:

e.g.: 

By touching the fault message, the unit info screen opens, which contains the plain text fault message and information about the unit, as well as the unit status.

With most fault messages, one or several icons also flash, which makes it possible to initially narrow down the cause of the fault.

7.1.1 Table of fault messages, possible causes and countermeasures

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	001	**Plug_ST09** The plug for the current or water level measurement is not attached.	• Plug sits not firmly or is not in place	• Check plug and attach if required
	002	**Cylinder_extension** Extension board is not detected by the software	• P.c.b. connection not o.k. • P.c.b. not present or defective • CAN-Bus addressing not correct	• Check firm connection of boards • Connect board, replace board if defective • Check DIP switch settings on extension board (both switches must be in the „zero“ position)
	006 007	**Relay_extension 1** **Relay:extension 2** Relay board(s) not detected by the software	• P.c.b. connection(s) not o.k. • P.c.b. (s) not present or defective • CAN-Bus addressing not correc	• Check firm connection of boards • Connect board(s), replace board(s) if defective • Check DIP switch settings on relay boards (both switches must be in the „zero“ position)
	029	**Internal**	• Mainboard is defective	• Replace mainboard

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	**030** **032**	**Filling_valve 1** **Filling_valve 1 a. 2** Filling was not successful, i.e. the expected level was not achieved after a filling time of 30 min.	• Solenoid valve or supply line contaminated or defective • Solenoid defective • Water supply not opened • Solenoid valve electrically not driven - electrical cabling not o.k. - Mainboard relay not energised • Steam hose not laid with sufficient incline/ decline resulting in a water bag obstructing steam flow. Steam builts up pressure in steam cylinder and pushes water towards drain • Blockage in steam pipe impedes the steam flow. The steam builds up pressure in the cylinder and presses the water into the drain. • L3 phase break-down • Main contactor does not switch phase L3	• Clean water supply line and/or solenoid valve; replace solenoid valve, if defective • Make measurement on solenoid; replace solenoid valve, if defective • Open water supply - Check electrical cable and replace, if required - Measure voltage on circuit board terminal 11 against N; replace mainboard, if required • Check steam hose layout. Eliminate water bag. • Remove blockage in steam pipe • Reestablish L3 phase feeding • Replace main contactor

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	061 062 063 064 065 066 067	**Blow-down fault**, concerning: **Part._blow-down** **Full_blow-down** **Blow-down_dilution (only ELDB)** **Max._current blow-down (only ELDB)** **Max._level blow-down (only HKDB)** **Standby_blow-down** **Start_blow-down (only HKDB)** The respective blow-down was not successful.	• Blow-down pump is not driven - electrical wiring not o.k. - Mainboard relay is not energised • Blow-down pump defective • Blow-down pump is working but water is not drained (i.e. cylinder drain is blocked) • Blow-down pump blocked by scale deposits	- Check wiring and replace, if required - Measure voltage on circuit board terminal 10 against N, if required, change board • Replace blow-down pump • Completely clean steam cylinder and base to preclude renewed short-term clogging • Check blow-down pump, drain system and cylinder for scale deposits and clean
	090	**Cylinder_full (only ELDB)** The sensor electrode consistently reports cylinder full status for 60 min	• Low or widely fluctuating water conductivity • Electrodes worn out • No electrode cable run through current transducer • Salt bridges in steamcylinder upper part • Foaming (when softened water is used)	• Check feed water quality; consult your expert dealer, if required • Replace electrodes • Run one phase through the current transducer • Clean • Increase blending rate (bigger raw water proportion)
	091	**Current_measurement (only ELDB)** The current transducer reading ist not correct	• Plug is not seated properly on mainboard • Current transducer defective	• Check plug seating • Replace current transducer

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	092	**Main_contactor_current (only ELDB)** A current is measured though the main contactor is not driven.	• Main contactor contact sticks	• Replace main contactor
	093	**Main_contactor_cyl._full (only ELDB)** „Cylinder full“ is detected though the main contactor is not driven.	• Main contactor contact sticks	• Replace main contactor
	120	**Thermal switch (HKDB only)** One of the thermal switches has tripped.	• Thermoswitch on steam cylinder cover has tripped due to lime coating on heating element • Capillary tube defective • Thermo switch on solid state relay has triggered due to blocked ventilation	• Switch off power supply. Remove lime coating. Allow cool-down of steam cylinder. Push-back unblocking pin on thermoswitch with needle-nose pliers or a screwdriver • Replace thermoswitch • Switch off unit. Allow cool-down of heat sink. Remove blockage. Ensure unobstructed ventilation. Restart humidifier operation.
	121	**Water_level_sensor (only HKDB)** The water sensor reading is not plausible.	• Water sensor is defective • Connecting hoses blocked	• Replace water sensor • Clean hoses

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	122	**Max.-level (only HKDB)** Water level has reached its maximum 5x in one single steam production phase	• Excessive air pressure in duct has impact on water in steam cylinder via steam hose. Water is pressed into drainage	• Reduce air pressure, check steam hose for blockages
			• Solenoid valve closing action imperfect. Cylinder water level rises though solenoid valve is not energised	• Check solenoid valve
			• Solenoid valve is permanently energised (water intake stops when unit is switched off)	• Relay contacts on mainboard stick. Measure voltage across terminal 11 and N; replace mainboard, if required
			• Large amounts of residues influence or restrict cyclic blowdown. The additional water introduction caused by the optional HyFlush rinse device may cause the max. level fault	• Clean steam cylinder, cylinder base, water sensor tubing and drainage system

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	123	**Steam_down_time (only HKDB)** The heaters are supplied with current, but water level doesnot change.	• Heater element is defective.	• Measure heater element resistance; replace heater element, if required. Nominal resistance values are: **FLH03** - 2.25 kW / 230 V - 21.3 - 26.1 Ω **FLH06** – 4.5 kW / 400 V – 32.3 - 39.5 Ω **FLH09** – 6.75 kW / 400 V - 21.5 - 26.3 Ω **FLH15** – 3.8 kW / 400 V – 38.2 - 46.8 Ω (3x) **FLH25** – 6.3 kW / 400 V – 23.1 - 28.2 Ω (3x) **FLH30 –** 3.8k W / 400 V - 38.2-46.8 Ω (6x) **FLH40** – 6.3 kW / 400 V – 23.1 - 28.2 Ω (3x) + 3.8 kW / 400 V – 38.2 - 46.8 Ω (3x) **FLH50** – 6.3 kW / 400 V – 23.1 - 28.2 Ω (6x)
			• Phase failure (external circuit breaker has tripped or is defective)	• Replace external circuit breaker, eliminate cause for tripping
			• Heater elements not supplied with voltage	• Check wiring and voltage supply
			• Main contactor swiching not o.k.	• Check main contactor, replace if required.
			• Main contactor not driven by mainboard relay	• Measure voltage on mainboard terminal 9 against N; replace mainboard, if required
	124	**Relay_main_contactor (only HKDB)** The main contactor is not driven by the electronics on the mainboard, but a voltage is measured	• Mainboard relay contacts stick	• Replace mainboard

These icons are flashing	Fault code	Fault message	Possible cause	Measure
	240	**Temp._sensor_miss** No measurements available	• Sensor not connected or defective • Connecting line damaged • Input level is defective	• Check sensor connection, replace sensor if required • Check connecting line • Replace mainboard
	241	**Temp._sensor_broken** No measurements or implausible measurements	• Sensor defective • Connecting line damaged • Input level is defective	• Replace sensor • Check connecting line • Replace mainboard
	242	**Temperature_max.** The Temp._actual value has exceeded the set value by the "Δ temp._max." value specified	• Heat build-up in the cabin • Additional heat source(s) in the steam cabin • Power retention is set to high	• Ensure continuous heat dissipation • Check heat sources • Check parameter settings
	243	**Temp._sensor 2_miss** No measurements available	• Sensor not connected or defective • Connecting line damaged • Input level is defective	• Check sensor connection, replace sensor if required • Check connecting line • Replace relay board
	244	**Temp._Sensor 2_broken** No measurements or implausible measurements	• Sensor defective • Connecting line damaged • Input level is defective	• Replace sensor • Check connecting line • Replace relay board
	245	**Temp._deviation** The two temperature sensors provide values whose deviation from each other is outside the tolerance	• One of the sensors is defective	• Identify defective sensor and replace

7.2 Servicemessages and warnings

Service messages and warnings are shown on the main screen in place of the HygroMatik logo, when the cause has occured. When tipping the display field, the unit info screen is shown with the messages in plain text.

Mainscreen presentation	Message	Possible cause	Countermeasure
	Steam_amount counter	The maintenance interval has expired.	Service or check steam humidifier. Reset the steam amount counter (also see chapter 6.8.4.1 „Monitoring and service messages“).
	Cycles_main_ contactor X	The maximum number of operating cycles for the main contactor X has been reached and the main contactor should be changed. (The device can contain several main contactors. X represents the designation number of the main contactor concerned.)	The main contactor should be changed. After replacement, the respective counter must be reset with the parameter „Main_contactor_Kx_Reset“ (x=number of main contactor, 1...5) (also see chapter 6.8.4.1 „Monitoring and service messages“).
	Warning_cyl._full (only ELDB)	Electrode wear is very advanced.	Replace Electrodes.
	Warning_pump	A performance capability decrease is detected in the area of the blow-down pump and its hosing.	Check area and clean. If warning persists, replace blow-down pump.
	Warning_valve	A performance capability decrease is detected in the area of the solenoid valve, cylinder base and its hosing.	Check area and clean. If warning persists check cylinder base for lime deposit.

The sensivity threshold of the last three warning messages is set to the highest level ex factory. Should the on-site conditions (e.g. the water conductivity) lead to an unwanted frequent occurence of the messages, the sensivity can be reduced in the „Service“ submenu (s. section 6.8.4).

7.3 Functional fault chart

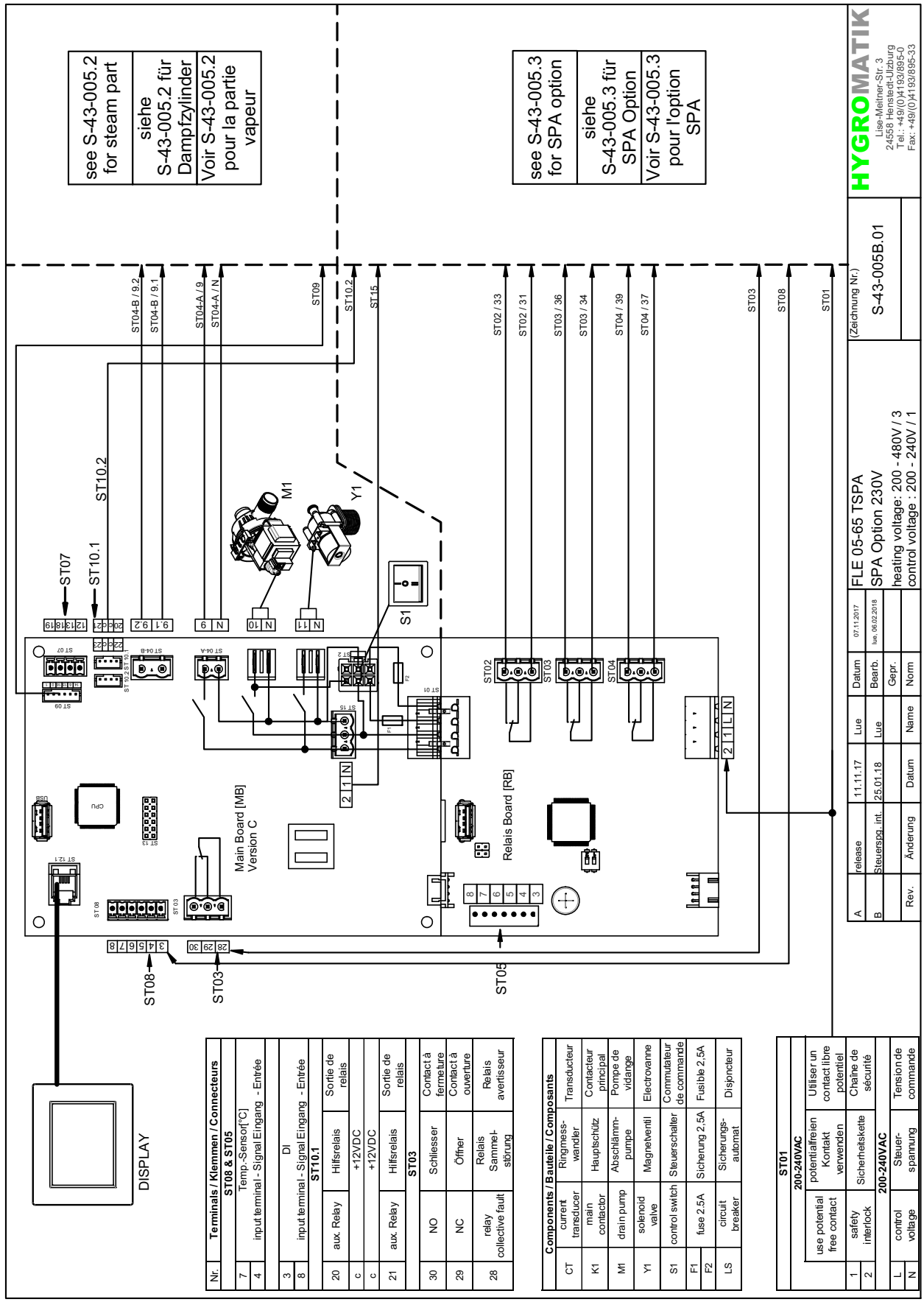
Possible condition	Possible cause for fault situation	Countermeasure
Accumulation of water on the floor panel	• Cylinder assembled incorrectly after maintenance: - O-ring damaged, not replaced or - not inserted. - Flange (tongue / groove) damaged. - Flange not closed properly. - Scale deposits in flange.	• Clean cylinder and install it properly.
	• The cylinder is placed incorrectly in the base.	• Insert new moistened O-ring into the base and then insert the cylinder.
	• When pumping out, the water can not drain freely.	• Ensure free drainage.
Water leaks from the top part of the steam cylinder.	• Hose clamps for steam or condensate hoses do not close.	• Tighten the hose clamps.
	• Steam hose adapter is not inserted correctly or O-ring has not been replaced.	• Replace O-ring and install steam hose adapter properly.
No steam production, even though the steam generator is switched on and the display is active	• Interlock (safety) system open	• Close Interlock (safety) system
	• The temperature set value specified has been reached, so that the control does not receive a demand for steam production.	• Check set value settings, check the plausibility of the temp._actual value.
	• Little air exchange; steam bath temperature remains above the programmed set value for a long time	• Provide for sufficient air exchange by adjusting fan performance
No steam production. Voltage is applied to the electrodes, but no water is fed in (ELDB only)	• Water supply is not open or solenoid valve is not electrically controlled	• Open water supply see also **Fault filling** (fault codes 030, 032)
The temperature specified is not reached	• The max. steam output specified prevents full power output	Check the "Steam_output_max." parameter and change setting, if required
.	• Nominal power output not sufficient	• Check technical data an the amount of air (check secondary amount of air as well)
	• A long steamhose laying through cold and drafty rooms may lead to increased condensation	• Install unit in a different location that allows a shorter steamhose. Insulate steamhose. •

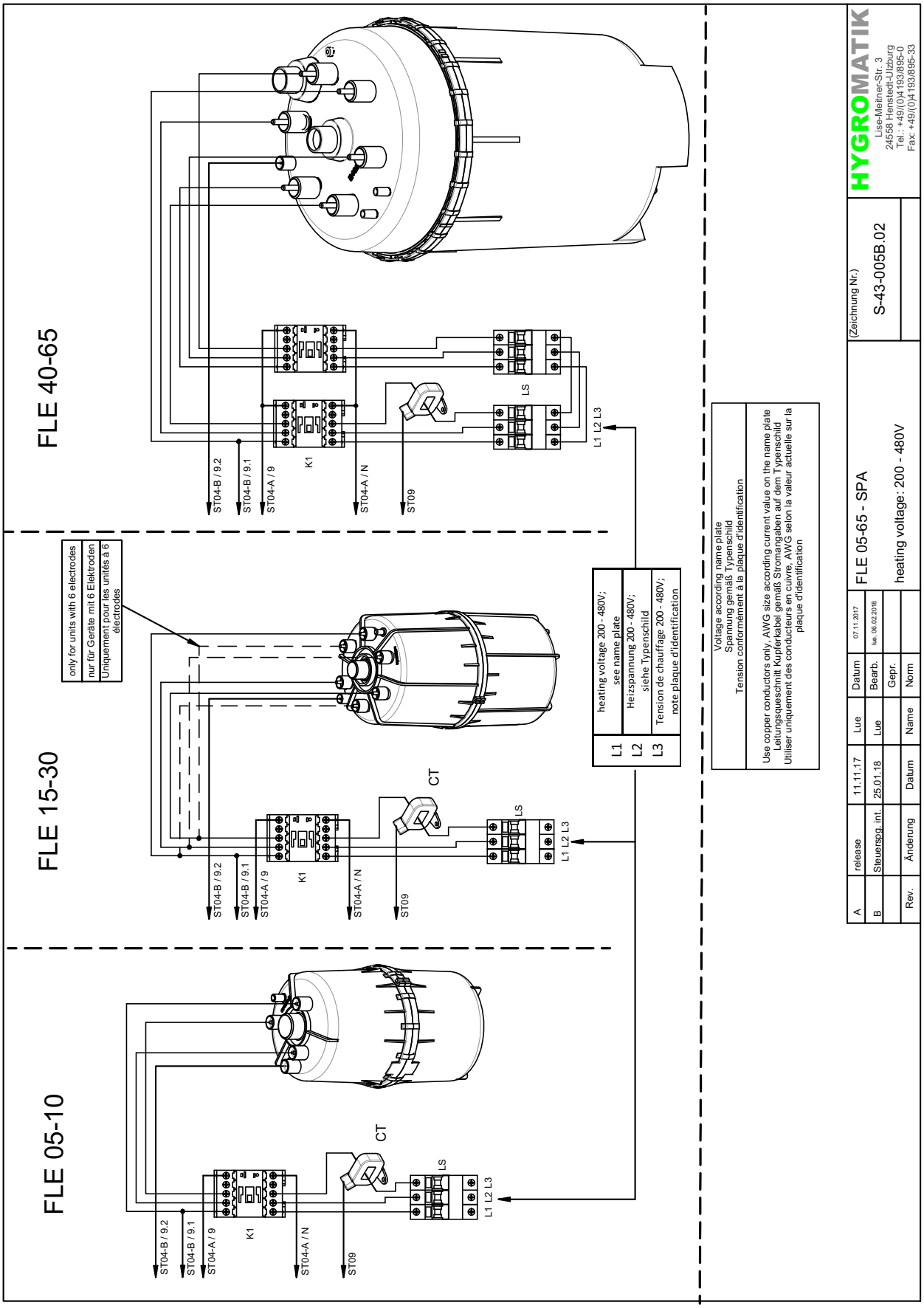
Possible condition	Possible cause for fault situation	Countermeasure
The temperature specified is not reached (ctd.)	• Unit is operated in "Cylinder full" (for ELDB only).	• see fault code 090 (Cylinder_full)
	• Incorrect performance design	• Check performance data, cabin size and thermal insulation
	• Failure of a phase (external fuse)	• Check fuse and switch on or replace if required
No visible steam in the cabin	• Unsuitable comprehensive insulation of steam bath	• Ensure heat dissipation can take place
	• Insufficient ventilation in the steam bath	• Install exhaust fan or increase exhaust performance
	• Additional heat supply (e.g. due to heated benches)	• Reduce additional heat supply
Temperature too high	• Temperature sensor is not calibrated correctly	• Correct using the "Correction_°C-signal" parameter
No essence or too little essence supply in steam bath	• No essence in the respective container	• Refill essence
	• Essence supply not enabled or not functional	• Enable essence supply (check the voltage supply of the peristaltic pump)
	• Essence filling time too low	• Set longer filling time
	• Essence pause time too long	• Set shorter pause time
	• Fuse or relay for essence in control defective (for 24 V applications)	• Check fuse and relay, replace if required
	• Hose in peristaltic pump defective (essence runs back into essence container via return line)	• Replace hose in peristaltic pump
Excessive essence supply in steam bath	• Essence filling time too high	• Set shorter essence filling time
	• Essence pauses too short	• Set longer pause time
No steam production, even though steamhumidifier is switched on. The display is dark.	• Fuse F1 and/or F2 on mainboard defective.	• Check micro-fuses and replace if required.
	• Failure of external control voltage (external fuse has tripped or is defective).	• Replace external fuse and search for possible cause for it being triggered.
	• Circuit breaker in unit was triggered (ELDB only).	• Switch circuit breaker back on, eleminate cause when circuit breaker trips repeatedly

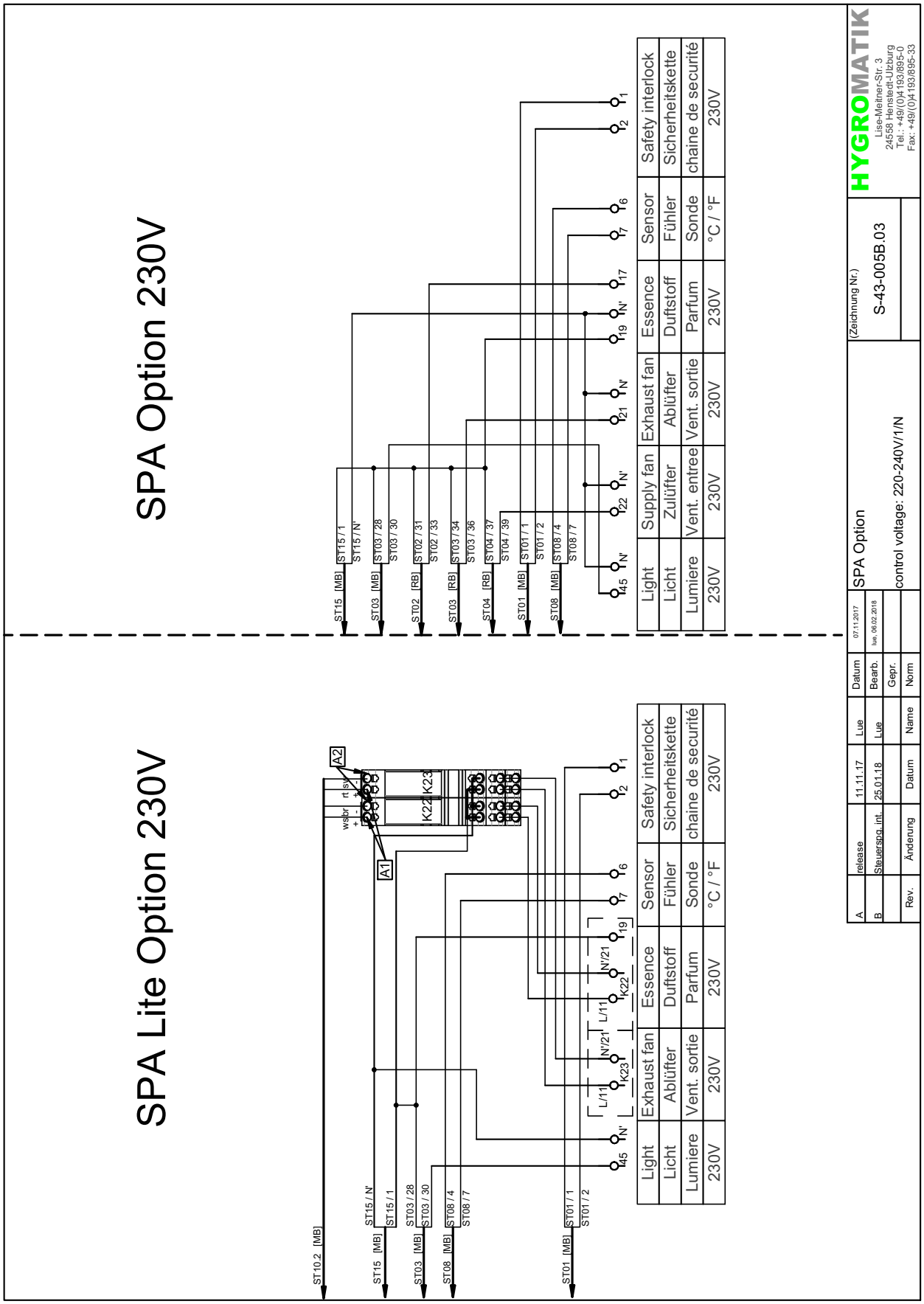
Possible condition	Possible cause for fault situation	Countermeasure
Blow-down pump is working, but no water is pumped out.	• Cylinder base or blow-down system is clogged.	• Clean cylinder base or blow-down system.
Cylinder is completely emptied after a blow-down, even though the pump has switched off.	• Ventilation hole in elbow is blocked.	• Clean ventilation hole and replace elbow adapter, if required.
No steam exit. Periodically, water emerges from the drain hose w/ o the pump running.	• Incorrect installation of the steam pipe (water pocket). • Overpressure in steam hose (max. overpressure 1200 Pa).	• Lay steam hose in accordance with recommendations. • Extend the drain hose, consult with the specialist dealer if required.
Uneven electrode burn-off (ELDB only)	• Electrode(s) not supplied with voltage • Fuse has tripped • Main contactor contact does not switch • Unequal phase load due to operating conditions • Uneven immersion depth of electrodes. The unit has not been aligned vertically and horizontally	• Check power supply to electrode(s) • Check fuse, replace if required • Check main contactor, replace if required • Check power supply (measure voltage differences) • Install unit horizontally and vertically so it is perpendicular

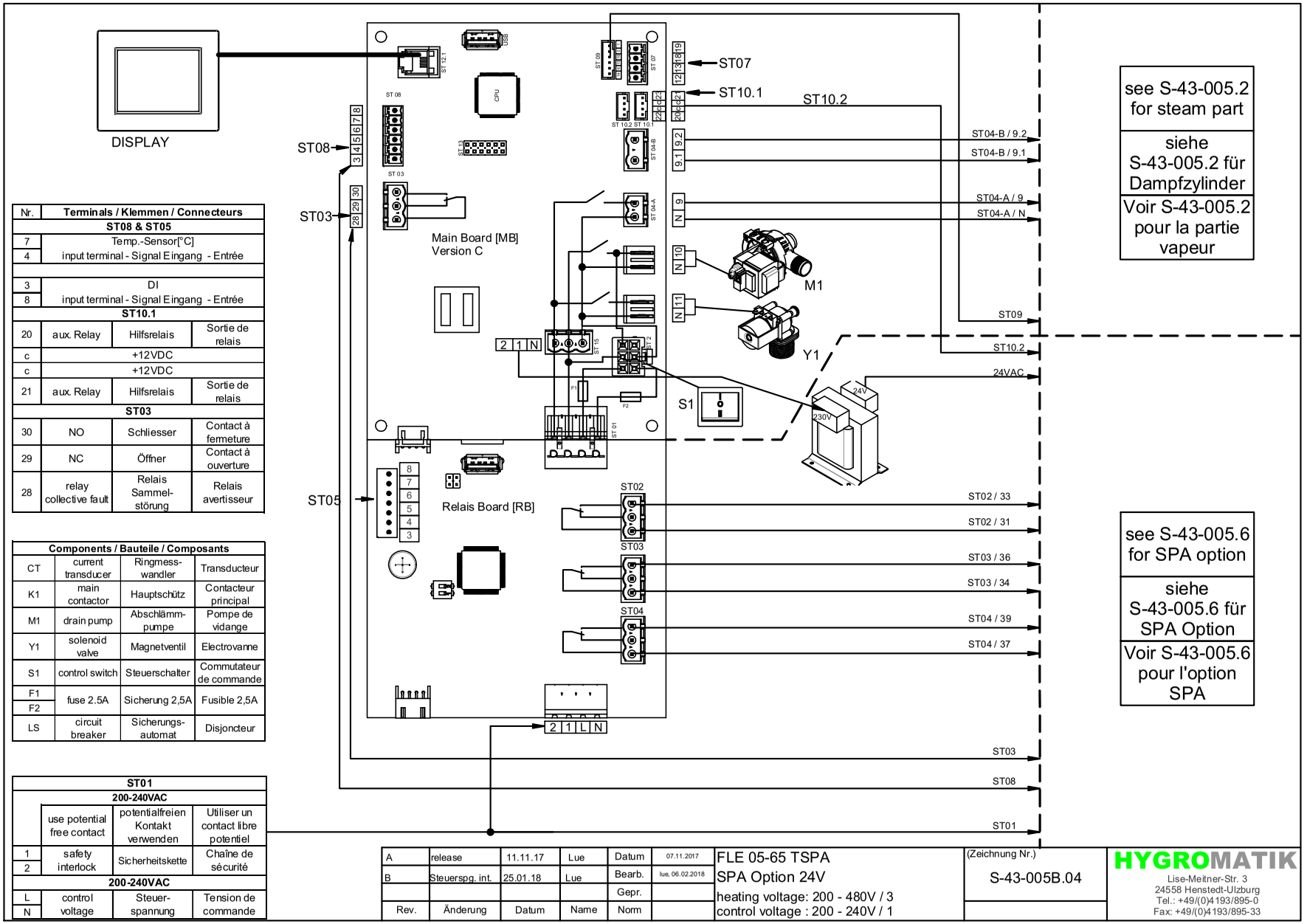
Possible condition	Possible cause for fault situation	Countermeasure
Appearance of lights/lightning in the cylinder (ELDB only)	• Very high conductivity of water resulting in massive electrode burn-off (indicated by the brown- black deposits)	• **Immediately take the unit out of operation, as it could be damaged otherwise.** Perform maintenance: - Replace electrodes - Clean steam cylinder - Check water quality and conductivity, see also Section "Intended use" Consult with the specialist dealer if required
	• Blow-down pump does not function properly or is defective	• Check the functioning of the blow-down pump and if required, replace the blow-down pump. See also **"Blow-down fault"** fault message

8. Wiring diagram




FLE 40-65
FLE 15-30
FLE 05-10
only for units with 6 electrodes
nur für Geräte mit 6 Elektroden
Uniquement pour les unités à 6 électrodes
heating voltage 200 - 480V; see name plate
Heizspannung 200 - 480V; siehe Typenschild
Tension de chauffage 200 - 480V; note plaque d'identification
L1
L2
L3
Voltage according name plate
Spannung gemäß Typenschild
Tension conformément à la plaque d'identification
Use copper conductors only, AWG size according current value on the name plate
Leitungsquerschnitt Kupferkabel gemäß Stromangaben auf dem Typenschild
Utiliser uniquement des conducteurs en cuivre, AWG selon la valeur actuelle sur la plaque d'identification
ST04-B / 9.2
ST04-B / 9.1
ST04-A / 9
K1
ST04-A / N
ST09
CT
LS
L1 L2 L3
A release 11.11.17 Lue Datum 07.11.2017
B Steuerspg. int. 25.01.18 Lue Bearb. Iwn. 06.02.2018
Gepr.
Rev. Änderung Datum Name Nom
FLE 05-65 - SPA
heating voltage: 200 - 480V
(Zeichnung Nr.)
S-43-005B.02
HYGROMATIK
Lise-Meitner-Str. 3
24558 Henstedt-Ulzburg
Tel.: +49/(0)4193/895-0
Fax: +49/(0)4193/895-33


SPA Option 230V
SPA Lite Option 230V
ST15 [MB]
ST15 / 1
ST15 / N'
ST03 [MB]
ST03 / 28
ST03 / 30
ST02 [RB]
ST02 / 31
ST02 / 33
ST03 [RB]
ST03 / 34
ST03 / 36
ST04 [RB]
ST04 / 37
ST04 / 39
ST01 [MB]
ST01 / 1
ST01 / 2
ST08 [MB]
ST08 / 4
ST08 / 7
ST10.2 [MB]
ST01 [MB]
ST01 / 1
ST01 / 2
ST08 [MB]
ST08 / 4
ST08 / 7
A1
A2
K22
K23
Light
Licht
Lumiere
230V
Supply fan
Zuluefter
Vent. entree
230V
Exhaust fan
Ablüfter
Vent. sortie
230V
Essence
Duftstoff
Parfum
230V
Sensor
Fühler
Sonde
°C / °F
Safety interlock
Sicherheitskette
chaine de securité
230V
SPA Option
control voltage: 220-240V/1/N
(Zeichnung Nr.)
S-43-005B.03
HYGROMATIK
Lise-Meitner-Str. 3
24558 Henstedt-Ulzburg
Tel.: +49/(0)4193/895-0
Fax: +49/(0)4193/895-33
A release 11.11.17 Lue 07.11.2017
B Steuerspg. int 25.01.18 Lue Ive. 06.02.2018
Rev. Änderung Datum Name Bearb. Gepr. Norm



Nr.	Terminals / Klemmen / Connecteurs		
	ST08 & ST05		
7	Temp.-Sensor[°C]		
4	input terminal - Signal Eingang - Entrée		
3	DI		
8	input terminal - Signal Eingang - Entrée		
	ST10.1		
20	aux. Relay	Hilfsrelais	Sortie de relais
c	+12VDC		
c	+12VDC		
21	aux. Relay	Hilfsrelais	Sortie de relais
	ST03		
30	NO	Schliesser	Contact à fermeture
29	NC	Öffner	Contact à ouverture
28	relay collective fault	Relais Sammel-störung	Relais avertisseur

Components / Bauteile / Composants			
CT	current transducer	Ringmess-wandler	Transducteur
K1	main contactor	Hauptschütz	Contacteur principal
M1	drain pump	Abschlämm-pumpe	Pompe de vidange
Y1	solenoid valve	Magnetventil	Electrovanne
S1	control switch	Steuerschalter	Commutateur de commande
F1	fuse 2.5A	Sicherung 2,5A	Fusible 2,5A
F2			
LS	circuit breaker	Sicherungs-automat	Disjoncteur

ST01			
	200-240VAC		
	use potential free contact	potentialfreien Kontakt verwenden	Utiliser un contact libre potentiel
1	safety interlock	Sicherheitskette	Chaîne de sécurité
2			
	200-240VAC		
L	control voltage	Steuer-spannung	Tension de commande
N			

Rev.	Änderung	Datum	Name	Norm	
A	release	11.11.17	Lue	Datum	07.11.2017
B	Steuerspg. int.	25.01.18	Lue	Bearb.	lue, 06.02.2018
				Gepr.	

FLE 05-65 TSPA
SPA Option 24V
heating voltage: 200 - 480V / 3
control voltage : 200 - 240V / 1

(Zeichnung Nr.) S-43-005B.04

HYGROMATIK
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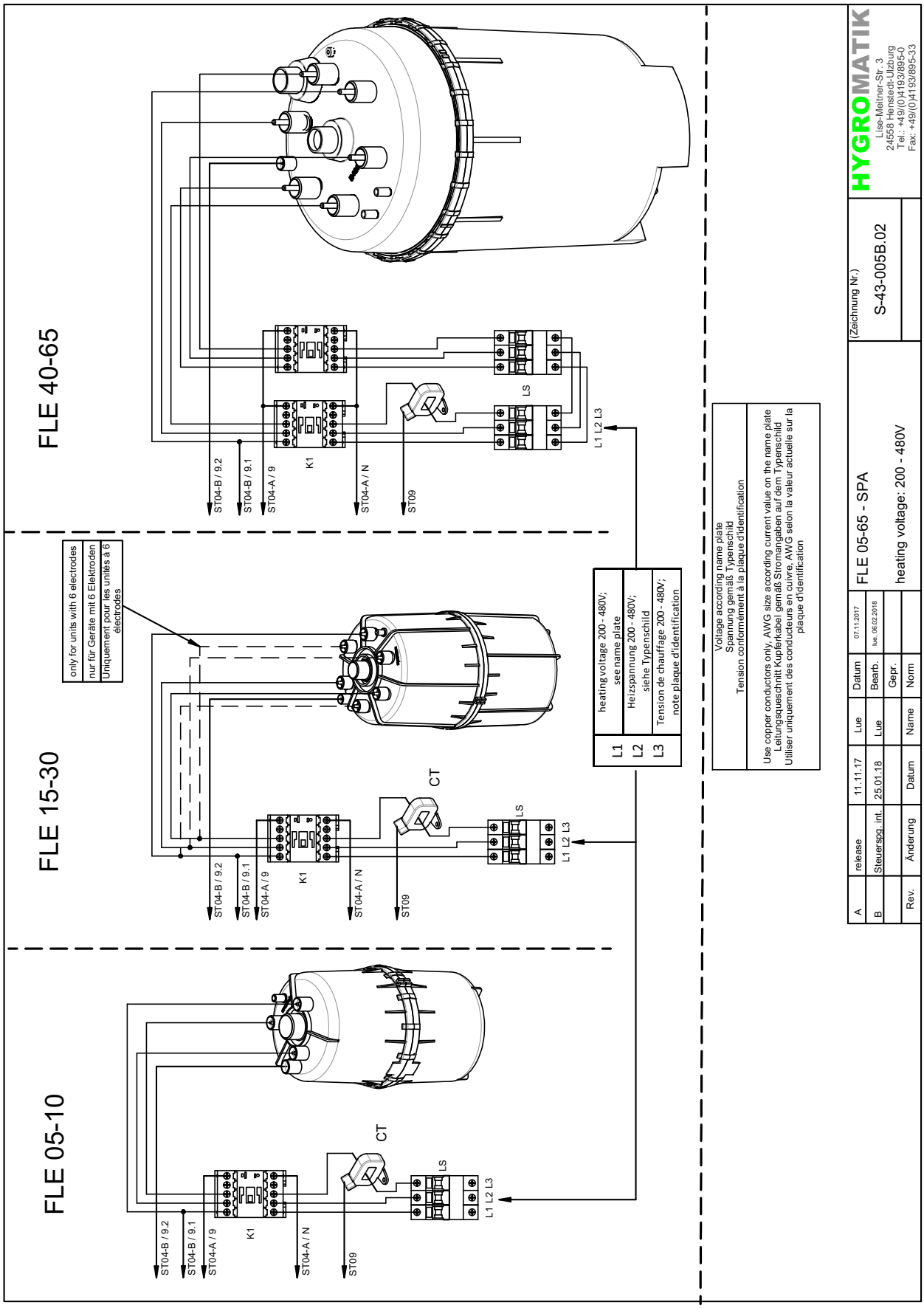
FLE 40-65
FLE 15-30
FLE 05-10
ST04-B / 9.2
ST04-B / 9.1
ST04-A / 9
ST04-A / N
ST09
K1
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CT
L1 L2 L3
only for units with 6 electrodes
nur für Geräte mit 6 Elektroden
Uniquement pour les unités à 6 électrodes
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L2
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heating voltage 200 - 480V; see name plate
Heizspannung 200 - 480V; siehe Typenschild
Tension de chauffage 200 - 480V; note plaque d'identification
Voltage according name plate
Spannung gemäß Typenschild
Tension conformément à la plaque d'identification
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Leitungsqueschnitt Kupferkabel gemäß Stromangaben auf dem Typenschild
Utiliser uniquement des conducteurs en cuivre, AWG selon la valeur actuelle sur la plaque d'identification
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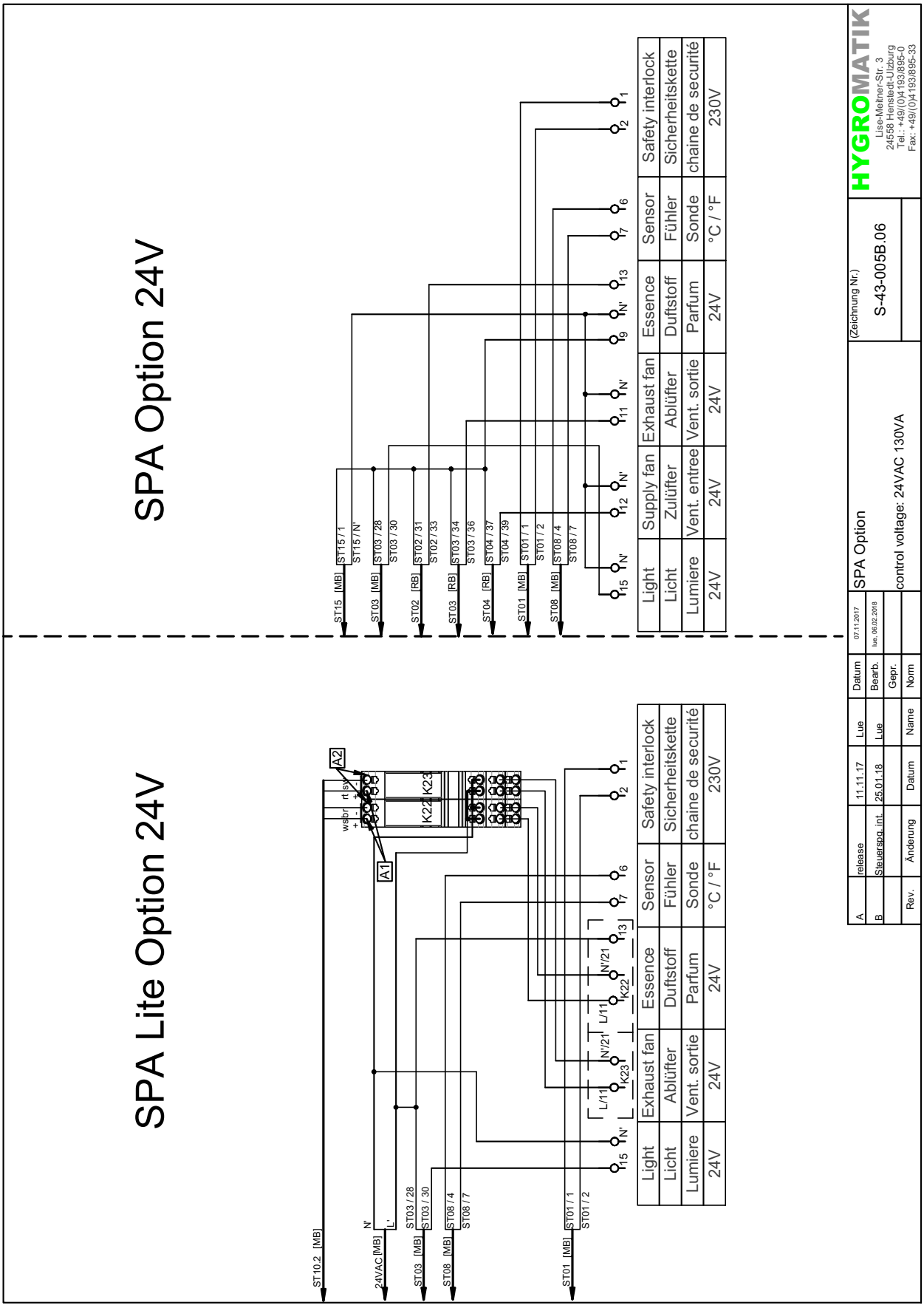
SPA Option 24V
SPA Lite Option 24V
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ST15 / 1
ST15 / N'
ST03 [MB]
ST03 / 28
ST03 / 30
ST02 [RB]
ST02 / 31
ST02 / 33
ST03 [RB]
ST03 / 34
ST03 / 36
ST04 [RB]
ST04 / 37
ST04 / 39
ST01 [MB]
ST01 / 1
ST01 / 2
ST08 [MB]
ST08 / 4
ST08 / 7
Light
Licht
Lumiere
24V
Supply fan
Zulüfter
Vent. entree
24V
Exhaust fan
Ablüfter
Vent. sortie
24V
Essence
Duftstoff
Parfum
24V
Sensor
Fühler
Sonde
°C / °F
Safety interlock
Sicherheitskette
chaine de securité
230V
ST10.2 [MB]
24VAC [MB]
N'
L'
A1
A2
K22
K23
L/11
N'/21
SPA Option
control voltage: 24VAC 130VA
(Zeichnung Nr.)
S-43-005B.06
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Tel.: +49/(0)4193/895-0
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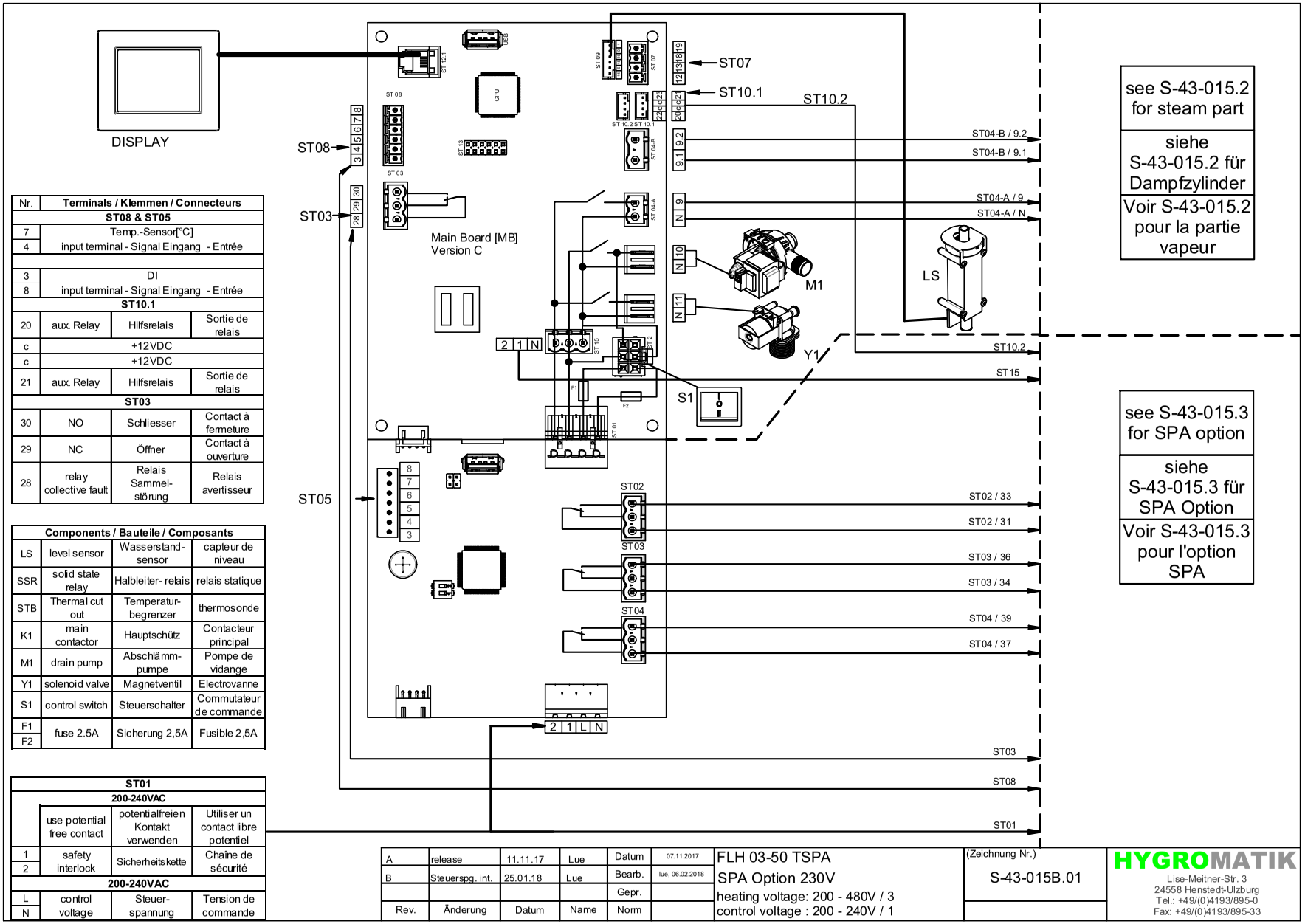

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c	+12VDC		
c	+12VDC		
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	ST03		
30	NO	Schliesser	Contact à fermeture
29	NC	Öffner	Contact à ouverture
28	relay collective fault	Relais Sammel-störung	Relais avertisseur

Components / Bauteile / Composants			
LS	level sensor	Wasserstand-sensor	capteur de niveau
SSR	solid state relay	Halbleiter- relais	relais statique
STB	Thermal cut out	Temperatur-begrenzer	thermosonde
K1	main contactor	Hauptschütz	Contacteur principal
M1	drain pump	Abschlämm-pumpe	Pompe de vidange
Y1	solenoid valve	Magnetventil	Electrovanne
S1	control switch	Steuerschalter	Commutateur de commande
F1	fuse 2.5A	Sicherung 2,5A	Fusible 2,5A
F2			

ST01			
	200-240VAC		
	use potential free contact	potentialfreien Kontakt verwenden	Utiliser un contact libre potentiel
1	safety interlock	Sicherheitskette	Chaîne de sécurité
2			
	200-240VAC		
L	control voltage	Steuer-spannung	Tension de commande
N			

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B	Steuerspg. int.	25.01.18	Lue

Norm	
Gepr.	
Bearb.	lue, 06.02.2018
Datum	07.11.2017

FLH 03-50 TSPA
SPA Option 230V
heating voltage: 200 - 480V / 3
control voltage : 200 - 240V / 1

(Zeichnung Nr.)
S-43-015B.01

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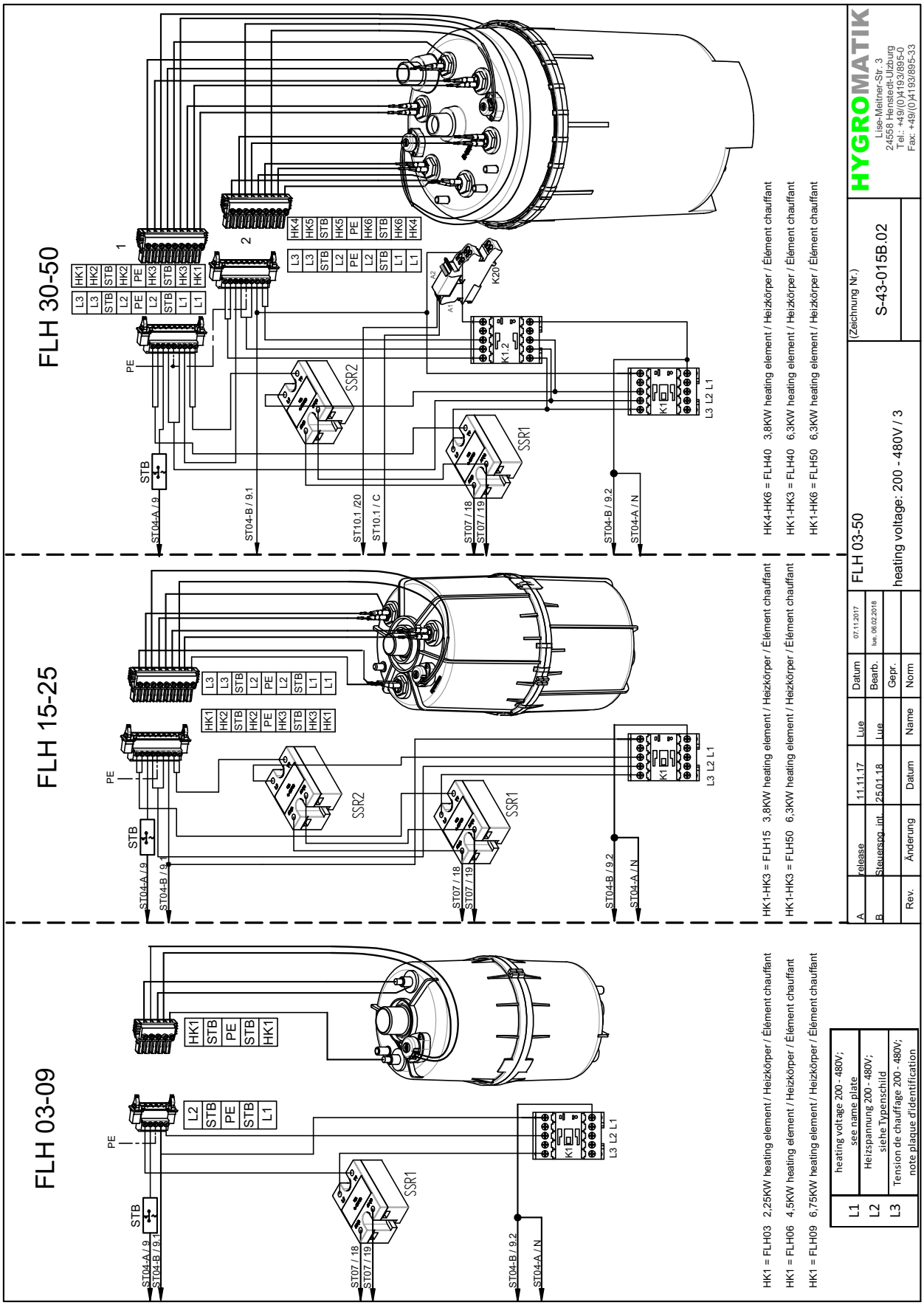
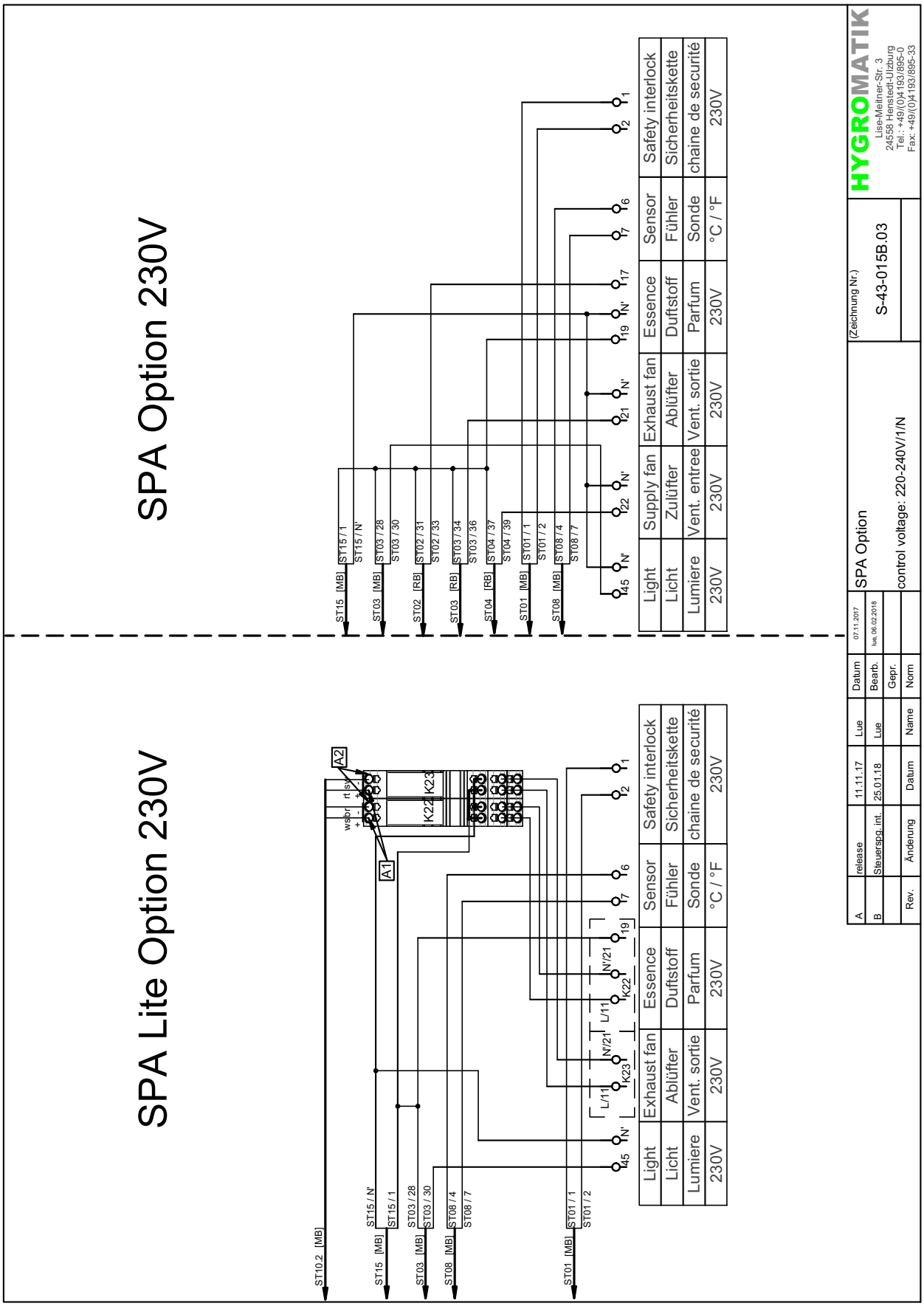
HYGROMATIK


FLH 30-50
FLH 15-25
FLH 03-09
FLH 03-50
S-43-015B.02
heating voltage: 200 - 480V / 3
HYGROMATIK
Lise-Meitner-Str. 3
24558 Henstedt-Ulzburg
Tel.: +49/(0)4193/895-0
Fax: +49/(0)4193/895-33
HK1 = FLH03 2,25KW heating element / Heizkörper / Élément chauffant
HK1 = FLH06 4,5KW heating element / Heizkörper / Élément chauffant
HK1 = FLH09 6,75KW heating element / Heizkörper / Élément chauffant
HK1-HK3 = FLH15 3,8KW heating element / Heizkörper / Élément chauffant
HK1-HK3 = FLH50 6,3KW heating element / Heizkörper / Élément chauffant
HK4-HK6 = FLH40 3,8KW heating element / Heizkörper / Élément chauffant
HK1-HK3 = FLH40 6,3KW heating element / Heizkörper / Élément chauffant
HK1-HK6 = FLH50 6,3KW heating element / Heizkörper / Élément chauffant
L1 heating voltage 200 - 480V; see name plate
L2 Heizspannung 200 - 480V; siehe Typenschild
L3 Tension de chauffage 200 - 480V; note plaque d'identification
SSR1
SSR2
K1.2
K20
STB
PE
L3 L2 L1


SPA Lite Option 230V
SPA Option 230V
ST10.2 [MB]
ST15 [MB]
ST03 [MB]
ST08 [MB]
ST01 [MB]
ST02 [RB]
ST04 [RB]
ST15 / 1
ST15 / N'
ST03 / 28
ST03 / 30
ST08 / 4
ST08 / 7
ST01 / 1
ST01 / 2
ST02 / 31
ST02 / 33
ST03 / 34
ST03 / 36
ST04 / 37
ST04 / 39
A1
A2
K22
K23
L/11
N'/21
N'
45
22
21
19
17
7
6
2
1
Light | Exhaust fan | Essence | Sensor | Safety interlock
Licht | Ablüfter | Duftstoff | Fühler | Sicherheitskette
Lumiere | Vent. sortie | Parfum | Sonde | chaine de securité
230V | 230V | 230V | °C / °F | 230V
Light | Supply fan | Exhaust fan | Essence | Sensor | Safety interlock
Licht | Zulüfter | Ablüfter | Duftstoff | Fühler | Sicherheitskette
Lumiere | Vent. entree | Vent. sortie | Parfum | Sonde | chaine de securité
230V | 230V | 230V | 230V | °C / °F | 230V
A release 11.11.17 Lue
B Steuerspg. int. 25.01.18 Lue
Rev. Änderung Datum Name
Datum 07.11.2017
Bearb. Mat. 06.02.2018
Gepr.
Norm
SPA Option
control voltage: 220-240V/1/N
(Zeichnung Nr.)
S-43-015B.03
HYGROMATIK
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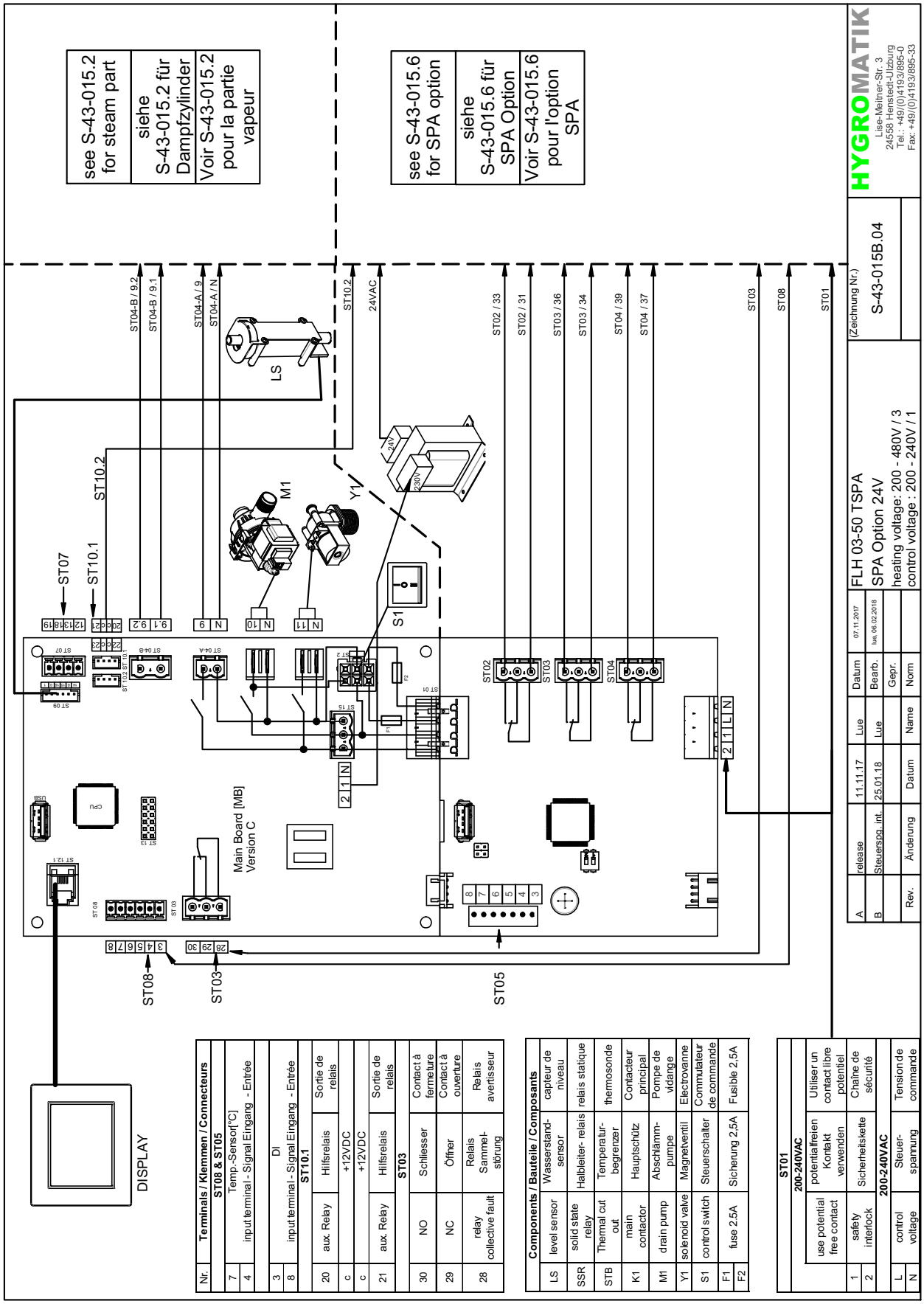
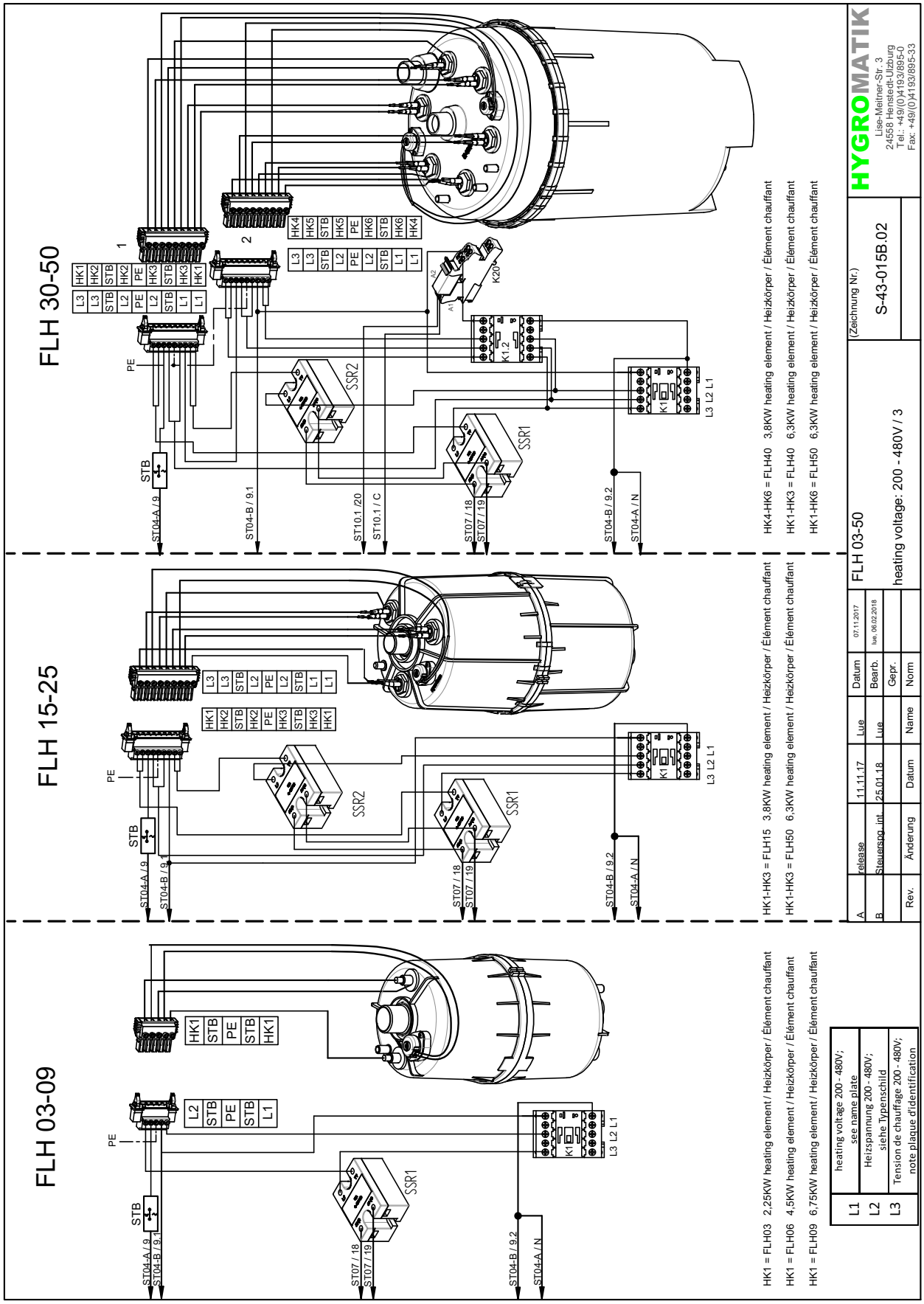


Nr.	Terminals / Klemmen / Connecteurs		
	ST08 & ST05		
7	Temp.-Sensor[°C]		
4	input terminal - Signal Eingang - Entrée		
		DI	
3	input terminal - Signal Eingang - Entrée		
8	**ST10.1**		
20	aux. Relay	Hilfsrelais	Sortie de relais
c		+12VDC	
c		+12VDC	
21	aux. Relay	Hilfsrelais	Sortie de relais
	ST03		
30	NO	Schliesser	Contact à fermeture
29	NC	Öffner	Contact à ouverture
28	relay collective fault	Relais Sammel-störung	Relais avertisseur

	Components / Bauteile / Composants		
LS	level sensor	Wasserstand-sensor	capteur de niveau
SSR	solid state relay	Halbleiter- relais	relais statique
STB	Thermal cut out	Temperatur-begrenzer	thermosonde
K1	main contactor	Hauptschütz	Contacteur principal
M1	drain pump	Abschlämm-pumpe	Pompe de vidange
Y1	solenoid valve	Magnetventil	Electrovanne
S1	control switch	Steuerschalter	Commutateur de commande
F1	fuse 2.5A	Sicherung 2,5A	Fusible 2,5A
F2			

	ST01		
	200-240VAC		
	use potential free contact	potentialfreien Kontakt verwenden	Utiliser un contact libre potentiel
1	safety	Sicherheits	Chaîne de
2	interlock	kette	sécurité
	200-240VAC		
L	control voltage	Steuer-spannung	Tension de commande
N			

Rev.	Änderung	Datum	Name	Norm	Datum
A	release	11.11.17	Lue		07.11.2017
B	Steuersoq. int.	25.01.18	Lue	Gepr.	Bearb.


FLH 30-50
FLH 15-25
FLH 03-09
HK1 = FLH03 2,25KW heating element / Heizkörper / Élément chauffant
HK1 = FLH06 4,5KW heating element / Heizkörper / Élément chauffant
HK1 = FLH09 6,75KW heating element / Heizkörper / Élément chauffant
HK1-HK3 = FLH15 3,8KW heating element / Heizkörper / Élément chauffant
HK1-HK3 = FLH50 6,3KW heating element / Heizkörper / Élément chauffant
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HK1-HK3 = FLH40 6,3KW heating element / Heizkörper / Élément chauffant
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L1 heating voltage 200 - 480V; see name plate
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L3 Tension de chauffage 200 - 480V; note plaque d'identification
A release 11.11.17 Lue 07.11.2017
B Steuerspg. int 25.01.18 Lue tue, 06.02.2018
Rev. Änderung Datum Name Norm
FLH 03-50
heating voltage: 200 - 480V / 3
(Zeichnung Nr.)
S-43-015B.02
HYGROMATIK
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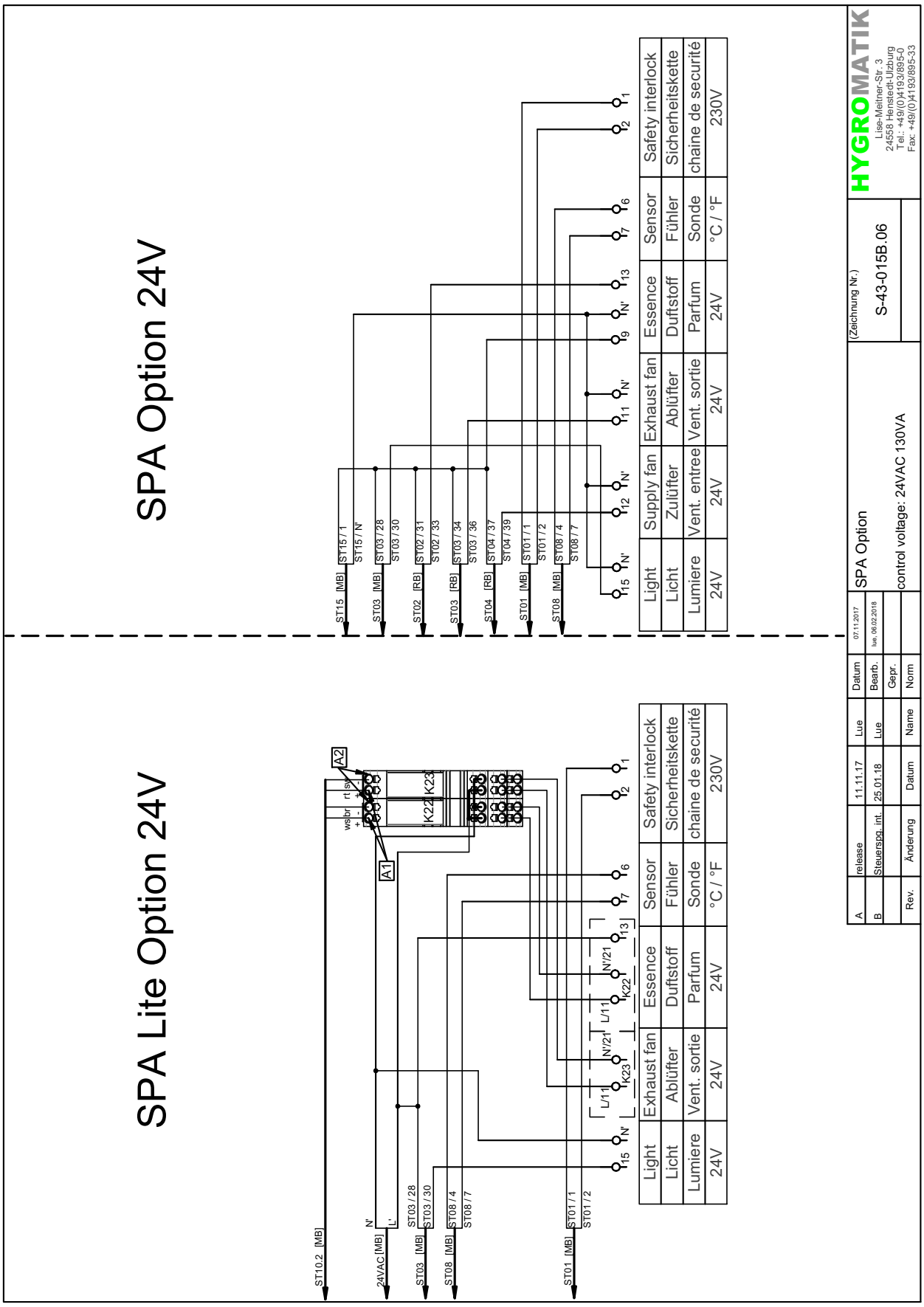
SPA Option 24V
SPA Lite Option 24V
ST15 [MB] ST15 / 1
ST15 / N'
ST03 [MB] ST03 / 28
ST03 / 30
ST02 [RB] ST02 / 31
ST02 / 33
ST03 [RB] ST03 / 34
ST03 / 36
ST04 [RB] ST04 / 37
ST04 / 39
ST01 [MB] ST01 / 1
ST01 / 2
ST08 [MB] ST08 / 4
ST08 / 7
Light Licht Lumiere 24V
Supply fan Zulüfter Vent. entree 24V
Exhaust fan Ablüfter Vent. sortie 24V
Essence Duftstoff Parfum 24V
Sensor Fühler Sonde °C / °F
Safety interlock Sicherheitskette chaine de securité 230V
ST10.2 [MB]
24VAC [MB]
N'
L'
A1
A2
K22
K23
L/11
N'/21
SPA Option
S-43-015B.06
control voltage: 24VAC 130VA
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9. Glossary

Term	[Index]	Explanation
Actual value	1	The actual value is the measured value of a physical quantity, which is compared with the →*Set value [3]* during the control process and may give rise to a readjustment, if required.
Set value	3	The set value of a physical quantity (e.g. the temperature) is the set target for a control process.
Steam output	4	The steam output calculated from the electrical power consumption in kg/h.
Demand	5	The demand describes the dimensionless control signal processed by the control system which is converted into a proportional →*Internal actuator signal [42]* for the power control for steam generation.
Update function	7	The update function provides the control with an update of parameter settings which is stored on an external USB memory stick. The "Update function" parameter is a read-only value which can be used to read out the status of the update.
SI system of units	8	The system of units with the temperature specified in °C and the quantity specified in kg.
Imperial system of units	9	The system of units used in the USA with the temperature specified in °F (Fahrenheit) and the quantity specified in lbs.
Initialisation	10	The control performs a self-test, during which the welcome screen with the software version is displayed. After the parameter settings and measured values have been read in, the →*Main screen [14]* is shown on the display. During the subsequent start blow-down, the read values can be used to query the device status, which is "Initialisation" in this phase.
Interlock (safety) system	11	The hardware interlock (safety) system makes it possible to immediately interrupt steam production, e.g. using an emergency stop button or. The interlock (safety) system must be closed to operate the unit. The interlock (safety) system must be implemented on-site with one or several potential free contacts (switched in series). It is connected to the control at terminals 1 and 2, with terminal 1 carrying 230 VAC as standard. In a special design (e.g. for the U.S. market), the interlock (safety) system is converted to low voltage through the additional use of a relay to meet local safety requirements. Instead of terminals 1 and 2 on the control, a potential free connection of the relevant DIN rail terminals must then be implemented on-site. If the interlock (safety) system is opened, the status of the unit changes to "Interlock (safety) system open".
Software control command	12	Coded command, which is, for example, sent from the building control system or a PLC via the →*Communication interface [13]* to the control. The command set available is listed in separate documentation, which is available from HygroMatik on request.
Communication interface	13	Serial computer interface for remote control of the unit using, for example, the →*Modbus [17]* RTU protocol.
Main screen	14	Screen content during the normal operation of the unit. The main screen includes the main display (in the middle of the screen) and the status icons (left and right of the main display).
Standby heating	16	So that steam production can be started more quickly, the standby heating keeps the water in the cylinder warm, if no →*Demand [5]* is present. The →*Interlock (safety) system [11]* must be closed. Heating and pause times are adjustable.
Timer function	18	The timer makes it possible to limit the duration of steam production in the short-time range, starting when steam production is halted (if no demand exists in normal operation), or ECO mode . The timer is triggered by pressing a button, which must be connected to the *digital input [97]* of the mainboard. In addition, the →*Digital function [98]* parameter must be set to "Timer_start". The "0" setting deactivates the timer. "1" or "2" is used to specify whether the steam is turned off or if there is a return to ECO mode after the timer has elapsed.
Solenoid valve (SV)	19	The solenoid valves for the water supply to the steam cylinder(s) are labelled with Y1, Y2, Y3 and Y4 in the circuit diagrams.
Start blow-down	20	The unit performs a →*Blow-down [58]* after it was switched off and has been switched on again. The process varies depending on the unit type. For the →*ELDB [77]* it is important that, when the main contactor is first switched, overcurrent due to excessive conductivity of the cylinder water does not occur while simultanously water level is high. A →*Partial blow-down [21]* is therefore used to ensure that the current does not reach an impermissible value. This procedure is not required for the →*HKDB [78]*. The only checks carried out here are on the functioning of the level control and the blow-down pump, by carrying out a plausibility check of the measured value of the water level sensor which is transferred in the context of a →*partial blow-down [21]*.
Partial blow-down	21	Only part of the cylinder water is pumped off during the →*Blow-down [58]*. For the →*ELDB [77]*, a partial blow-down is carried out periodically after 40 solenoid valve operating cycles (fillings). For the →*HKDB [78]*, the frequency of the partial blow-down is determined by the steam volume.
Full blow-down	22	All of the cylinder water is pumped off during the →*Blow-down [58]*.
Dilution	23	A dilution is a →*Partial blow-down [21]*, which is caused by excessive conductivity of the cylinder water. For deconcentration, fresh water is used to top up the cylinder after the partial blow-down.
Overcurrent blow-down	24	Depending on the selection of the →*Control curve*, the current is increased to 128% or 113% of the nominal current during a cold start, in order to achieve a quick start characteristic. When the respective current value has been reached, the overcurrent blow-down is started causing the nominal current to revert to the normal value (only for →*ELDB [77]*).
Max. level blow-down	25	When the water level sensor signals the maximum level, a →*Partial blow-down [21]* is carried out to reduce the water level (only for →*HKDB [78]*).
Stand-by blow-down	26	If the unit was switched on for an extended period without a →*Demand [5]* arising, or if the →*Interlock (safety) system [11]* was opened for an extended period, a (→*Blow-down [58]*) of the cylinder water is performed to prevent germ formation. The interval for triggering the blow-down is defined with the "Standby_blow-down_interval" parameter.

Continuation of glossary (1)

Term	[Index]	Explanation
Flushing of dead-end line	27	When this function is activated, the feed water line is flushed during operation phases in which there are no requests in order to prevent germ formation. For this purpose, the inlet solenoid valve and the blow-down pump are activated at the same time. The "Flushing_of_dead-end line_interval" parameter determines when flushing starts after a request was not received, the "Flushing_of_dead-end line_duration" parameter determines how long flushing takes. The interlock (safety) system must be closed so that the inlet solenoid valve can be controlled ("partially automatic flushing of dead-end line").
Manual blow-down	28	Pumping out of the cylinder water by touching the "Blow-down" icon on the screen or by a →*Software control command [12]* via the →*Communication interface* [13]. Repeated actuation or a corresponding →Software command [12] switches the →*Blow-down function [58]* off again). The cylinder water may also be pumped by setting the control switch on the device front panel in the "II" position while the control remains switched off.
Switch-off point	29	The switch-off point for switching off steam production with decreasing →*Demand [5]* is specified as a percentage value of the maximum control signal. The switch-off point is generally selected as > "0" to hide any errors on the control signal close to the zero value and thereby allow reliable switch-offs.
? Switch-on point	30	The difference value for the switch-on point specifies the percentage share of the max. control signal by which the switch-on point is to be above the switch-off point. It therefore determines the switching differential between switching off and switching on again and is also used to prevent the unit from being frequently switched on and off unnecessarily. Example: Switch-off point 20%, ? Signal_switch-on_point 5% , signal type voltage control in the range 0... 10 V, the switch-on point is then at 2.5 V, the switch-off point at 2.0 V.
Thermo sensor	31	With the →*HKDB [78]*, a thermo sensor is located on the cylinder cover, connected to the heater - or if available - both heaters via a capillary tube. A thermal switch is also arranged on every →*Solid state relay [46]* . All thermo sensors/thermal switches are connected in series. If one of the thermo sensors/thermal switches is triggered, the power supply to the steam humidifier is interrupted. The thermo sensor(s) on the cylinder(s) have to be reset mechanically after cooling down. The thermal switches are automatically reset after cooling down.
Limitation of operating time	32	The unit stops the steam production according to the number of minutes specified. The time is counted from the point when the interlock (safety) system was closed. To put the unit back into operation, the interlock (safety) system must be opened and closed again, or the →*Communication interface [13]* must be used to transmit →*Software control commands [12]* to open and close the virtual interlock (safety) system again. Alternatively, the control switch can also be opened and closed again. This does, however, cause the unit to be restarted. Setting the parameter to a value of "0" deactivates the limitation of operating time.
Steam_amount_service	33	The steam volume produced [kg] is compared to the default value set in the "Steam_amount_service" parameter to obtain a criterion for maintenance requirements. Once the default value has been reached, the message "Steam_amount_counter" is displayed. Once the service has been performed, the steam volume counter has to be reset with "Service_reset_cyl. x". The remaining steam volume can be viewed using the "Steam_until_msg._cyl. x" read value.
Service_main_contactor	34	The operating cycles of the main contactor(s) are recorded by counters and compared to factory-set default values by the software. When a default value is reached, the "Service_main_contactor x" message is displayed on the screen. After a main contactor has been replaced, the respective counter must be reset with the parameter "Main_contactor_x_Reset" (x = number of the main contactor, 1...5).
Cylinder full status	38	When the unit measures a potential at the sensor electrode, it reports a cylinder full status. In this case, the cylinder water level is so high that it creates an electrical bridge between one of the power electrodes and the sensor electrode. If the cylinder full status continues for an hour, steam production is shut down and a fault message is generated.
Level control	39	With the →*HKDB [78]*, communicating tubes are used for the contact-free measurement of the water level in the cylinder.
Max. level	40	The maximum water level value supplied by the →*Level control* is reached. If this state is reached 5x in succession within a predefined time interval, the control issues a "Error_max.level" message (only →*HKDB [78]*).
Max. temperature	41	Maximum steam bath temperature where, once reached, the unit switches off for safety reasons. This is set using the differential value ? Max temp. in "K" (corresponding to °C), which must be added to the temperature target value to determine the absolute switch-off temperature.
Internal actuator signal	42	Actuator signal for the control of the power element of the unit concerned.
Max. steam output	43	Reduction of output power to 25... 100% of the nominal output. Can lead to improved control behaviour at lower output requirements.
1 step operation	44	On/off operation of the steam generator without control function through a potential free contact suitable for low voltage, to be supplied on-site.

Continuation of glossary (2)

Term	[Index]	Explanation
Second temperature sensor	45	For enhancement of the temperature measurement reliability or the consideration of the influences introduced by on-site particularities, the control may be operated with a 2nd temperature sensor. Prerequisite is the unit's configuration level with an expansion board or a relay board in addition to the mainboard. The 2nd sensor is connected to the relevant connector plug on the respective p.c.b., just as the 1st sensor is. Activation of the 2nd sensor is made by setting the "Sensor 2_connection" parameter within the "SPA" submenu to setting variant "Cylinder extension" or "Relay 1 extension" (De-activation is accomplished by selecting the "Off"-setting for the a.m. parameter). Measuring value processing can be made in two ways: 1. **Averaging** the readings of both sensors with a defined weighting 2. Comparison of the two readings and generation of a **fault message in case of deviation** Selection processing method is made by setting the "Temperature_measurement" parameter within the "SPA" submenu. Setting options are "Average" and "Deviation". Averaging takes both measurements in concern for forming a new value that is relevant for further processing. "Sensor 1_weighting" with a 0 to 100% range defines the impact of each of the sensors on the total result. Scaling is as such: "0%" = only the sensor 2 measurement value is taken into account "50%"= the measurement values of both of the sensors determine the average value with an identical weighting "100%"= only sensor 1 measurement value is taken into account When "Deviation" is selected, only the sensor 1 measurement value is processed, as long as a significant deviation is not detected. However, when a significant has occurred, the fault message "Deviation" is generated. The criterion for this message is the degree of deviation that may be set as the "Sensors_deviation" parameter (s. SPA submenu) between 1.0K and 10.0K.
Solid state relay (SSR)	46	Electronical power switch mounted on a thermically monitored heat sink (only →*HKDB [78]*).
Humidification	47	The unit produces steam, if a temperature sensor has issued a →*Demand [5]* and the →*Interlock (safety) system [11]* is closed.
PWM	48	**P**ulse **w**idth **m**odulation with variable frequency and variable duty cycle for the control of the heater current via the →*Solid state relay [46]*. Because the heater current determines the steam output, it is possible to control the steam output in this way (only for →*HKDB [78]*).
Δ Temp._ECO	52	To save energy, the ? *set value* of the steam bath can be lowered by the value stored in "? Temp._ECO". For this purpose, a →*pushbutton [106]* has to be wired to the *?Digital input* and the function of the digital input has to be programmed to "ECO".
Steam_down_time_to_fault	53	If the level of the cylinder water has not changed within the time defined in this parameter, this indicates that a malfunction is present. The steam production is then suspended and the "Steam_down_time" fault message is output (only →*HKDB [78]*).
Filling_cycled	54	The fill operation does not take place continuously , but with breaks, in order to prevent the overflowing of the filling cup (HyFlow). Filling and pause intervals can be adjusted separately.
Blow-down correction	55	If the water has high electrical conductivity or if there is a very high level of maintenance, it may be useful to increase the blow-down frequency. At low electrical conductivity, however, a reduction in the frequency of the blow-down may be useful. Depending on the water quality, the blow-down rate can be adjusted in 10 steps ("0" is the default). More frequent blow-down: Values up to max. +5, less frequent blow-down values down to -5, whereby "-5" means that blow-down is completely switched off.
Pumps_without_main_contactor	56	In rare cases, leakage currents may flow through the water to the earth during the blow-down process. To prevent a sensitive FI switch from being triggered, the main contactor can be switched off during the pumping process (only →*ELDB [77]*).
HyFlush (option)	57	When open, an additional solenoid valve produces a rotating turbulence for an improved discharge of scale deposits during blow-down. The solenoid valve is controlled by the software with a fixed ratio of active and pause times.
Blow-down	58	Pumping off the water in the cylinder for the following reasons: Elimination of scale deposits, replacement of water to prevent germ formation and reduction of conductivity (only →*ELDB [77]*), which increases due to evaporation and leads to increased power consumption. A distinction is made between →*Full blow-down [22]* and →*Partial blow-down [21]*.
HyCool (option)	59	Waste water cooling system for the protection of temperature-sensitive plastic waste water pipes. A solenoid valve is used to mix fresh water with the waste water so that the water temperature does not exceed 60 °C.
Steam jet activation	60	A steam jet can be triggered manually if a →*button [106]* intended for this purpose is wired between the →*Auxiliary voltage [105]* at Pin 3 of ST08 (mainboard) or ST05 (relay board) and the →*Digital input [97],* and the →*Digital_input_function [98]* has been programmed to "Steam_boost". When triggered, the steam bath set temperature is increased in the short term to a value which results from the set temperature + ? steam_boost. The duration of the target temperature increase is determined by the "Steam_jet_duration" parameter. The value of the "Steam_jet_blocking" parameter determines the time between the last steam jet and when the next steam jet can take place.
ECO mode	61	Reduction of →*Temperature set value [3]* to conserve energy.

Continuation of glossary (3)

Term	[Index]	Explanation
Power level	63	If the →*HKDB [78]* is equipped with 3 heaters, the power is provided in 2 levels from a certain performance class onwards. As long as a certain threshold value has not been reached, the heating performance required in level 1 is exclusively provided proportionally via the →*Solid state relay [46]* . After reaching the threshold value, the heater(s) is/are energised for "base performance" in level 1 via the contactor in 1 step operation. The power requirement which exceeds the "base performance" is then covered proportionally by the solid state relay in level 2.
Relay assignment	65	If the basic relay or additional relays which may be present are not used for signalling but for direct load switching, the maximum contact load 250 VAC/8 A must be taken into account
Power retention	66	After the set temperature has been reached, power is reduced to between 1 and 50% of the nominal output which was provided previously.The "0" setting means that the function is switched off. The original power is resumed when the temperature falls below the target temperature.
Control curves	68	In the "Load optimised" factory setting, the power control of an →*ELDB [77]* is set so that a current of 113% of the nominal current is permitted during a cold start to avoid overloading the power supply. In the "Energy optimised" setting, the current is increased to 128% of the nominal current during a cold start for achievement of a preferably short heat-up period. In the "Process optimised" setting, control is particularly fine.
Output signal	69	Signal 0... 10 V on terminals 12 and 13 (GND), which is proportional to the input signal. Can be used to control downstream units.
Fan control	71	The control may switch 2 **supply fans** and 2 **exhaust fans** with the respective 2nd fan adding an additonal performance level (in case of two-stage fans the 2nd performance level is already integrated). When in "Auto" mode, the following mechanism controls the exhaust fans: • Switch on exhaust fan 1 when the temperature set value is exceeded (Tactual > Tset) • Switch off exhaust fan 1 when the actual temperature has fallen below (Tactual - Exhaust fan 1_Δ Temp.) • Switch on exhaust fan 2 in addition to exhaust fan 1 (or 2nd performance level) when the actual steam bath temperature has reached (Tset + Exhaust fan 2_Δ Temp.) • Switch off exhaust fan 2 jointly with exhaust fan 1 when the exhaust fan 1 switch-off criterion was reached Example: Tset = 45°C, Exhaust fan 1_Δ Temp = 5K, Exhaust fan 2_Δ Temp = 2K Exhaust fan 1 switches on, when the steam bath temperature exceeds 45 °C Exhaust fan 1 switches off, when the steam bath temperature falls below 40 °C Exhaust fan 2 is additionally switched on when the steam bath temperature exceeds 47 °C Exhaust fan 2 switches off when the steam bath temperature falls below 40 °C When in "Auto" mode, the following mechanism controls the supply fans: • Switch on supply fans 1 and 2 as long as the actual steambath temperature has not yet reached the set value (Tactual<Tset) • Switch off supply fan 1 when the actual temperature has reached the (Tset + Supply fan1_Δ Temp.) value • Switch off supply fan 2 when the actual temperature has reached the (Tset + Supply fan2_Δ Temp.) value Example: Tset = 45°C, Supply fan 1_Δ Temp. = 4K, Supply fan 2_Δ Temp. = 2K Supply fans 1 and 2 switch on, as long as the steambath temperature is below 45 °C Supply fan 2 switches off when the steambath temperature has reached 47 °C Supply fan 1 switches off when the steambath temperature has reached 49 °C
Dropout delay	74	By assigning the "8" value to one of the relay contacts, a control signal for the delayed closing of a steam valve is made available for pressure reduction. The dropout delay is set with the "Humidification_off_delay" paramter. Factory default is 60 s.
Main contactor	75	The installed main contactors are labelled K1...K4. The operating cycles of the main contactor(s) are monitored and compared with the value specified by the manufacturer for the expected service life. When the stored value is reached, the message "Service_main_contactor" is generated. After the main contactor has been replaced, the status message must be deleted, for example using the →Main_contactor_K1_Reset = "1" parameter.
ELDB	77	Electrode steam humidifier.
HKDB	78	Heater steam humidifier.
SPA	80	Collective term for use of the unit as a steam bath and organic sauna
Stopping time	82	If the interlock (safety) system is opened, the respective supply and steam bath fans continue to run for the stopping time specified to assist in the drying of the steam bath.
Intensity	83	The intensity of the essence injection can be changed incrementally from 0... 10, where "0" switches off the respective essence.
Pause time	84	The time between two essence doses. Essence is only dosed when steam is also produced.

Continuation of glossary (4)

Term	[Index]	Explanation
Dosage time	85	The duration of an essence dose.
Virtual interlock (safety) system	86	If control via →*Communication interface [13]* was selected, software is used to place a logical switch in series with the hardware interlock (safety) system. This switch can be opened and closed via →*Software commands [12]*. If the hardware interlock (safety) system is closed and the switch is opened via software control command, steam production is stopped and the unit is placed in "Remote switch-off" status.
Supply voltage	89	The units are designed for connection to supply voltage ranges (e.g. 380 to 415 VAC in case of a 400 VAC unit, s. name plate)
Unit name	90	Here, "Plant 1" is entered by default. The entry in the field can be changed according to customer requirements using a HygroMatik service tool.
Weekly timer	91	The timer makes it possible to program 2 periods per day of the week, each defined by a start time and a end time. The temperature set value and an essence dose can be preset for each time period.
Temperature threshold value	92	If the specified threshold value has been reached, the relay which is intended for this purpose is energised. The assignment of this relay must be "256 = Message_Temp.-threshold_value".
Recording	93	The control can record 10 data sets internally on a rolling basis. Snapshots of the unit status are carried out at intervals of 10 s, which can be helpful for troubleshooting. When the storage space is filled, a new set of data overrides the oldest entry. The complete record can be saved to a USB stick with NTFS formatting.
Warning message	95	The electrodes (for the →*ELDB [77]*), the blow-down pump and the solenoid valves are items with limited service life due to wear and tear. They must be checked during maintenance works and replaced if required. To avoid unplanned maintenance requirements, alerts can be set up for the respective items, which are activated when a defined state of wear is reached. The criteria for the alerts to be triggered can be defined in three stages each through the sensitivity setting.
PI controller	96	Internal controller with control characteristics which contain a **P**roportional part and an **I**ntergal part. Both parts can be changed as parameters.
Digital input	97	Digital input on the mainboard and on the relay boards for switching functions. A logical meaning (e.g. timer start) is assigned to the digital input via the →*Digital_input_function [98]* parameter. The digital input must be wired on-site in accordance with its use, e.g. with a →*Pushbutton [106]* or a →*Switch (NO) [102]* against the 20 VDC on terminal 8 on the mainboard terminal strip ST08 or the terminal strip ST05 on the other available boards. When the 20 VDC voltage is applied (short-term via a →*Pushbutton [106]* or permanent via a →*Switch (NO) [102*]), as required in accordance with →*Digital_input_function [98]* parameter setting), the switching function is carried out.
Digital_input_function	98	Determines which function will be executed if the →*Digital input [97]* on the mainboard or one of the relay boards is loaded externally with level "1" (= 12 V).
Nominal power output	99	The steam output range given on the name plate derived from the allowable range of suply voltages
Power section	100	That part of the unit that makes the energy conversion from the curent supplied into steam output
Load shedding	101	Load shedding can be set up by assigning the →Function_digital_input [98] "Power limitation" to the →*Digital input [97]*. When the →*Digital input [97]* is then then connected to an →*Auxilliary voltage [105]* by means of a →*Switch (NO) [102]*, →*Max. steam output [43]* is reduced by the percentage set up in the "Δ power limitation" parameter. After withdrawel of the voltage normal operation is reestablished.
Switch (NO)	102	Electrical switch with **N**ormally **O**pen contacts
Steam_down_time_min.	103	Steam-down time between fillings is continously monitored. If the minimum steam-down time set falls below the value set up several times in a row, an indication exits that the cylinder water conductivity has risen to an extend non tolerable. For conductivity reduction, →*Dilution [23]* is triggered (only →*ELDB [77]*).
Slave_hysteresis	104	In order to avoid unnecessary frequent switching on and off of →*Slave [94]* units (as required by the output demand) or an oscillating tendency, switching is made with a hysteresis. Example: One Master controls one Slave. Switching on the slave without hysteresis would occur at 50% output demand, same situation for switching the slave off. With a 1% hysteresis, switching on the slave is at 51% output demand wheras switching off is at 49%. By this, instabiliy of the switch-off point is accomplished.
Pushbutton	106	Electrical switch the contacts of which remain closed as long as the pushbutton is pushed
Fully automatic deadleg flushing	107	For "fully automatic" →*Deadleg flushing [27]*, an additional relay must be implementes that allows for switching the intake solenoid valve even when the →*Interlock (safety) system [11]* is open. Control of this additional relay is either by the base relay on the mainboard or a coupling relay. The relay used for this function must have "68" as the assignment.

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	Technical specifications FlexLine Electrode											
Unit type	**FLE05**	**FLE10**	**FLE15**	**FLE20**	**FLE25**	**FLE30**	**FLE40**	**FLE50**	**FLE65**	**FLE80**	**FLE100**	**FLE130**
Steam output [kg/h]	4,8-5,2	9,5-10,4	14,3-15,6	19,0-20,8	24,0-26,0	28,5-31,2	38,2-41,7	48,0-52,0	62,0-67,5	76,2-83,4	95,4-104,2	124,0-135,0
Electrical supply[1] V/phases/Hz	380-415/3/N/50-60											
Power rating [kW]	3,6-3,9	7,1-7,8	10,8-11,7	14,3-15,6	18-19,5	21,4-23,4	28,6-31,2	35,9-39,2	46,3-50,6	2 x 28,6-31,2	2 x 35,9-39,2	2 x 46,3-50,6
Nominal current [A]	5,4	10,8	16,3	21,7	27,2	32,5	43,5	54,5	70,4	2 x 43,5	2 x 54,5	2 x 70,4
Circuit Protection [A][4]	3 x 10	3 x 16	3 x 40				3 x 50	3 x 63	3 x 80	2 x 3 x 50	2 x 3 x 63	2 x 3 x 80
Number of steam cylinder	1									2		
Control	TouchSPA											
Control voltage, internal	220-240/1/N/50-60Hz											
Control current: [A]	2,5											
Steam hose connection [mm]	1 x 40						1 x 40 with Y	2 x 40		2 x 40 with Y	4 x 40	
Condensate hose connection [mm]	1 x 12							2 x 12			4 x 12	
Height[6] [mm]	535		695		700	750		785		750	785	
Width[6] [mm]	540				415	580		640		1090	1170	
Depth[6] [mm]	320					355		420		355	420	
Water installation	Water / tap water (different qualities) 1 bis 10bar (100 x 10^3 bis 1000 x 10^3 Pa),with 3/4" connection for external thread											
Drain water connection	Connection Ø 1 1/4"										2x Connection Ø 1 1/4"	

[1] Other votages upon request.

[4] Multiply power input by 1.1 after full blow-down. Note overload capacity of automatic breakers. If necessary, select the next higher rating.

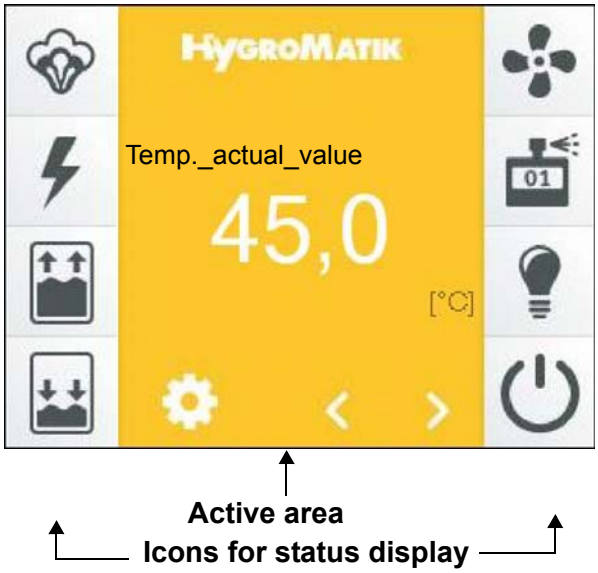
[6] Outer dimensions of width and depth. Hight incl.drain connection.

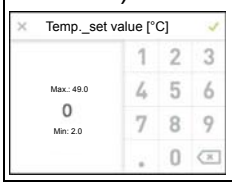
Technical specifications FlexLine Heater										
Unit type	**FLH03**	**FLH06**		**FLH09**	**FLH15**	**FLH25**	**FLH30**	**FLH40**	**FLH50**	**FLH80**	**FLH100**
Steam output [kg/h]	2,7-3,3	5,5-6,5		8,2-9,8	13,7-16,4	22,7-27,1	27,4-32,7	36,5-43,5	45,5-54,3	73,0-87,0	91,0-108,5
Electrical supply[1] V/phases/Hz	220-240/1/N/50-60	380-415/3/N/50-60									
Power rating [kW]	2,1-2,4	4,1-4,9		6,2-7,3	10,3-12,3	17,1-20,3	20,6-24,5	27,3-32,6	34,1-40,7	2 x 27,3-32,6	2 x 34,1-40,7
Nominal current [A]	9,4-10,2	18,7-20,4	10,7-11,7	16-17,5	15,6-17,1	25,9-28,3	31,2-34,1	41,5-45,4	51,8-56,6	2 x 41,5-45,4	2 x 51,8-56,6
Circuit Protection [A]	1 x 16	1 x 25	3 x 16	3 x 20		3 x 32	3 x 35	3 x 50	3 x 63	2 x 3 x 50	2 x 3 x 63
Number of steam cylinder	1									2	
Control	TouchSPA										
Control voltage, internal	220-240 V/1/N/50-60Hz										
Control current: [A]	2,5										
Steam hose connection [mm]	1 x 40						2 x 40			4 x 40	
Condensate hose connection [mm]	1 x 12						2 x 12			4 x 12	
Height[6] [mm]	535				695		785				
Width[6] [mm]	540						640			1170	
Depth[6] [mm]	320						420				
Water installation	Fully demineralized water / cleaned condensate / partially softened Water / tap water (different qualities) 1 bis 10bar (100 x 10^3 bis 1000 x 10^3 Pa),13mm Hose										
Drain water connection	Connection Ø 1 1/4"									2x Connection Ø 1 1/4"	

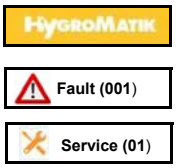
[1] Other voltages upon request.

[6] Outer dimensions of width and depth. Hight incl.drain connection.

Display



Active display area	Use
	**Main display** for operating values, navigation using the scroll icons. In the event of a fault or a service message, the HygroMatik logo changes to a display field which describes the fault or the service requirement.
	Scroll keys, used to display the following operating values: • Temp._actual value [°C] • **Temp._set value [°C]**, can be changed using the on-screen keyboard*) **after tapping on it**[1)] • Steam_actual_unit [kg/h] • Steam_output_max. [%] • Demand [%] • Control_signal_internal [%] • Output signal [V] • Current_actual_Cyl. 1[A] (only for electrode steam humidifier ELDB) • Current_actual_Cyl. 2 [A] (only for ELDB double cylinder units) • Water_level_cyl. [mm] (only for heater steam humidifier HKDB) • Water_level_cyl. 2 [mm] (only for HKDB double cylinder units) • Essence_selection1 (1... 4, if enabled) [1)] the display and option to change the temperature set value is not available with weekly timer operation; with the following exception: If "ECO" is selected for the steam generation, the temperature set value display is also available in the weekly timer operation.
*) 	On-screen keyboard for changing the Temp._set value; is displayed after tapping on the temperature set value display and is used for the direct input of the set value Confirm the input and save using the check mark in the top right, cancel using the "X" in the top left

Active display area	Use
	Icon to open set-up mode (via password prompt). Password "000" -> operating functions of user level (see Section 6.5) Password "010" -> operating functions of operator level (see Section 6.7)
	In the event of a fault or a service message, the relevant display field is shown instead of the HygroMatik logo. Tapping on it opens the unit info screen (see Section 6.9).
	Unit info screen (see Section 6.9) for the display of fault and service messages in plain text. Is displayed by touching the fault or service message.

Icon	Status	Meaning
	dark bright flashes	Steam generation active No steam generation Fault steam generation
	dark bright flashes	Main contactor switched Main contactor not switched Fault main contactor
	dark bright flashes	Filling active No filling Fault filling
	dark bright flashes	Blow-down active No blow-down Fault blow-down <u>Manual blow-down</u> A manual blow-down can be triggered by tapping on the icon. Touching the icon again stops the manual blow-down.
	dark bright	Fan active Fan not active
	dark bright	Essence active Essence not active
	dark bright	Light active Light not active
	dark flashes	Operating mode display Unit is in the initialisation phase

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