EMP-Control

for Electrode Steam Humidifiers

Operation Instructions

HygroMatik

**Humidification
L2 = 46,6 A**

Esc

CE DVE GS EMC

Service Life and Commissioning

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

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

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

The table in section 1.1 headed "Operating Instructions" shows our interpretation of normal to be between 200 and 500 µS/cm (Micro Siemens per Centimetres) at 15 °C.

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

In the HYGROMATIK electrode humidifier the preset blow-down parameters can easily be adjusted to the precise requirements of a particular area by a small change within the programme.
In addition, a plastic star can be inserted between the electrodes to reduce electrode wear. A Super Flush can also be installed in order to extend maintenance periods.

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

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

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

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EMP-Control for Electrode Steam Humidifiers

Operation Instructions

1. Introduction

Dear customer,

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

To be sure of operating your HYGROMATIK steam humidifier efficiently please read these Operation Instructions.

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

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

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1.1 Operating Instructions

The HYGROMATIK steam humidifier produces steam using normal tap water.

Be sure to use feed water with conductivity between 50 and 1200 µS/cm.

lower limit	area of low conductivity; adjustments recommended	normal tap water		area of high conductivity; adjustments recommended	upper limit
50	200	500	800		1200

allowable conductivity [µS/cm] of feed water at 15°C for HYGROAMTIK steam humidifiers

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

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

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

1.2 Typographic Distinctions

• Enumeration with preceding heading: General enumeration.

» Enumeration with preceding double chevron: Work or maintenance steps that must be followed sequentially.

☐ Sequential step to be checked.

1.3 Safety Notes

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

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

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

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

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

![hand] **Note:** Further explanation or cross-references to other sections of the text in this Operation Instructions.

2. EMP-Control

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

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

HYGROMATIK steam humidifiers process all standard control signals.

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

The EMP-control offers e.g.:

- Proportional or on/off control

- Backlit alphanumeric LC Display for reading and programming data

- Integrated PI-controller

- Option to connect proportional max-limiter

- Integrated interface RS282 or RS485 or bus system, available after customer specified choice.

- 4 additional signal lamps to indicate important operation information

- 4 potential free signals for remote indication

- Stand-by blow-down function to prevent stand-ing cylinder water. After a period without steam production the cylinder is drained completely. Can be programmed individually.

Performance and settings of the EMP-control are described in this manual in detail.

3. Controls

The HYGROMATIK control type EMP can be programmed for the following control modes. Parameter U6 has to be set according to chapter "Parameter Settings using Code".

EMP Control (U6)
1 Step control
Proportional control with external controller
Proportional control with integrated PI software controller
Proportional control with integrated PI software controller and floating max. limitation

The integrated software controller functions as a PI controller. An active humidity sensor must be connected.

A second humidity sensor must be attached when using the control mode "Integrated software controller and floating max. limitation". This humidity sensor must supply a 0 - 10 V DC signal.

The steam humidifier normally switches to stand-by when it receives a (control) signal lower than 20%, i.e., no steam is being produced. When a signal of more than 25% is received the humidifier switches back on.
For special control functions, the switch points can be altered by HYGROMATIK.

At the minimal signal of 20% the steam output is set to 10% of the maximum steam output. Below the minimum signal the humidifier switches off, as most of the produced steam would only condensate in the steam hose or cylinder. In this case steam would not reach its destination e.g. air duct.

Control characteristics:

Changes in Demand	Matching of Steam Output
Rising demand	Rise of steam production due to fresh water feed into steam cylinder
Reducing demand	Steam output increase gradually until new operating point (Steaming down)
Sudden reduced demand	After draining a part of cylinder water steam output increase gradually until new operating point

Safety Interlock:

Each humidifier is supplied with terminals 1 and 2. These terminals are provided to be connected to a safety chain e.g. a maximum hygrostat or if in one step controller mode - a hygrostat. Safety interlocks of the safety chain must close so that the system is clear to function.

All twin cylinder units are equipped with an interlock feature, i.e. both cylinders are cleared for operation simultaneously. If desired, each individual cylinder can be equipped with its own interlock system.

3.1 Limiting Steam Generation Output

The parameter **P1 Output Limitation** is used to adjust the steam output between 25 and 100% of the nominal steam output (refer also to chapter 8.4) The actual steam production is still a function of the control signal.
A steam output limitation can sometimes be useful for optimising unit control.

3.2 Safety Interlock

Floating interlock contacts of a safety chain, such as maximum hygrostat, flow control switch, pressure switch etc. are to be installed in series between terminals 1 and 2.

⚠️ **Attention:** The installation of a maximum hygrostat connected to the safety chain is essential to safely prevent too high a humidity level.

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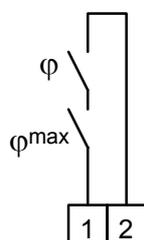
Terminal block

3.3 Mutual Safety Interlock of Humidifiers Operated in Parallel (optional)

It is possible to switch two humidifiers with one safety interlock. The first humidifier has to be equipped with an additional auxiliary relay and two terminals 18 and 19.

For the safety interlock connect terminals 18 and 19 of the first humidifier with terminals 1 and 2 of the second humidifier according to the following schematic. Wiring diagrams are available on request.
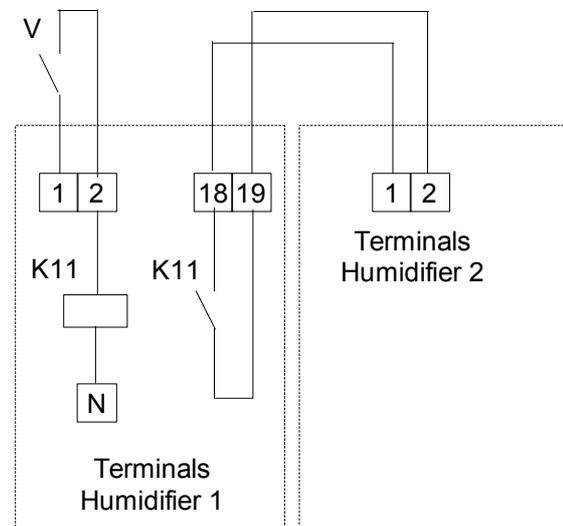
Optional: Mutual Safety Interlock of two humidifiers

3.4 Control

⚠️ **Attention:** The unit shall be controlled so that it will not operate the breaker more than 4 times per minute (this will otherwise lead to destruction of the breaker).

3.5 1 Step Control

The hygrostat should be installed in series with the terminals of the safety chain between 1 and 2.

Other floating interlock contacts of a safety chain, such as max. hygrostat are to be installed in series between terminals 1 and 2.

![HygroMatik logo]

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

φ

φ^{max}

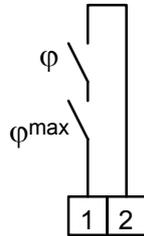| 1 | 2 |

Terminal block

3.6 Proportional Control with External Controller

The parameter E3 **Control signal** has to be set according to chapter 8.5 "Parameter Settings using Code" to match the humidifier to the control signal.

External Signals EMP (E3)*	
0(2) - 5 V DC	
Single cylinder units:	min. 0,1 mA
Twin cylinder units:	min. 0,2 mA
0(2) - 10 V DC	
Single cylinder units:	min. 0,2 mA
Twin cylinder units:	min. 0,4 mA
0(4) - 20 V DC	
Single cylinder units:	min. 0,3 mA
Twin cylinder units:	min. 0,6 mA
0(4) - 12 mA DC	
Single cylinder units:	min. 1,8 V
Twin cylinder units:	min. 3,6 V
0(4) - 20 mA DC	
Single cylinder units:	min. 3 V
Twin cylinder units:	min. 6 V
0 - 140 Ohm	
0 – 20 V DC Phase angle (Staefa)	

* external controller: controller signal
integrated software controller: active humidity sensor signal

The standard setting is 0(2)..10 VDC.

The humidifier switches off at 2 V and on at 2,5 V.

Parameter U6 **Control** must be programmed for use with external controller.

👉 **Note*:** If the control signal wires pick up stray induction signals from surrounding power cables the humidifier might operate erratically. It is therefore recommended to use shielded control

wiring with the shielding earthed at the controller.

Connect controller(s) to terminal block according to diagram:

Controller
(⊥) (y)
 -   +

| 1 | 2 | | 4 | 5 |
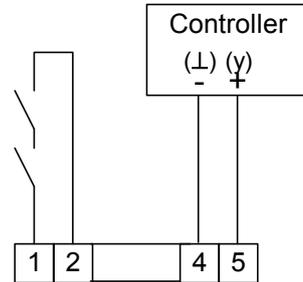
Terminal block

External control signal, single cylinder units
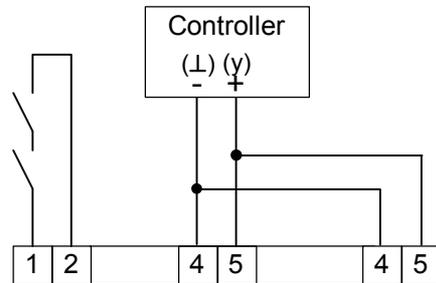
Controller
(⊥) (y)
 -   +

| 1 | 2 | | 4 | 5 | | 4 | 5 |

Terminal block

External control signal, double cylinder units - voltage output

Controller
(⊥) (y)
 -   +

| 1 | 2 | | 4 | 5 | | 4 | 5 |
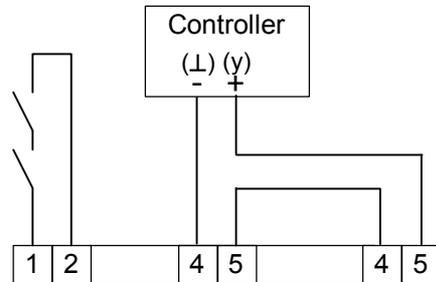
Terminal block

External control signal, double cylinder units - amperage output

Controller   Controller
(⊥) (y)   (⊥) (y)
 -   +   -   +

| 1 | 2 | | 4 | 5 | | 4 | 5 |
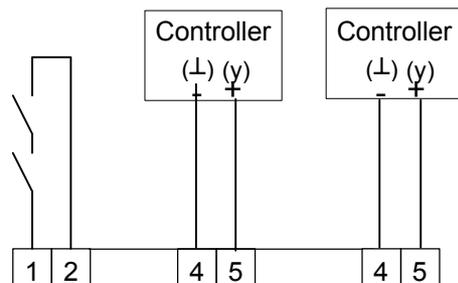
Terminal block

External control signal, double cylinder units - resistance output

3.7 Proportional Control with Integrated Controller

The optional HYGROMATIK active sensor for use with the internal controller has an output signal of 0 - 10 V DC. Connect active sensor to terminal block according to the following schematic:
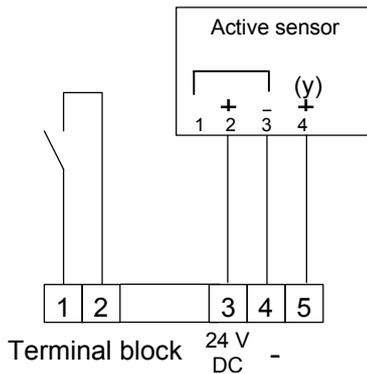
*Active sensor, single cylinder units -
voltage output signal.*
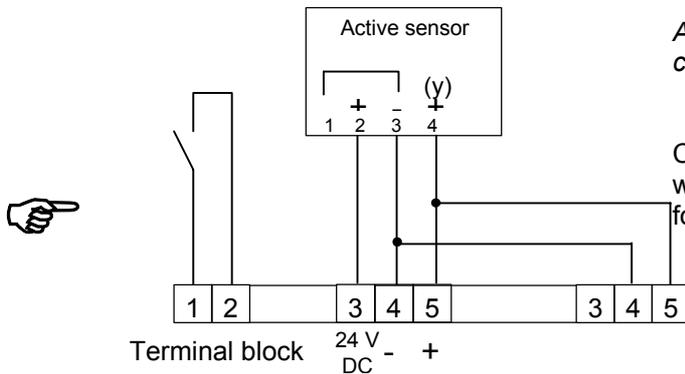
*Active sensor for twin cylinder units -
voltage output signal*

Note: Up to four single cylinder or two twin cylinder units can be accommodated by one active HYGROMATIK sensor.

In the case that other sensor signals should be used, then the parameter E3 **Control signal** must be adjusted accordingly. Parameter U6 **Control** must be programmed for an "Internal PI controller".

Controller Signals for active Sensor (E3)
0(2) - 5 V DC
0(2) - 10 V DC
0(4) - 20 V DC
0(2) - 12 mA DC
0(4) - 20 mA DC
0-140 Ohm
0 – 20 V DC (Phase angle, Staefa)

If the sensor has a current output signal then it is to be wired according to the following schematic:
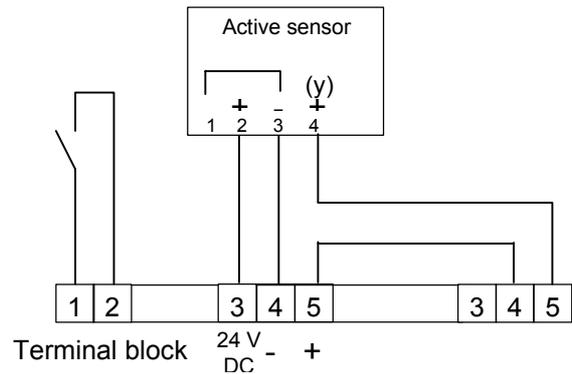
*Active sensor, Twin cylinder units -
current output signal*

Connect active sensor with 0-20 mA signal, two-wire system to terminal block according to the following schematic:
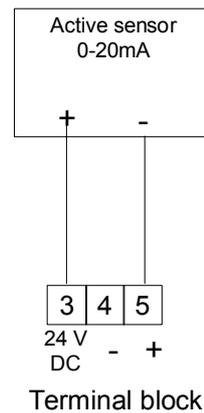
*Active sensor, single cylinder units -
current output signal, two-wire system*

Active sensor
0-20mA

+   -

| 1 | 2 | | 3 | 4 | 5 | | 3 | 4 | 5 |

24 V
DC -   +

Terminal block
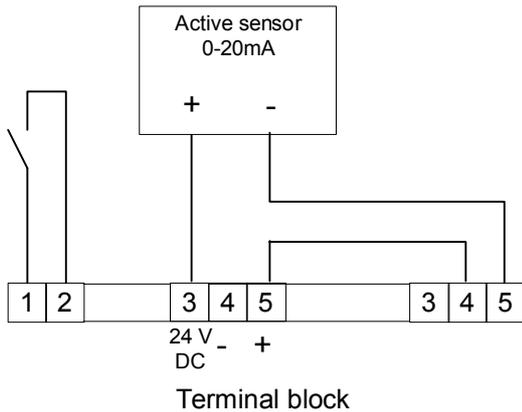
*Active sensor, double cylinder units -
current output signal, two-wire system*

☞   **Note:** If resistance sensors are to be used with twin cylinder units then two sensors are necessary.

3.8 Proportional Control with Integrated Controller and Floating Max. Limitation.

The active sensor and the floating max. limiter are to be wired up according to the following schematic:

Active Sensor	Active Sensor Max Limiter
(y)	(y)
+ - +	+ - +
1 2 3 4	1 2 3 4

| 1 | 2 | | 3 | 4 | 5 | | 6 | 7 | 8 |

24 V
DC -   24 V
DC -

Terminal Block
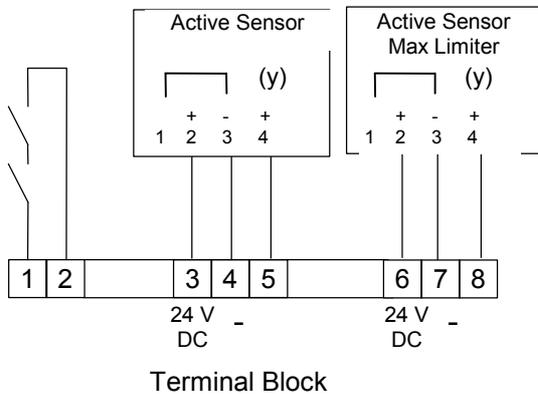
☞   **Note:** Please, pay attention to the following:

- Parameter E3 **Control signal** has to be set accordingly to chapter "Parameter Settings using Code" to match to the signal of the active humidity sensor.

- Parameter U6 **Control** has to be set to the control mode "Internal PI control with max.-limiter".

- The active humidity sensor connected to terminals 6 - 8 must supply a 0 - 10 V DC.

3.9   1 Step Control De-humidifier

A de-humidifier can be controlled in on-off control mode by using the potential free outputs (relay 2, relay 3). In this case parameter U6 **Control** must be programmed for the control mode "Internal PI controller" or "Internal PI controller with max-limiter". The change-over between humidification and de-humidification is determined by parameters P8 **Set point rel. Humidity** and E8 **Offset for de-humidification**. The hysteresis between humidification and de-humidification of 1% is fixed. Refer also to chapters 8.5 and 8.6.

E8

Humidification   De-humidification

Rel. humidity %RH

P8
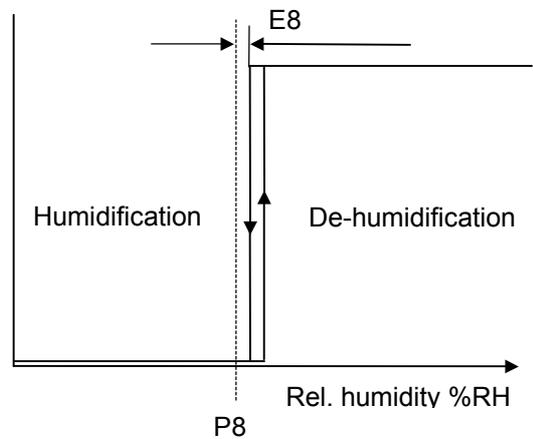
Example:
P8 Set point rel.-humidity =   50%
E8 Offset for de-humidification =   5%
Change-over humidification - de-humidification =
                          55% + 1% hysteresis

In this example de-humidification starts at 56% and goes off at 55%.

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4. Potential free Signal Outputs

The maximum contact load is 250V/8A.

Relay / Contact	Terminals	Description
Main contactor*	Contacts main contactor	Humidification
Relay 1 NC NO	28,29,30 29 30	Collective Fault: − Blow-down Fault − Fault Filling − Fault Main Contactor − Service
Relay 2 NC NO	31,32,33 32 33	Free programmable Parameter E5
Relay 3 NC NO	34,35,36 35 36	Free programmable Parameter E6

* Units without neutral wiring are not normally supplied with this message facility. The message is, however, available via relays 2 or 3.

Steam Humidifier Type	Execution
HyLine	28-36 terminals in the unit
CompactLine	28-30 terminals in the unit 31-36 terminals on the pcb
MiniSteam	28-30 terminals in the unit 31-36 terminals on the pcb

For programming see chapter 8.5 "Parameter Settings using Code".

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5. Commissioning

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

Switch Off Steam Humidifier

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

» Switch off the control switch located on unit cover.

» Close the fresh water tap.

Switch steam humidifier on:

» Open fresh water tap.

» Switch on control switch located on unit cover.

The following functions are shown:

• Display shows :

> Hygromatik ®
> EMP Vers x.y

• Unit self tests

> Self Test
> LED's On

• The LED's located in the cowling must light up.

• The pump will run for a couple of seconds (to check pump function and partial water exchange when re-activating system).

> Self Test
> Part. Blow-down

• Depending on the signal from the controller or the hygrostat, the unit function and the present electrical current will be displayed e.g.,

> Heating Up
> L2 = 2.3 A

• Inlet solenoid valve opens and introduces water into the cylinder.

• As soon as the electrodes are immersed the current rises from 0 A to nominal (refer also to parameter L2, chapter 8.2). Nominal current is indicated on the unit name plate. Note also the steam output limitation value (see also chapter 8.2). Factory adjustment of the output limitation is 100%.

• When nominal current is reached, cylinder filling is stopped.

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

> Humidification
> L2 = 10.4 A

☞ **Note:** Normally the display shows the humidifier operational mode and a readout value. Normally the momentary current value is displayed. Other standard readout values can be programmed (see chapter 8.2).

Further checking :

☐ All electrical functions must be in order

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

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

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

» Repair leaks.

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

6. Operation

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

Put the unit into operation as follows:

» Turn on water supply.

» Switch on the control switch on unit cowling.

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

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7. EMP-Control

Twin Cylinder units have two displays. The top display is for the left cylinder and the bottom one for the right.

7.1 EMP Display and Operating Panel

EMP display and operating panel for local communication with the humidifier

The LC display is a two line alphanumeric backlit type.

The first line displays the operational mode of the humidifier **Heating Up, Humidification, Stand By, No Demand**, **Filling, Blow-down, Deconcentration** or **Stand-by Blow-down**. The second line shows a parameter (L-Parameter) or a sub menu point.

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

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

If the red LED lights permanently it means that the service interval is overdue or the cylinder is filled with water up to the sensor electrode „Cylinder full". In this case the humidifier is still in service and the display shows the momentary operational mode.
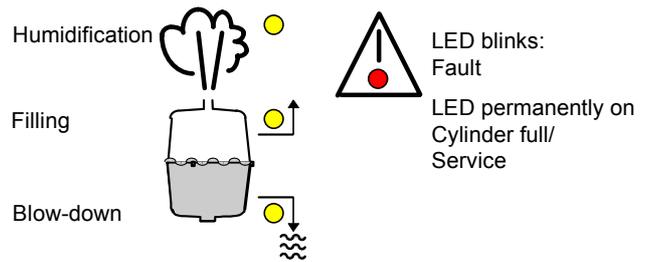
Other information and functions can be called up by the panel keys.

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

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

7.2 Operational Conditions

The display shows the following operational conditions:

Heating Up/Humidification
The steam humidifier produces steam when there is a demand from the hygrostat or the controller (safety chain must be closed).
After a cold start or a full blow-down the **Heating Up** message is displayed for a short time. **Humidification** is displayed only after the first cylinder filling phase.

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Stand By
Safety chain is open. No steam is generated.

No Demand
The controller demand lies below the humidifier switch point. No steam is generated.

Filling
Inlet solenoid valve is activated and water is introduced into the cylinder.

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

Full Blow-down
Depending on the water quality of the water the cylinder will be drained completely every 3 - 8 days.

Blow-down Over-current
When starting from cold the current is allowed to rise to 125% of nominal in order to reach a quick-start characteristic. At this current level an over-current blow-down is activated and causes a partial blow-down process.

Deconcentration
The de-concentration message is displayed when an additional partial blow-down is required. This is the case when, for instance, there is high conductivity, a highly fluctuating controller signal or a blocked drain.

Manual Drain
By pressing [↑] and [↓] simultaneously the water is drained manually.

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

7.3 Fault Messages

☞ **Note:** Refer also to chapter 10 "Faults".

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

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

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

Fault Messages
Blow-down Fault
Fault Filling
Fault Contactor
Fault Humidity Sensor (Fault RH Sensor) *
Service

*   available from software-version 5.0

Blow-down Fault
The EMP-control periodically activates the pump to maintain a constant water conductivity in the cylinder.
If during a blow-down process no or too little water is drained, the control reports a **Blow-down Fault.**

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

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

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

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8. EMP-Menu

8.1 Menu

* only if internal software controller is activated !
** only if internal software controller with
   max.-   limiter is activated!
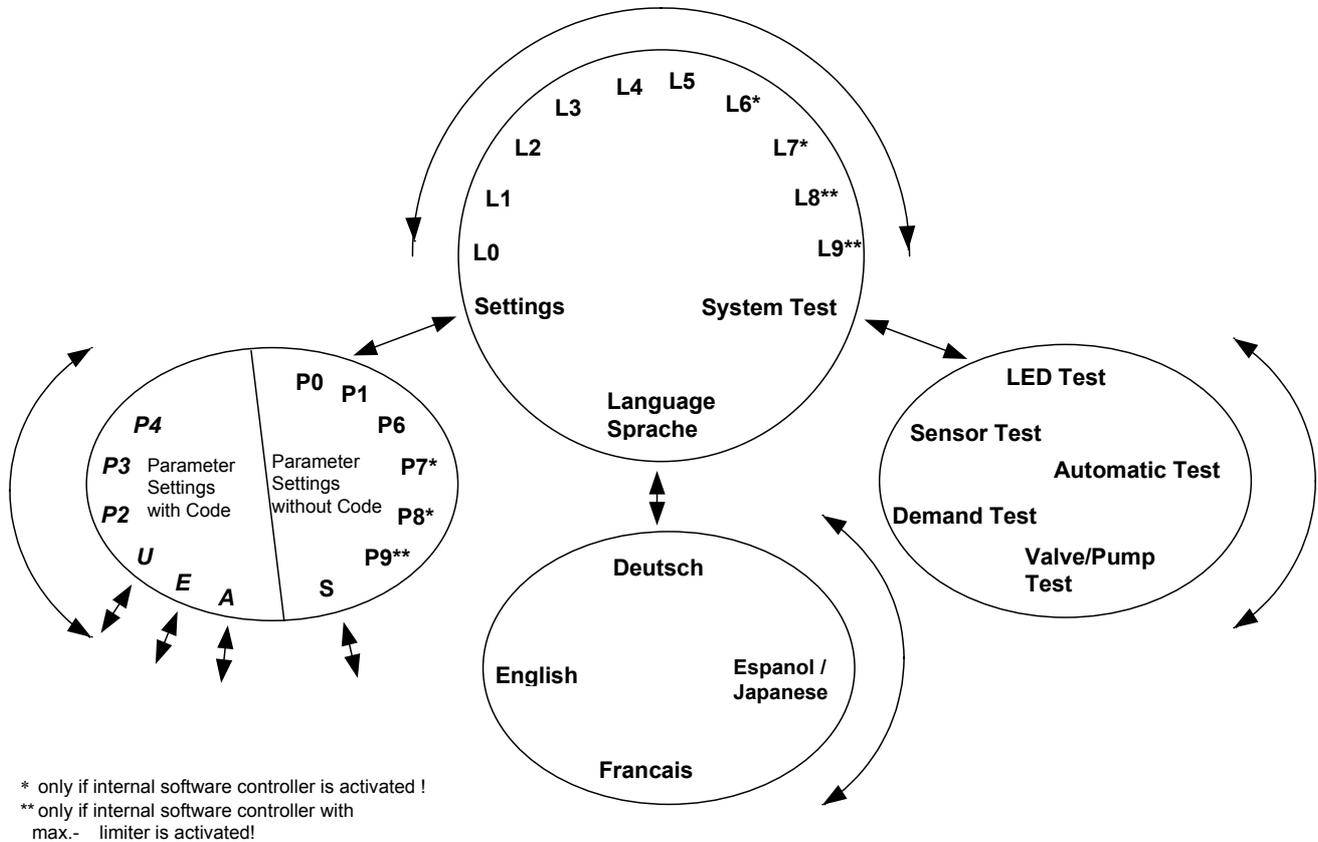
8.2 Readouts

By using ↑ or ↓ the following readouts (L)
are shown:

Readouts	
L0	Total steam [10³ kg]
L1	Steam per hour [kg/h]
L2	Mom. Current [A]
L3	Internal signal [%max. output]
L4	Demand [%]
L5	Output limitation [%max. output]
L6*	Set point rel. humidity [%RH]
L7*	Actual rel. humidity [%RH]
L8**	Set point rel. max. humidity [%RH]
L9**	Actual rel. max. humidity [%RH]

*   only if software controller is activated !

** only if software controller with max-limiter is
    activated !

After the readouts L5, L7 or L9 the sub menu
points *System Test*, *Settings* and *Language /
Sprache* are displayed.

☞ **Note:** Normally the humidifier operating
mode and a readout value will be
displayed. The readout value is selected
as follows:

Example: The actual relative humidity (L7) should
be displayed.

» Use ↑ or ↓ to select the actual relative
humidity value.

> Humidification
> L7 = 62%RH

» Use ↵ to confirm the selection.

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8.3 Control Name Plate

The display can show 6 different sets of unit data.

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

» Select sub menu **Settings** using [↑] or [↓] and confirm using [↵] .

» Using [↓] to select letter **S**.
Cursor is under letter **S**.

Parameter Set
* * * <u>S</u> *

» press [↵] .

» Call up information using [↑] or [↓] . Display then shows, for example:

Nominal Capacity
S2 = 45 kg/h

» Escape S-Parameter using [Esc] .

8.4 Parameter Settings without using Code

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

Parameter	Description
P0	Code input
P1	Output limitation [%]
P6	Hours run meter (only readable) [days:hours]
P7*	Sensor damping On Off
P8*	Set point rel. humidity [%RH]
P9**	Set point max. rel. humidity[%RH]

* only if internal software controller is activated !

** only if internal software with max-limiter is activated !

Example: The relative humidity set value should be changed from 50 %RH. to 70 %RH.

⚠ **Attention:** The internal software controller must be activated (Parameter U6).

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

» Select sub menu **Settings** using [↑] or [↓] and confirm selection with [↵] .

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

Settings
P8 = 050 %

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

Settings
P8 = <u>0</u>50 %

» Press [↵] once. Cursor appears under second figure.

Settings
P8 = 0<u>5</u>0 %

» Press [↑] twice.

Settings
P8 = 0<u>7</u>0 %

» Press [↵] twice. Cursor disappears from display.

Settings
P8 = 070 %

The relative humidity setpoint is now set at 70%RH.

Other values to be set in the same fashion as described above.

If the parameters are to be **changed permanently** this must be confirmed with the code **(P0) = 015** by leaving the Settings program level:

» Escape sub menu *Settings* using [Esc] .

> **Code input**
> **P0 = >***<**

»Confirm parameter with [⏎]. Cursor appears under 1st digit.**.**

> **Code input**
> **P0 = >0̲00<**

»Press [⏎] once. Cursor appears under 2nd. digit.

> **Code input**
> **P0 = >0̲0̲0<**

»Press [↑] once.

> **Code input**
> **P0 = >01̲0<**

»Press [⏎] once. Cursor appears under 3rd digit.

> **Code input**
> **P0 = >010̲<**

»Press [↑] five times.

> **Code input**
> **P0 = >015̲<**

»Press [⏎] once. Following correct code input, display shows first "safed" than sub-menu **Settings** again.

> **Code input**
> **Saved**

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

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8.5 Parameter Changes with Code

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

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

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

»select sub menu **Settings** [↓] [↑] with and confirm with [↵] .

»select with [↓] [↑] parameter (P0) .

»confirm with [↵]. Cursor appears under first digit.

Code input
P0 = >***<

»press [↵] once. Cursor appears under 2nd digit.

Code input
P0 = >0̲00<

»press [↑] once.

Codeeingabe
P0 = >00̲0<

»press [↵] twice. Display shows following after correct code input:

Code input
P0 = >01̲0<

»select parameter **U** with [↓] [↑] till cursor appears under **U**. Display shows:

Parameter
P1 = 100%

»confirm parameter with [↵] . Display shows:

Parameter Set
* A * U̲ S E

»press [↓] once.

Pump without K1
U5 = off

»confirm parameter with [↵]. Cursor appears under 1st letter:

Operation mode
U6 = ON/OFF Cont.

» select required Operation mode with

Operation mode
U6 = O̲N/OFF Cont.

[↓] [↑] .Display shows:

Operation mode **U6 = <u>i</u>nt. PI-Control**	»confirm parameter with ⏎. Display shows:
Operation mode **U6= int. PI-Control**	»exit sub-menü **Settings** with 2x <kbd>Esc</kbd> Display shows code input request:
Code input **P0 = >***<**	»Confirm parameter with ⏎ . Cursor appears under 1st digit.
Code input **P0 = ><u>0</u>00<**	»Press ⏎ once. Cursor appears under 2nd. digit.
Code input **P0 = >0<u>0</u>0<**	»Press ↑ once.
Code input **P0 = >0<u>1</u>0<**	»Press ⏎ once. Cursor appears under 3rd digit.
Code input **P0 = >01<u>0</u><**	»Press ↑ five times.
Code input **P0 = >01<u>5</u><**	»Press ⏎ once. Following correct code input, display shows first "safed" than sub-menu **Settings** again.
Code input **Saved**	

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

The access to the following parameters is protected by the code **P0 = 10** (extended customer level):

Parameter	Description
P2	Amount of steam service interval [10³ kg/h]
P3	Reset service interval No/ Yes
P4 [1)	Offset humidity sensor [0%-100%]
A4	Stand-by Blow-down [h]
E1*	Gain PI-controller [Xp = 0 - 100%]
E2*	Integration time PI-controller [Tn = 0 - 255 sec]
E3	Control signal 0(2)-5 V DC / 0(2)-10 V DC 0(4)-20 V DC / 0(4)-12 mA DC 0(4)-20 mA DC / 0-140 Ohm 0-20 V phase-angle (Staefa)
E4*	Calibration sensor [-15 - +15%]
E5	Report relay 2 Humidification Service Blow-down fault Service Interval expired Fault filling No Demand Set point rel. humidity exceeded * (Display: > Humidity) Dehumidification System fault Fault data transfer
E6	Report relay 3 Choice as parameter E5
E7	Baud rate interface 9600 / 4800 / 2400 / 1200
E8*	Offset for dehumidification (P8) [-2 - +15%]
E9**	Gain max. limiter [Xp = 0 - 100%]
U5	Pumping with mains disconnected On (Main contactor switch off) Off (Main contactor switch on)
U6	Control On/Off control External control Internal PI control Internal PI control with max. limiter

* only if internal software controller is activated or **
** only if internal software controller with max.-limiter is activated !
1) parameter available from software-version 5.0

8.6 Parameter Descriptions

Amount of Steam Service Interval (P2)
The EMP controller constantly monitors the actual amount of produced steam. This data is compared to parameter **P2 Amount of Steam Service Interval.** When the humidifier has produced the set amount of steam the red LED on the control panel lights up permanently.
The maintenance frequency is largely dependent upon the water quality (conductivity, water hardness) as well as the amount of generated steam. Using parameter P2, the maintenance interval can be adjusted to suit the water quality.

Reset Service Interval (P3)
Following a service, the service interval is reset as follows (red LED still on):

» Select sub menu *Settings* using [↑] or [↓] and confirm using [↵] .

» Select Parameter **P0** with [↑] or [↓] .

> Code
> P0 = > * * * <

» Confirm selection with [↵] . Cursor appears under first figure.

> Code
> P0 = >000<

» Press [↵] once. Cursor appears under second figure.

> Code
> P0 = >000<

» Press   once.

> Code
> P0 = >010<

» Press [↵] twice. Cursor disappears from Display.

> Settings
> P1 = 100%

» Select parameter **P3** using [↑] or [↓] . Display shows:

> Reset Service
> P3 = No

![HygroMatik logo]

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

```
Reset Service
P3 = No
```

» Press ↓ once.

```
Reset Service
P3 = Yes
```

» Confirm using ⏎ . The red LED is off.

```
Reset Service
P3 = No
```

If the parameters are to be **changed permanently** this must be confirmed with the code **(P0) = 015** by leaving the Settings program level:

» Escape sub menu **Settings** using Esc .

```
Code input
P0 = >***<
```

» Confirm parameter with ⏎ cursor appears under 1st digit.

```
Code input
P0 = >000<
```

» Press ⏎ once. Cursor appears under 2nd digit.

```
Code input
P0 = >000<
```

» Press ↑ once.

```
Code input
P0 = >010<
```

» Press ⏎ once. Cursor appears under 3rd digit.

```
Code input
P0 = >010<
```

» Press ↑ five times.

```
Code input
P0 = >015<
```

» Press ⏎ once. Following correct code input, display shows first "safed" than the mainmenu again.

Offset Humidity Sensor (P4)
Standard humidity sensors interpret 0 V, 0 mA and 0 Ohm signals as a relative humidity of 0% RH. With a humidity sensor, with e.g. a 4-20 mA input signal, the "Offset Humidity Sensor" parameter (P4) has to be set to 20%. The EMP-control can now correctly interpret a 4 mA-signal as 0% RH. (This parameter is available from software-version 5.0.)
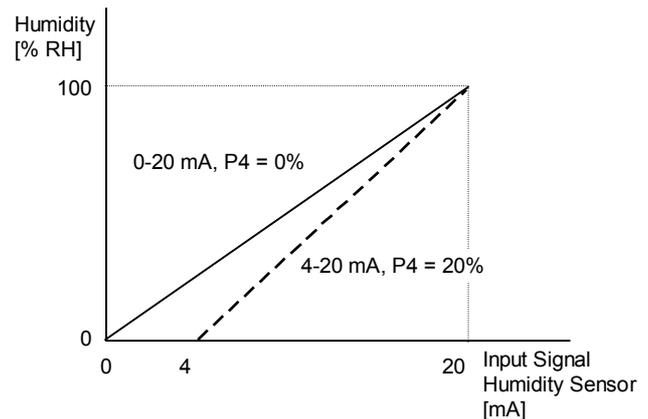
Sensor Damping (P7)
This parameter influences the internal software controller reaction characteristics. The „Sensor damping on" mode activates a delay component. This is a useful feature when a not delayed capacitor type humidity sensor is connected to the unit.

Stand-by Blow-down (A4)
If the controller or the hygrostat demands no steam from the system for a considerable time, then it is advisable to drain the cylinder water. The parameter **A4 Stand-by Blow-down** programs the time interval after which an automatic full blow-down is done. Water is introduced into the cylinder only following a new demand for steam.

Calibration Sensor (E4)
This parameter allows the calibration of the active humidity sensor connected to terminals 3 – 5 in a range from –15% RH to +15% RH.

EMP-Control

Potential free Signal Outputs (E5/E6)
Different humidifier operational reports may be signalled by three built in relays and their potential free contacts. Refer also to chapter 4.

The contacts are suitable for up to 250Volt/8A.

The first set of contacts is permanently reserved for the collective fault signal. The other two can be programmed by parameters E5 and E6.

The two programmable outputs may also be used to control a de-humidifier in on-off mode. P8 is then governing the humidity set point.

Offset for Dehumidification (E8)
The change-over between humidification and de-humidification is controlled by parameter E8. E8 adds a dead-band to the set point P8. Standard setting is +5%. Refer also to chapter 3.7 "1 Step Control De-humidifier".

Pumping with Mains Disconnected (U5)
This parameter determines the main contactor position during the blow-down process. In the "Pumping with Mains Disconnected" mode the electrodes are disconnected from the power supply (main contactor is switched off). This can be useful when the mains power is protected by a fault-current circuit breaker.

8.7 Language/Sprache

This menu is used to select the desired system language.

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

» Select sub menu *Language/Sprache* using [↑] or [↓] and confirm with [↵] .

» Display shows:

> Language/Sprache
> English

» Select desired language using [↑] or [↓] and confirm using [↵] .

» Escape sub menu *Language/Sprache* with [Esc] .

8.8 System Test

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

The following test routines are available:

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

» Select sub menu *System Test* using [↑] or [↓] and confirm using [↵] .

» The display shows:

> System Test
> LED-Test

» Select desired tests with [↑] or [↓] and confirm using [↵] . The test will be carried out as selected.

» Escape sub menu *System Test* with [Esc] .

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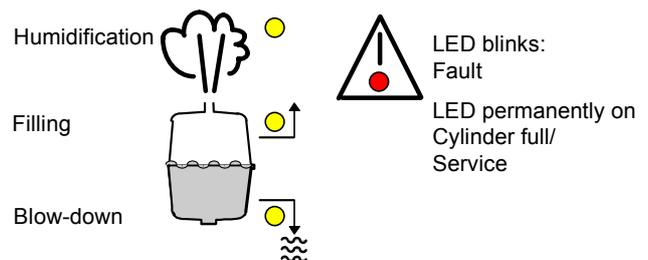
Example: LED **Humidification** is activated.

> LED Test
> LED Humidificat.

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

Sensor Test
This tests the connected signals. It is not necessary in 1 Step controller mode.

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

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

☞ **Note:** When the humidifier operates in control mode "Internal PI controller with max. limitation" (Parameter U6) the control sensor and the max.-limiter sensor are tested one after another.

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

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

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

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

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

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

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

9. Interface (Optional)

The EMP Control can be equipped with an RS232 or RS485 interface.

RS232:
The serial interface with Sub D9 plug transfers all system conditions and operational data.

- Operational parameters can be entered and altered via this interface.

- The unit can be switched on or off in remote mode.

Socket	Sub D9
Pin allocation	2 TxD
	3 RxD
	5 Gnd

☞ **Note**: Please contact HYGROMATIK for the correct syntax for these commands.

RS485:
The optional interface RS485 is equivalent to the American EIA standard. Data transfer is preferred using twisted pair cable.

The RS485 hardware accommodates a connection to a field bus system (e.g. Profibus, Bitbus, EIB,...)

☞ **Note:** Interface software is to be provided by the customer.

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10. Faults

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

Fault	Causes	Measures
Service The red LED is flashing. The unit is switched off in case it senses a period of one hour's operation in the „Cylinder full" condition.	• Cylinder is full of scale, which limits the active immersion depth of the electrodes.	Clean cylinder.
	• Electrodes are worn.	Replace electrodes.
	• One phase is missing (external safety fuse is defect).	Replace safety fuses.
	• Phase L3 has not been passed through the current transducer on the pcb.	Pass phase L3 through the current transducer.
	• Cylinder is filled up to the maximum water level electrode without the nominal current or nominal steam output being reached.	Check water quality (conductivity, carbonate and total hardness) and contact HYGROMATIK.
Blow-down Fault Unit is automatically switched off after one hour. Red LED is flashing.	• Cylinder outlet, blow-down pump and/or draining system are blocked by scale preventing operation.	Clean cylinder outlet, blow-down pump and/or draining system.
	• Blow-down pump is not receiving electrical power.	Check cable connections. Check whether relay on the pcb operates (clicks).
	• Blow-down pump is defective	Change blow-down pump.
	• Solenoid valve has not fully closed. Water level in the steam cylinder is only decreasing very slowly, although the pump is running.	Check solenoid valve.
Filling Fault Unit is automatically switched off after one hour. Red LED is flashing.	• Water shut-off valve is not open.	Open shut-off valve.
	• Solenoid valve or water supply pipe is blocked.	Clean or exchange solenoid valve. Flush water supply pipe, if necessary
	• Solenoid valve is not receiving electrical power.	Check cable connection.
	• Coil is defective.	Measure the coil and exchange solenoid valve if necessary.
	• Water is being drained permanently from the outlet. Pump is not operating.	
	– Steam hose installed sags.	Remove blockage in steam hose. See chapter "Installation Examples"*.
	– Pressure in duct too high. – (Maximum duct pressure 1200 Pa)	Lengthen drain hose. Contact HYGROMATIK if necessary.

Fault	Causes	Measures
Main Contactor Fault Unit is automatically switched off after one hour. Red LED is flashing.	• Main contactor is defective. • Sticking relays on main board.	Change main contactor. Change main board
Fault RH Sensor (Fault Humidity Sensor) Unit is automatically switched off after one hour. Red LED is flashing. (from software-version 5.0)	• Humidity sensor or connection cable defective.	Check humidity sensor and connection cable. Exchange if necessary.
Cylinder Full The red LED is on. The unit is operating.	• Cylinder is filled up to the maximum water level sensor without the rated current or rated steam output being reached. This may happen when: - starting from cold, - restarting after a full blow-down - water conductivity is low or subject to considerable fluctuation • Unit has to be maintained. • Service interval has been exceeded.	As a result of continuing vaporisation gradually increasing the water conductivity, the signal is cancelled after a prolonged operating period and the rated output is restored automatically. Check water quality (conductivity, carbonate and total hardness) and contact HYGROMATIK. Maintain humidifier. See also fault **Service**. Maintain or check steam humidifier. Service interval is reset by parameter P3. Using parameter P2, the maintenance interval can be adjusted to suit water quality.
No steam produced. Display shows **Stand By.** **Note:** Running "Sensor Test" and "Demand Test" give additional pointers for possible cause of fault. See chapter „System Test".	• If the humidity exceeds the value set on the hygrostat or controller there is no demand for steam. • If a proportional controller is fitted the humidifier cannot start if there is a mismatch of set and actual controller signal. • The safety interlock system has been triggered. • If a proportional controller is fitted, but there is no safety system, the absence of a bridge between terminals 1 and 2 prevents the humidifier from starting.	Check the setting and if necessary operation of the sensor and controller. Check parameters "E3" and "U6". See also chapter "Parameter Settings with Code" in this manual. Look for failing function and remedy. Insert a bridge between the terminals 1 and 2 on the terminal block.
No steam produced Display shows: **No Demand**	• The humidifier switches off at a (controller)signal below 20 % and on again at 25 %. The demand is too low. • Incorrect control signal levels	Increase set value, if necessary. Check parameters "E3" and "U6". See also chapter "Parameter Settings with using Code".

Fault	Causes	Measures
No steam production, although the unit is switched on. The Display is dark.	• The control fuse F1 1.6 A is defective.	Check and exchange fuse if necessary. See also chapter "Wiring Diagrams" in this manual.
	• Phase L1 is missing (external safety fuse is defective).	Replace external safety fuse. Check for the reason that caused the fuse to blow.
	• The EMP-control is defective.	Exchange EMP-control.
	The optional interface is not correctly plugged into the EMP-control.	Ensure that the interface is correctly plugged into the EMP-control. Regard the notes "Front" and "Back".
Humidity level too low	• Steam output limiting function of the unit is preventing full output.	Check parameter P1 "Output limitation". See chapter "Parameter Settings without using Code".
	• Steam humidifier operates in the "Cylinder full" condition.	See fault **Service**.
	• Despite full output being attained the humidity cannot be achieved due to incorrect output parameters.	Check steam output data.
	• If one phase is missing the desired output is reduced.	Check if one phase is missing.
	• A long steam hose passing through cold and draughty rooms can lead to increased condensation levels.	Reposition humidifier, insulate hose.
	• Incorrect installation of steam distributors can lead to condensation in the air duct.	Check system layout and installation.
	• A control signal mismatch leads to incorrect and possibly low steam outputs	Check the control signal and parameter "E3". See chapter "Parameter Settings with Code".
Humidity level too high	• Steam output limitation set too high can lead to poor control characteristics and even cause condensation in ducts.	Check parameter P1 "Output limitation". See chapter "Parameter Settings without using Code".
	• Controller parameters set incorrectly can lead to poor control characteristics and even cause condensation in ducts.	Check parameters "E3" and "U6". See also chapter "Parameter Settings with Code".
Cylinder is completely drained after a blow-down although the pump has stopped.	• Vent pipe in the drain hose is blocked.	Clean or replace vent pipe. See chapter "Function" * pos. 3.
The blow-down pump is operating but no water is being drained	• Cylinder outlet is blocked.	Clean cylinder outlet.

Fault	Causes	Measures
Water collecting on base plate of the steam humidifier	● The cylinder was reassembled incorrectly after maintenance: − O-ring seal damaged or not replaced. − The flange itself is damaged. − Scale has collected in the flange.	Look for faults and eliminate. Re-assemble cylinder as described in chapter "Cleaning Steam Cylinder" *.
	● Cylinder is incorrectly inserted into the base.	Insert the cylinder correctly with a new o-ring in the cylinder base.
	● Discharged water cannot flow freely.	Insure proper draining. See chapter "Water Discharge" *.
Water leaks from the top part of the cylinder	● Hose clamps for the steam and condensate hose are not tightened	Tighten clamps.
	● Electrodes are improperly secured.	Tighten hand nuts.
	● Adapter for the steam hose has not been fitted correctly or the o-ring was not exchanged during maintenance.	Fit or exchange o-ring. See chapter "Cleaning Steam Cylinder" *.
	● If the condensate is not being returned to the cylinder then a condensate sealing cap is used.	Insure that condensate sealing cap is fitted..
	● Main contactor does not operate (No "Cylinder full" signal)	Replace main contactor.
Intermitted electrical Malfunction	● External sources of electrical interference.	Switch off control switch and after a short time switch on again.
No steam from steam distributor Water is being drained from the outlet. Pump is not operating.	● Steam hose installed sags. ● Pressure in duct too high (Maximum duct pressure: 1200 Pa)	Remove blockage in steam hose. See chapter "Installation Examples"*. Lengthen drain hoses. Please contact HYGROMATIK, if necessary.
Uneven electrode wear	Electrode has not been supplied with power.	
	● Fuses have been triggered.	Check main fuses. Replace if necessary.
	● Main contactor is defective.	Check main contactor and exchange if necessary.
	● Phases are not symmetrically loaded.	Check power supply. (Measure phase difference)
	● Immersion depth of electrodes uneven. Unit has not been installed in a level position.	Install humidifier in level position.

Fault	Causes	Measures
Attention: Electrical arcing/flashes in the cylinder ⚠	Electrical arcing/flashes in the cylinder indicates that the conductivity of the water is too high or the cylinder is not being drained frequently enough. In this case please contact HYGROMATIK.	Switch unit off immediately, the unit could be damaged. Inspect steam cylinder: - Exchange electrodes. - Clean steam cylinder - Check water quality (conductivity). See chapter 1.1 Increase pumping time.
	• Blow-down pump is operating incorrectly.	Check function of blow-down pump. Exchange blow-down pump if necessary See: **Blow-down Fault**.

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

11. EMP-Control Description

Control EMP

B3	Current transducer
2	Supply solenoid valve and main contactor
3-5	Input signal for external controller or active sensor signal
6-7	Input sensor electrode
9	Output main contactor
10	Output blow-down pump
11	Output solenoid valve
15-16	Power supply
16	Supply blow-down pump
28-30	Collective fault
31-33	Potential free output (free programmable)
34-36	Potential free output (free programmable)
43-45	Input for max.-limiter, input signal 0 - 10 V DC

Steam Humidifer

B1	Sensor electrode
F1	Controller fuse 1,6 A
K1	Main contactor
L1-L3	Main terminals
M1	Blow-down pump
M2	Motor Fan (only MiniSteam)
S1	Control switch ON/OFF
Y1	Solenoid Valve
Y2	SUPER FLUSH (optional)
X1	Connector strip
1-2	Terminals for hygrostat and safety interlock
3-5	Terminals for proportional control signal
6-8*	Terminals for max.-limiter, input signal 0 - 10 V DC
28-30	Terminals for Collective fault
31-33*	Terminals Potential free output (free programmable)
34-36*	Terminals Potential free output (free programmable)
*	only steam humidifer type HyLine

12. Connections EMP-Control

Wiring diagram labels (transcribed):

Column header: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

X1 L1 L1 L2 L3 N PE

K1 1 3 5 13 / 2 4 6 14   Betriebsmeldung operation

F1 1,6A   S1

Sicherheitskette interlock system   X1 1 2

sensor : 24V - +Y 24V - +Y
ext. control: - +Y

6-8 nur in/only in HY

potentialfreie Kontakte
potential free contacts
(31-36 nur in/only in HY)
Frei (E5) Frei (E6)
free (E5) free (E6)

X1 3 4 5 6 7 8 28 29 30 31 32 33 34 35 36

L1 L2 L3 B1

HY1-2 C6-17 MS5-10

L1 L2 L3 L1 L2 L3 B1   B3

HY3-5 C30-58

OPTION Y2: M2 nur bei/
SUPER FLUSH   only for MS

Y1 M1 Y2 K1 M2

6 ST3 7   16 15   ST1 11 10 9 2   5 4 3 45 44 43 ST2

B3

EMP Elektronik/electronic

28 29 30 31 32 33 34 35 36

a	Freigabe	17.11.97	Kral	Datum	17.11.97	(Benennung)	(Zeichnung Nr.)	HYGROMATIK	Telefax	Phone
b	Bez. C58	12.07.99	Kordi	Bearb.	Kral	HY1-5 C6-58 MS5-10	S971912	Lise-Meitner-Str. 3	+49-(0)4193 / 895 - 33	+49-(0)4193 / 895 - 0
				Gepr.	17.11.97	mit EMP/385-415/3/N		D-24558 Henstedt-Ulzburg		
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers.f	Ers.d	Germany	(Datei) S971912B.001

Blatt 1 von 1 Bl.

0	1	2	3	4	5	6	7	8	9

Sicherheitskette
interlock system

potentialfreie Kontakte
potential free contacts
(31-36 nur in/only in HY)
Frei (E5) Frei (E6)
free (E5) free (E6)

sensor   :
ext. control:

6-8 nur in/only in HY
24V - +Y   24V - +Y
          - +Y

X1 L1 L1 L1 N N PE

X1 1   2

X1 3 4 5 6 7 8   28 29 30 31 32 33 34 35 36

F1
1,6A

K1   1 3 5 13
     2 4 6 14

Betriebsmeldung
operation

S1

L1 L2 L3 B1

HY1-2 C6-17 MS5-10

OPTION Y2:   M2 nur bei/
SUPER FLUSH   only for MS

Y1   M1   Y2   K1   M2

6 ST3 7   16   15   11   10   9   2   5 4 3 45 44 43
                    ST1   ST2

B3

EMP Elektronik/electronic

28 29 30 31 32 33 34 35 36

a	Freigabe	17.11.97	Kral	Datum	17.11.97	(Benennung)		(Zeichnung Nr.)	HYGROMATIK	Telefax	Phone	
b	Anschlüsse	05.02.01	Lue		Kral	HY1-2 C6-17 MS5		S971913	Lise-Meitner-Str. 3	+49-(0)4193 / 895 - 33	+49-(0)4193 / 895 - 0	
				Gepr.	17.11.97	mit EMP/220-230/1/N			D-24559 Henstedt-Ulzburg	(Datei)		Blatt 1
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers.f	Ers.d	Germany	S971913B.001	von 1	Bl.

Zylinder/cylinder 2

EMP Elektronik/electronic

Zylinder/cylinder 1

EMP Elektronik/electronic

HY3-5 C30-58

HY1-2 C6-17 MS5-10

HY3-5 C30-58

HY1-2 C6-17 MS5-10

Betriebsmeldung
operation

Betriebsmeldung
operation

Sicherheitskette
interlock system

F1 1,6A

F1 1,6A

S1

S1

K1

K1

K2

K11

K11

OPTION Y2:
SUPER FLUSH

M2 nur bei/
only for MS

OPTION Y2:
SUPER FLUSH

M2 nur bei/
only for MS

sensor :
ext. control:

sensor :
ext. control:

6-8 nur in/only in HY
24V - +Y 24V - +Y
- +Y

6-8 nur in/only in HY
24V - +Y 24V - +Y
- +Y

24V - +Y
+Y

24V
+Y

potentialfreie Kontakte
potential free contacts
(31-36 nur in/only in HY)
Frei (E5) Frei (E6)
free (E5) free (E6)

potentialfreie Kontakte
potential free contacts
(31-36 nur in/only in HY)
Frei (E5) Frei (E6)
free (E5) free (E6)

a	Freigabe	23.09.97	Kral		Datum	08.03.95	(Benennung/designation)	(Zeichnung Nr.)	
b	Ausschluss	26.11.97	Kral		Name		HY6-7EMP/380-415/3/N	S-971904	
c	Aus	05.02.01	Lue				Zylinder/cylinder 2		

Urspr. S-971901   Ers.f   Ers.d

[Datei/file] S971904C.001 Blatt 1 von 1 Bl.

Column scale (top): 0 1 2 3 4 5 6 7 8 9

Sicherheitskette
interlock system

potentialfreie Kontakte
potential free contacts
(31-36 nur in/only in HY)
Frei (E5) Frei (E6)
free (E5) free (E6)

sensor   : 6-8 nur in/only in HY
ext. control: 24V - +Y 24V - +Y
                    - +Y

X1 L1 L1 L1 N N PE

X1 1 2

X1 3 4 5 6 7 8 28 29 30 31 32 33 34 35 36

Attention! Wiring must
be done regarding
the EMC

Achtung! Verdrahtung
muß unter Berücksichti-
gung der EMV erfolgen

K1 1 3 5 13
    2 4 6 14

Betriebsmeldung
operation

F1
1,6A

S1

L1 N B1

DBE2

OPTION Y2:   M2 nur bei/
SUPER FLUSH   only for MS

Y1 M1 Y2 K1 M2

6 ST3 7   16   15   ST1 11   10   9   2   5 4 3 45 44 43 ST2

B3

EMP Elektronik/electronic

28 29 30 31 32 33 34 35 36

potentialfreie Kontakte
potential free contacts
(31-36 nur in/only in HY)
Frei (E5) Frei (E6)
free (E5) free (E6)

Sicherheitskette
interlock system

sensor   : 6-8 nur in/only in HY
ext. control: 24V - +Y 24V - +Y
                     - +Y

X1 L1 L1 L2 L3 N PE

X1 1 2

X1 3 4 5 6 7 8   28 29 30 31 32 33 34 35 36

Attention! Wiring must
be done regarding
the EMC

Achtung! Verdrahtung
muß unter Berücksichti-
gung der EMV erfolgen

K1 1 3 5 13   Betriebsmeldung   F1
    2 4 6 14   operation   1,6A

S1

L1 L2 L3 B1

HY1-2 C6-17 MS5-10

B3

L1 L2 L3 L1 L2 L3 B1

HY3-5 C30-58

OPTION Y2:   M2 nur bei/
SUPER FLUSH   only for MS

Y1 M1 Y2 K1 M2

6 ST3 7   16   15   11   10   9   2   5 4 3 45 44 43
                          ST1   ST2

B3

EMP Elektronik/electronic

28 29 30 31 32 33 34 35 36

a	Freigabe	26.11.97	Kral	Datum	04.06.97	(Benennung)		(Zeichnung Nr.)	HYGROMATIK	Telefax	Phone
b	Anschlüsse	05.02.01	Lue	Bearb.	Kral	DBE6-45EMP/400/3/N		S-971105	Lise-Meitner-Str. 3	+49-(0)4193 / 895 - 33	+49-(0)4193 / 895 - 0
				Gepr.					D-24558 Henstedt-Ulzburg		
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers.f	Ers.d	Germany	(Datei) S971105B.001	Blatt 1
											von 1 Bl.

Control Type EMP for Electrode Steam Humidifiers

Technical Data

Steam Humidifier Type HyLine HY1EMP - HY7EMP					
Type	**HY1.05**	**HY1.08**	**HY2.13**	**HY2.17**	**HY3.23**
Steam Output [kg/h]	5	8	13	17	23
Electrical Power [kW]	3,8	6,0	9,8	12,8	17,3
Current [A]	5,4	8,7	14,1	18,4	24,9
Fuse [A] **	3x6	3x10	3x16	3x20	3x35
Type	**HY4.30**	**HY5.45**	**HY6.60**	**HY7.90**	**HY7.116**
Steam Output [kg/h]	30	45	60	90	116
Electrical Power [kW]	22,5	33,8	2x22,5	2x33,8	2x43,5
Current [A]	32,5	48,8	2x32,5	2x48,8	2x62,8
Fuse [A] **	3x35	3x63	6x35	6x63	6x63
Electrical Supply *	400V/3/N /50-60Hz				
Control Voltage	230V/50-60Hz				

* Other voltages on request.
** Times 1.3 power input after Full Blow Down. If expulsion fuses are used close to their specific limit we recommend to choose expulsion fuses with a higher range.

Steam Humidifier Type CompactLine C6EMP- C45EMP					
Type	**C6**	**C10**	**C17**	**C30**	**C45**
Steam Output [kg/h]	6,0	10,0	17,0	30,0	45,0
Electrical Power [kW]	4,5	7,5	12,8	22,5	33,8
Current [A]	6,5	10,8	18,4	32,5	48,8
Fuse [A] **	3x10	3x16	3x20	3x35	3x63
Electrical Supply *	400V/3/N/50-60Hz				
Control Voltage	230V/50-60Hz				

* Other voltages on request.
** Times 1.3 power input after Full Blow Down. If expulsion fuses are used close to their specific limit we recommend to choose expulsion fuses with a higher range.

Steam Humidifier Type MiniSteam MS5EMP - MS10EMP			
Type	**MS5**	**MS10**	**MS5**
Steam Output [kg/h]	5	10	4,8
Electrical Power [kW]	3,8	7,5	3,8
Current [A]	5,4	10,8	15,7
Fuse [A] **	3x6	3x16	1x16
Electrical Supply*	400V/3/N/50-60Hz		230V/1/N/50-60Hz
Control Voltage	230V/50-60Hz		

* Other voltages on request.
** Times 1.3 power input after Full Blow Down. If expulsion fuses are used close to their specific limit we recommend to choose expulsion fuses with a higher range.