

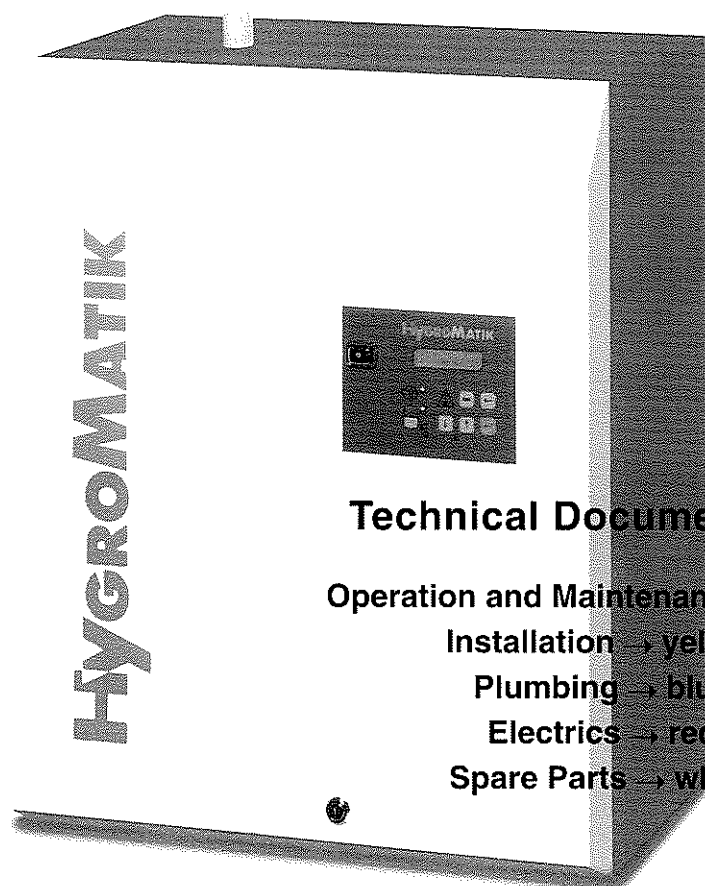
# HYGROMATIK®

## DBV and *DBV-Universal*

Electric Heater Steam Humidifiers

DBV for use with fully demineralised water

*DBV-Universal for use with all water qualities*



## Notes:

Text written in the **Arial Standard** font refers to points of general validity and mainly to operation with fully desalinated water or purified condensate with a conductivity of maximum 20 micro Siemens per centimeter.

*Text written in the **Arial Italic** font refers either exclusively or additionally to operation with the DBV Universal for use with tap water*

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## Electric Heater Steam Humidifiers

### Series DBV66P - DBV526P

for use with fully demineralised water or purified condensate

### Series DBV-U66P - DBV-U526P

for use with tap water

## Operation and Maintenance Instructions

### Operating Instructions

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## 1.1 Introduction

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 and Maintenance 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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### 1.1.1 Operating Instructions

The proven principle of heating water by the use of electric immersion heaters is exploited to generate steam.

The DBV-(U)P range series of HYGROMATIK electric heater steam humidifiers includes 9 basic models with maximum generating capacities from 6 to 52 kg/h.

**When using fully demineralised water or purified condensate with a max. conductivity of 20 µS/cm please refer to chapter 1.21.1 "Maintenance when using demineralised Water or Condensate".**

***When using tap water please refer to chapter 1.21.2 "Maintenance when using Tap Water". Text written in Arial Italic refers exclusively to DBV Universal operation when using tap water. Be sure to use feed water with a maximum total hardness of 15°dH.***



**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 1.2 "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).

### 1.1.2 Typographic Distinctions

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

## 1.2 Safety Notes

### 1.2.1 General

#### Warning Notes and Safety Symbols

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



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



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



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



**Note:** Further explanation or cross-references to other sections of the text in the Operation and Maintenance Instructions.

### 1.2.2 Operational Safety Notes

#### In General

Observe all safety and warning notices.

If there should be malfunctions, shut down the unit immediately and secure against being restarted. Faults should be rectified immediately.

During repair work, guarantee operational safety of the unit by using qualified personnel.

Only use original HYGROMATIK spare-parts.

For the effective operation of this unit refer to any national regulations restricting or governing its use.

#### Accident Prevention Regulations

Observe the accident prevention regulations:

UVV "Electrical installation and electrical equipment" (VBG 4) or equivalent national codes. In this way you can prevent injury to yourself or others.

### Operation of the Unit

Do not impair the safety of the unit.

Periodically check all protection and warning devices for proper functioning.

Safety equipment is not to be removed or put out of operation.

### Installation, Dismantling, Maintenance and Repair of the Unit.

Turn off power, when doing maintenance work or repairs to the unit.

Extensions to the unit or installation of additional equipment is only allowed after obtaining written approval from the manufacturer.

### Electrical Parts

Work on electrical parts must be carried out by qualified electricians.

Turn off the power and secure against restart when working on electrical parts.

Immediately turn the unit off when faults occur in the electrical energy supply.

Only use original type fuses of correct rating.

Make periodical checks of the electrical equipment.

Defects, like loose connections or burned cables must be repaired immediately.

Test all installed protective devices after installation or repairs (e.g. grounding).

### 1.2.3 Disposal after Dismantling



**Note:** the operator is responsible for the component parts of the unit being disposed of according to the law.

## 1.3 Transport

### 1.3.1 General

Transport the steam humidifier carefully. Prevent damage from careless loading and unloading and avoid the use of unnecessary force.

### 1.3.2 Transport Size and Weight

Type	Height [cm]	Depth [cm]	Width [cm]	Weight [kg]
DBV (U)66P	84	36	60	41
DBV (U)96P	84	36	60	41
DBV (U)126P	84	36	60	43
DBV (U)176P	84	36	60	43
DBV (U)266P	84	36	60	44
DBV (U)306P	84	36	98	72
DBV (U)356P	84	36	98	70
DBV (U)436P	84	36	98	72
DBV (U)526P	84	36	98	73

### 1.3.3 Packing



**Note:** Observe the pictograms displayed on the carton.

### 1.3.4 Interim Storage

During storage, keep the unit dry and protected from frost.

### 1.3.5 Check for complete and correct Delivery of Goods

Upon receipt of the unit, make sure that:

- type and serial number on the name plate correspond to the order and supply information,
- equipment is complete and in perfect condition.



**Note:** Immediately file a written claim with your shipping agent in case of transport damage or missing parts.

Following are typical conditions of notification to transport companies (national variations possible)\*:

Transport Company	After Receipt of Goods
Post	24 hours at the latest
Rail	7 days at the latest
Lorry and railway companies	4 days at the latest
Parcel services	at once

\* Subject to change without prior notice.

## 1.4 Function and Installation

### 1.4.1 Function

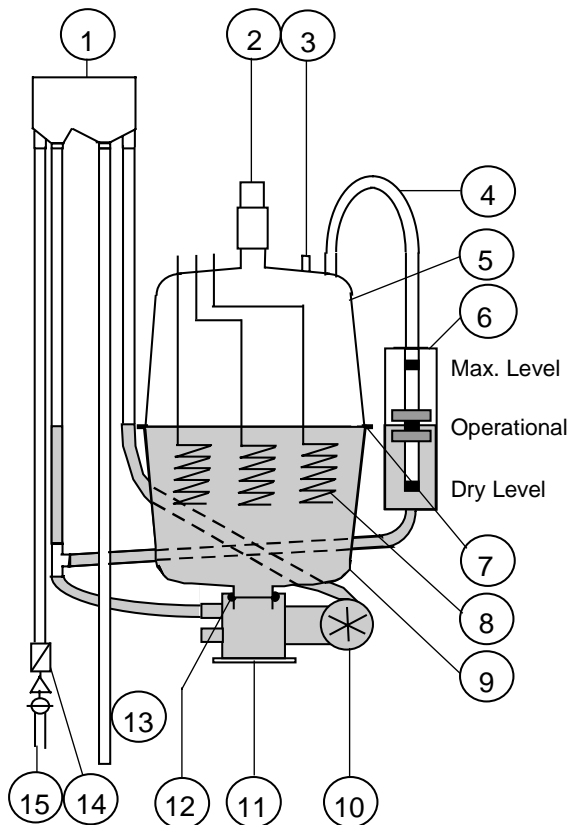
#### The Electric Heater Principle

One, two or three heaters are arranged in a closed cylinder and connected to an AC voltage. The heat generated by the immersion heaters is used directly to boil the water supplied to the cylinder.

The demineralised water supply is practically free of minerals. This ensures long cylinder and heater life. It minimises the need for periodic cylinder water blow-down as well as the need for maintenance checks.

*If the steam humidifier type DBV Universal is operating with tap water, the minerals contained in the water will be precipitated out. Most of the scale deposits are periodically drained off using a heavy duty waste water pump. Please refer to chapter 1.21.2 "Maintenance when using Tap Water".*

The steam generated is saturated at a temperature of about 100°C and is at low pressure only ("non-pressurised steam"). It is demineralised and virtually free from bacteria. Any residual minerals remain in the cylinder.



### 1.4.2 Installation and Procedures

Water is admitted through the solenoid valve (14) when the hygostat or controller calls for humidity. The solenoid valve is designed for pressures from 0.2 to 10 bar.

Solenoid valves for lower pressures are available upon request.

To provide an air gap, water is fed to a filling cup (1) before it flows into the steam cylinder (5+9). This ensures that no hot cylinder water enters the water supply line in case of feed-water shortages.

The water level in the cylinder must be kept within certain upper and lower limits. The filling cup is used here as a safety overflow device for the case of an excessive water level where the water then flows back into the filling cup. Excessive water levels would permit water to enter the steam hose, whereas too low a level could lead to overheating the heater elements (8). Too high or too low level readings cause the humidifier control to switch off the heater power supply.

There is a water level control device in the cylinder. It consists of one stainless steel cylinder with two float switches and three Reed-Contacts. The float switches indicate the water level in the steam cylinder i.e. "Dry Level", "Operational" and "Max. Level". The cylinder is pressure equalised to prevent false readings due to varying air duct pressures.

Position	Description
1	Filling cup
2	Steam hose adapter
3	Condensate return
4	Pressure equalisation
5	Top part of steam cylinder
6	Water level control
7	Cylinder flange and o-ring
8	Electrical heaters
9	Lower part of steam cylinder
10	Blow-down pump
11	Cylinder base
12	O-ring
13	Water drain
14	Water inlet solenoid valve
15	Water inlet

The main breakers supply power to the heaters when the water level leaves the lower level sensor in the level control cylinder. Steam production begins within a few minutes.

The water level in the cylinder is maintained by the middle level sensor. If the water level goes below the sensor "operational" for more than 10 seconds, the solenoid valve opens to replenish any evaporated water.

The humidifier switches to stand-by after sufficient humidity has been produced. The humidifier also switches to stand-by if any safety system is triggered.

The steam cylinder consists of two flanged plastic halves bolted together with stainless steel nuts and bolts and sealed with an o-ring. Up to 3 heaters of either 4.5 or 6.5 kW each are installed in the top half. Each heater (8) is thermostatically supervised by its temperature cut-out. The cylinder can be opened easily for inspection. Any necessary replacement of heaters or temperature cut-outs can be done easily.

In case of any malfunction which could lead to heater elements overheating, each element has a mechanical temperature cut-out. This feature leads to a double safety system in the case of low water supply.

Although fully demineralised water contains only traces of residual minerals, operating experience has shown periodic full blow-down of the cylinder contents increases the time interval between cylinder inspections and lengthens the life cycle of heater elements. A heavy-duty waste water pump is therefore used periodically to flush out any accumulated residual non-volatile matter. Steam production is interrupted only for a few minutes.

*When using the steam humidifier type DBV Universal - for use with tap water - the water is drained periodically. The blow-down is effected using the HYGROMATIK SUPER FLUSH. Please refer to chapter 1.21.2 "Maintenance when using Tap Water".*

Steam is fed into air-conditioning ducts through special steam hoses and dispersion manifolds. If only the amount of steam required for normal humidification is generated, this steam has virtually no heating effect on the air. The condensate formed returns to the steam cylinder via a condensate hose.

Direct humidification of rooms (without ducts) is accomplished using ventilation units with fans and integrated manifolds. The steam generator is

connected to the dispersion manifold or ventilation unit by steam and condensate hoses.

### 1.4.3 Control DBV- (U)P

The HYGROMATIK control type DBV-P2 can be programmed for the following control modes. Parameter U6 **Control** has to be set according to chapter 1.14 "Parameter Settings using Code".

Control DBV-(U)P (U6)
1step 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 parameter E3 **Control signal** has to be set according to chapter 1.14 "Parameter Settings using Code" to match the humidifier to the control signal.

External Signals DBV-(U)P (E3)
0(2) - 10 V DC (min. 0,5 mA)
0(4) - 20 V DC (min. 1,0 mA)
0 - 20 V DC (Phase angle, Staefa)
0 - 140 Ω*
0(2) - 10 mA DC (min. 2,5 V)
0(4) - 20 mA DC (min. 5 V)

\* only control mode (U6): external Controller

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 5% 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.



## 1.4.4 Internal Output Adjustment

Control of the DBV-(U)P steam humidifier is done by proportional control of one of the heating elements and phased addition of further heating elements. In this way the humidifier output can be controlled proportionally over its whole range.

For example:

For a humidifier with two heating elements an internal signal of 60% is realised by switching on the first heating element (50%). The second heating element covers remaining 10% using a solid state relay.

## 1.5 Commissioning



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



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

### 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.

≈ Close the water feed shut-off valve.

### Switch On Steam Humidifier

≈ Check that all cable fittings, heater cables and connections are firmly grounded.

≈ Check seating of cylinder and clamps of steam and condensate hose.

≈ Insert main fuses.

≈ Switch on the control switch.

≈ Open the water feed shut-off valve.

≈ Make sure only fully demineralised water enters the cylinder. Operating pressure 0.2 to 10 bar.

*Using tap water regard chapter 1.21.2 "Maintenance when using Tap Water".*

≈ Set hygrostat of proportional controller to humidity required.

Then the following functions are taking place:

- Display shows:

Hygromatik®  
DBV-P2 SW Vers. x.y.

- If the hygrostat or controller calls for humidity the inlet solenoid valve opens and introduces water into the cylinder. LED "Filling" lights up and display shows:

Dry Level  
L1 = X.Y kg/h

- When the water level in the steam cylinder reaches the level "Operational" the LED "Humidification" lights up and the display shows:

Humidification  
L1 = X.Y kg/h

- After approximately 15 to 20 minutes the steam production starts.

### Further Checking:

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

≈ Observe the steam humidifier after 15 to 30 minutes of operation and check for any leaks.

**Attention:** Observe safety regulations governing work carried out with live components!



≈ Switch the unit off and stop the leaking.

## 1.6 Operation



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

Put the unit into operation doing the following:

≈ Turn on water supply.

≈ Switch on the control switch in the door of the steam humidifier.

Now the unit proceeds as mentioned under chapter 1.5 "Commissioning".

## 1.6.1 Steam Output Limitation



By changing the "Steam output limitation" parameter P1 the capacity can be adjusted for a value between 25% and 100% of the maximum (see chapter 1.13). This can be used if necessary for fine tuning the control functions.

## 1.6.2 Blow-down

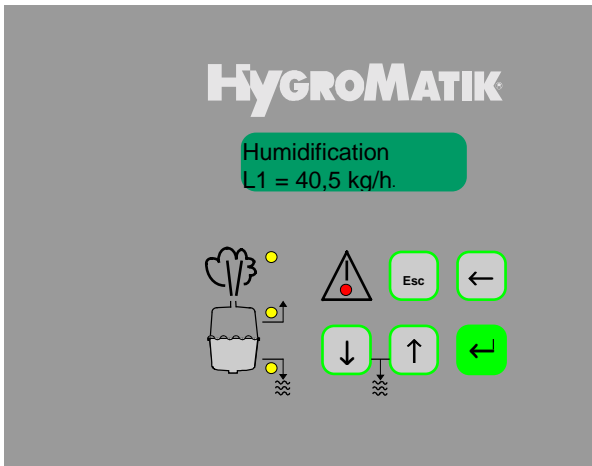
A full blow-down is carried out periodically. The time period between two blow-downs can be programmed with the parameter H1 "Blow-down counter". Refer to chapter 1.14 "Parameter Settings using Code".

*The DBV Universal for use with tap water can be programmed for a moderately extended specific maintenance blow-down interval (see chapter 1.21.2 "Maintenance when using Tap Water"). In this case please contact HYGROMATIK.*

### Manual Drain:

Press simultaneously the keys  and  on display and operating panel. While both keys are pressed the pump is draining the cylinder water.

## 1.7 DBV-(U)P Display and Operating Panel



DBV-(U)P display and operating panel for local communication with the humidifier

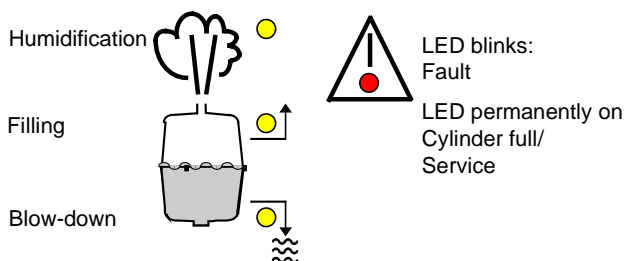
The LC display is a two line alphanumeric backlit type.

The first line displays the operational mode of the humidifier **Humidification, Stand By, No Demand, Filling** and **Dry Level**. 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.

Permanently lighted red LED means service interval is overdue. The display shows "Service". The maintenance interval can be adjusted to suit water quality. For this to chapter 1.14 "Parameter Setting using Code, Parameter P2".



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

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

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



**Note:** After pressing a key the display lights up. After one minute without pressing any key the display goes back into stand by mode. (The display is dark.)

## 1.8 Operational Conditions

The display shows the following operational conditions:

### Humidification

The steam humidifier produces steam when there is a demand from the hygrostat or the controller (safety chain must be closed ).

### 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.

## Dry Level

If the water level in the steam cylinder matches the dry level, the controls reports **Dry Level**.

## 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.

## 1.9 Fault Messages



**Note:** Refer also to the "Faults" chapter 1.20.

The control type DBV-(U)P constantly monitors all important functions of the humidifier. In the case of a fault the humidifier switches off.

A flashing red LED shows a fault message. The following messages can be displayed:

Fault Messages	Monitored Function/ Monitored Part
Blow-down Fault	Blow-down pump, Water Drain
Max. Level	Water Inlet Solenoid Valve, Varying Pressure in the Airduct
Fault Filling	Water Inlet Solenoid Valve, Water Supply
Fault Humidity Sensor	Humidity Sensor
Fault Sensor Level	Water Level Control
Steam-down time exceeded	Temperature Cut-outs, Heaters, Power Supply, Main Contactor(s)

## Blow-down Fault

The control type DBV-(U)P periodically activates the pump to drain the cylinder water and smaller pieces of granular materials.

If during the set blow-down time the cylinder water level does not reach the "Dry Level", the control report **Blow-down Fault**.

## Max. Level

If the water level touches the sensor "Max. Level" for the fifth time within a defined short time, the display shows **Fault Max. Level**. The control resets the counter if there is no demand or if the unit has been switched off.

## Fault Filling

In the standard setting the control type DBV-(U)P activates the solenoid valve for 30 minutes. If during this time the water level in the cylinder has not reached the level "Operational", the control reports a **Fault Filling**.

## Fault Humidity Sensor

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

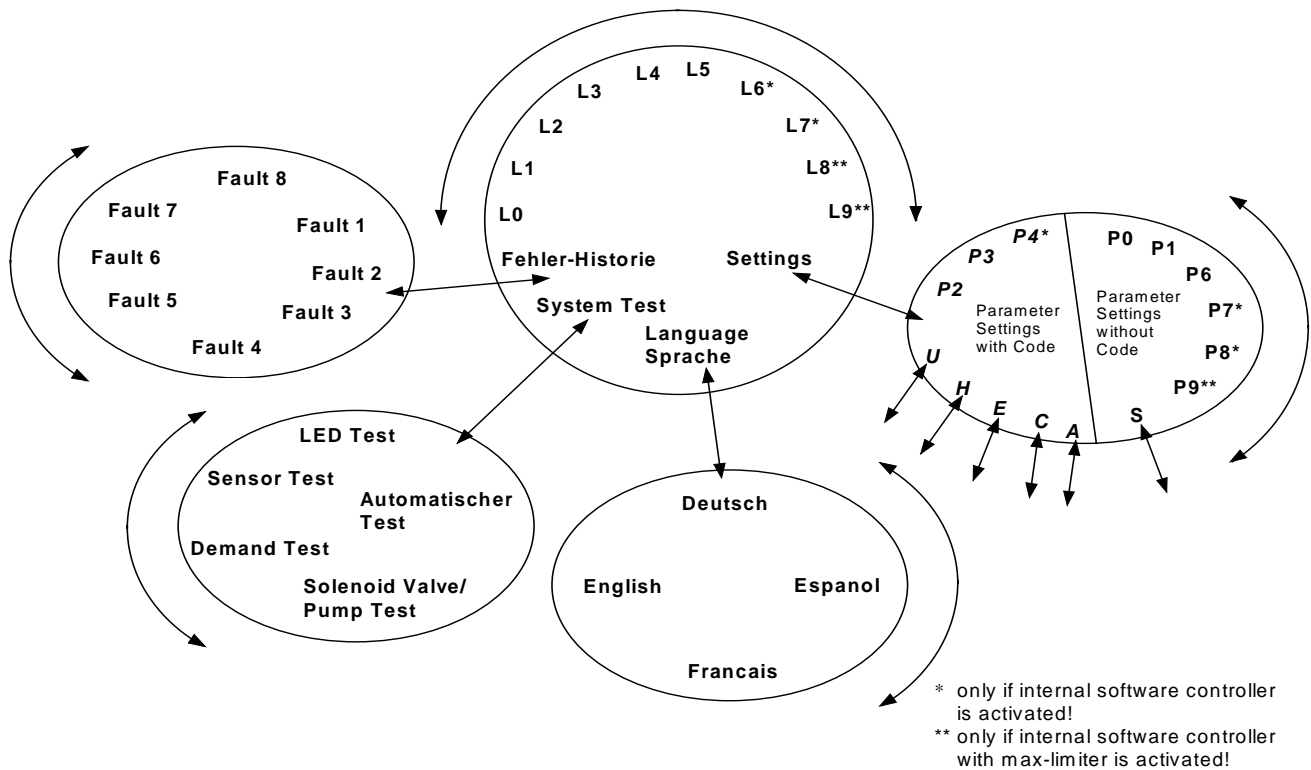
## Fault Humidity Sensor

The level control device consists of two float switches and three reed-contacts. The control reports **Fault Sensor Level**, if the float switches activate the reed-contacts in a wrong order.

## Steam-down time exceeded

If the hygrostat or the controller calls for humidity, the control activates the water inlet solenoid valve within a short time. If the control does not activate the solenoid valve within several hours, **Steam-down time exceeded** is displayed.

## 1.10 DBV-P - Menu



## 1.11 Readouts

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

Readouts	
L0	Total steam [10 <sup>3</sup> kg]
L1	Steam per hour [kg/h]
L2	Running hours [days:hours]
L3	Internal signal [%max. output]
L4	Demand [%]
L5	Output limitation [%max. output]
L6*	Setpoint rel. humidity [%RH]
L7*	Actual rel. humidity [%RH]
L8**	Setpoint 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 **Settings**, **Language / Sprache**, **System Test** and **Fault Events** 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  
 L8 = 62%RH


≈ Use  to confirm the selection.

## 1.12 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
*** S *
```

≈  press.

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

```
Nominal Capacity
S2 = 45 kg/h
```

≈ Escape S-Parameter using .

## 1.13 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*	Setpoint rel. humidity [%RH]
P9**	Setpoint 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 with .

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

```
Setpoint RH
P8 = 050 %
```

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


```
Setpoint RH
P8 = 050 %
```

≈ Press  once. Cursor appears under second figure.

```
Setpoint RH
P8 = 050 %
```

≈ Press  twice.

```
Setpoint RH
P8 = 050 %
```

≈ Press  twice. Cursor disappears from display.

```
Setpoint RH
P8 = 050 %
```

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

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

≈ Escape sub menu **Settings** using .

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

## 1.14 Parameter Settings using Code

The control type DBV-(U)P is equipped with a modern computer chip. The external, non-volatile data storage device allows operating parameters to be altered, adjusted and stored. For security reasons, these can only be accessed after inputting a code in parameter **P0**.

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

Parameter	Description
P2	Amount of steam service interval [10 <sup>3</sup> kg/h]
P3	Reset service interval No/ Yes
P4	Offset humidity sensor [0%-100%]
A1	Remote control Yes/No
A2	Delay filling [0 - 255 sec]
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)-10 mA DC 0(4)-20 mA DC 10-140 Ohm* 0-20 V phase-angle (Staefa)
E4*	Calibration sensor [-15 - +15%]
E5	Report relay 2 Humidification Max.-Level Blow-down fault Service Interval expired Fault filling No Demand Setpoint rel. humidity exceeded * (Display: > Humidity) Dehumidification Fault data transfer
E6	Report relay 3 Choice as parameter E5
E7	Baudrate interface [75 - 19200]
E8*	Offset for dehumidification (P8) [-2 - +15%]
E9**	Gain max. limiter [Xp = 0 - 100%]

Parameter	Description
H1	Blow-down counter [1 - 25500 kg]
H2	Blow-down time [sec]
H3	Report logic positive / negative
H6	Blow-down On/Off
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 !

**Example:** The external controller signal should be changed from 0-10 V to 4-20 mA.



**Attention:** Control mode "external controller" must be selected. (Parameter U6).

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

≈ Select sub menu **Settings** using or and confirm with .

≈ Select parameter **P0** using or .

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

≈ Confirm parameter selection using . Cursor under first figure.

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

≈ Press once. Cursor appears under second figure.

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

≈ Press once.

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

≈ Press twice. After inputting code correctly the display shows:

```
Code
P0 = OK
```


≈ Press once. Cursor appears under character **E**.

```
Parameter Set
H A * U S E
```

≈ Confirm with Return.

≈ Press  or  until the display shows parameter "Control Signal (E3)":


```
Control Signal
E3 = 0 - 10 Volt
```

≈ Confirm parameter selection . Cursor appears under figure 0.

```
Control Signal
E3 = 0 - 10 Volt
```

≈ Press  twice.

```
Control Signal
E3 = 4 - 20 mA
```

≈ Confirm input signal selection with . Cursor disappears from display.

```
Control Signal
E3 = 4 - 20 mA
```

The steam humidifier is now set up for an external controller signal of 4-20 mA.

Other values to be changed in the fashion described above.

≈ Escape sub menu **Settings** using .

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

## 1.15 Parameter Description

### Amount of Steam Service Interval (P2)

The control type DBV-(U)P 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
```

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


```
Reset Service
P3 = No
```

≈ Press  once.

```
Reset Service
P3 = Yes
```

≈ Confirm using . The red LED is off.

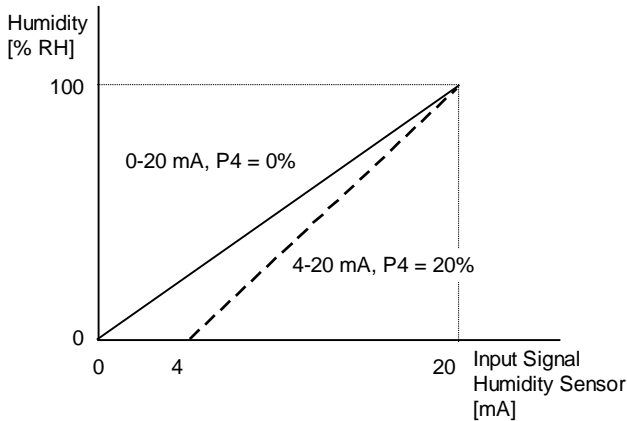
```
Reset Service
P3 = No
```

≈ Escape sub menu **Settings** using .

### Offset Humidity Sensor (P4)

Standard humidity sensors interpret 0 V, 0 mA and 0 Ohm signals as a relative humidity of 0% RH. With a humidity sensor, with e.g. a 4-20 mA input signal, the "Offset Humidity Sensor" parameter (P4) has to be set to 20%. The control type DBV-P can now correctly interpret a 4 mA-signal as 0% RH.





## 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 an undelayed capacitor type humidity sensor is connected to the unit.

## Remote Control (A1)

This parameter switches on and off the remote control (optional). It is not possible in the "Remote Control Off" mode to set parameters by the remote control.

## Delay Filling (A2)

Rapid pressure surges in the airduct can cause momentary imbalances in the level control cylinder. It is possible that the pressure surges force the float switch beyond the level "Operational" although the steam cylinder contains sufficient water. The control activates the solenoid valve with a time delay to avoid an overfilling of the steam cylinder. The time delay can be set by the parameter **Delay Filling**.

## 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.

## 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 4.6.

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 setpoint.

## Offset for Dehumidification (E8)

The change-over between humidification and de-humidification is controlled by parameter E8. E8 adds a dead-band to the setpoint P8. Standard setting is +5%. Refer also to chapter 4.5.5 "1step Control De-humidifier".

## Calibration Sensor (E4)

This parameter allows the calibration of the active humidity sensor connected to terminals 3 - 5.

## Blow-down Counter (H1)

The **Blow-down Counter (H1)** indicates after which amount steam produced the blow down will be activated. The parameter "Blow-down" (H6) has to be set to "Yes".

## Blow-down Time (H2)

This parameter determines the blow-down time. The parameter "Blow-down" (H6) has to be set to "Yes".

## Blow-down (H6)

This parameter activates the blow-down process. For activation set mode to "Blow-down Yes".

## Report logic (H3)

This parameter determines the switching logic of the potential free relays (terminals 28 - 36). Refer to the following table.



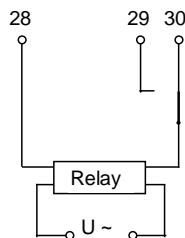
**Note:** If the setting of parameter report logic (H3) is changed, the unit has to be re-started.

Standard setting of parameter **Report logic** (H3) is negative. In this mode the relays report a failure or a message even if the control voltage is missing or the control is defective.

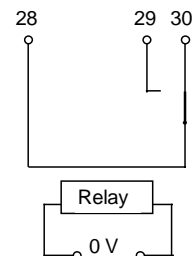
Setting Parameter H3	Condition Relay	State	Contacts Closed:	Contacts Opened:
Negative (standard)	operating ill. 1	No Message/ No Failure	28-30 31-33 34-36	28-29 31-32 34-35
	releasing ill. 2	Message/Failure occurs	28-29 31-32 34-35	28-30 31-33 34-36
Positive	releasing ill. 3	No Message/ No Failure	28-29 31-32 34-35	28-30 31-33 34-36
	operating ill. 4	Message/Failure occurs	28-30 31-33 34-36	28-29 31-32 34-35

**Example:** Collective Fault Relay,  
Terminals 28 - 30

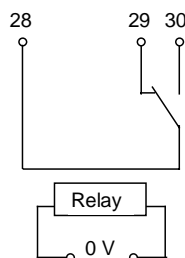
**III. 1** Parameter **H3 = negative**, relay: **activated**,  
state: **no** failure



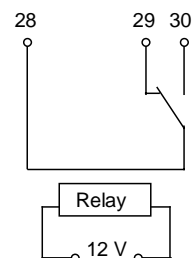
**III. 3** Parameter **H3 = positive**, relay: **not activated**,  
state: **no** failure



**III. 2** Parameter **H3 = negative**, relay: **not activated**,  
state: **failure**






**III. 4** Parameter **H3 = Positive**, relay: **activated**,  
state: **failure**



## 1.16 Language/Sprache




This menu is used to select the desired system language.

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

≈ 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 .


## 1.17 Faults Events

This routine stored the last eight occurred fault messages. "Fault 8" is the newest fault message – "Fault 1" is the oldest one.

The stored fault message are shown as follows:

≈ Select sub menu **Fault Events** with  or  . Display shows:

Fault Events

≈ Confirm selection with  . Display shows e.g.:

Fault 1  
Fault Sensor Level

≈ By using  or  the display shows the last eight failures.




Escape sub menu **Fault Events** with .

## 1.18 System Test

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




The following test routines are available:

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

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

≈ The display shows:

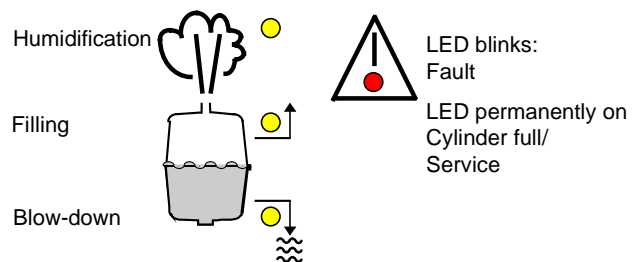
System Test  
LED-Test

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

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

### LED Test

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



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

LED Test  
LED Humidificat.

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

## Signal-Test

This tests the connected signals (terminals 3 - 8 built in the unit). The Signal Test is useful, if parameter "Control" (U6) is set to "internal PI-controller" or "internal PI-controller + Max.-limiter".

Possible Messages	Condition
Signal Test L7 = 50,8 %	Actual rel. humidity: 50,8 %RH

L7: Actual rel. humidity [%RH]

L9: Actual rel. max. humidity [%RH]

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 in sequence.

## 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:** The safety chain has to be closed (terminals 1 and 2). If the Safety chain is open the display shows "No Demand".

## 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".

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 L4 = 63.0 %	The safety chain is closed. There is a demand on the unit. The signal is displayed. The humidifier is in operation
Demand Test L4 = 0.0 %	There is no demand on the humidifier. The unit is in stand-by mode.

L4: Demand [%]

## Automatic Test

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

## 1.19 Interface (Optional)

The Control type DBV-(U)P can be equipped with an RS232 or RS485 interface.

### RS232:

The serial interface with SubD9 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	SubD9
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. Preferable use twisted pair cable for data transfer.

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.

## 1.20 Faults



Switch off the steam humidifier immediately if a fault occurs. Faults are only to be remedied by qualified personnel following the proper safety instructions.

Fault	Causes	Measures
<p><b>Blow-down Fault</b> Unit is automatically switched off after one hour. Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Blow-down pump does not receive electrical power.                             <ul style="list-style-type: none"> <li>– Cable connections are not in order.</li> <li>– Relay on the pcb does not operate.</li> </ul> </li> <li>• Blow-down pump is defective.</li> <li>• Solenoid valve has not fully closed. Water level in the steam cylinder is only decreasing very slowly, although the pump is running.</li> <li>• Blow-down pump is running, but no water is pumped out because cylinder outlet is blocked.</li> </ul>	<p>Check whether relay on the pcb operates (clicks).</p> <ul style="list-style-type: none"> <li>– Check cable connections.</li> <li>– Check whether relay on the pcb operates (clicks). Measure voltage between terminals 10 and N. Change pcb, if necessary.</li> </ul> <p>Change blow-down pump.</p> <p>Check solenoid valve. Refer also to <b>Filling Fault</b>.</p> <p>Clean cylinder and drain hose completely to avoid further blockage</p>
<p><b>Blow-down Fault</b> <i>Operating with tap water</i></p>	<ul style="list-style-type: none"> <li>• <i>Cylinder outlet, blow-down pump and/or draining system are blocked by scale preventing operation.</i></li> </ul>	<p><i>Clean cylinder outlet, blow-down pump and/or draining system. See chapter 1.21.5.</i></p>
<p><b>Max. Level (Failure)</b> Unit is automatically switched off after one hour. Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• As soon as the water level reaches the sensor "Max. level" the pump runs until the water level touches the sensor "Operational". If the water level touches the sensor "Max. level" for the fifth time within a relatively short time, the display shows "Max. Level".</li> <li>• The steam hose has not been laid with sufficient gradient so that there is a blocking effect. This is hindering the steam flow. The steam then generates a back pressure in the cylinder and forces water to drain off through the filling cup.</li> <li>• Duct air pressure is too high. This pressure influences the cylinder via the steam hose and forces water to drain off through the filling cup.</li> </ul>	<p>Refer also to "Max. Level".</p> <p>Check installation steam hose. See chapter 2.6 "Installing Examples"</p> <p>Fit filling cup higher in unit. Lengthen hoses. See chapter 2.4 "Installation".</p>

Fault	Causes	Measures
<p><b>Filling Fault</b> Unit is automatically switched off after one hour.</p> <p>Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Solenoid valve or water supply pipe is blocked.</li> <li>• Coil is defective.</li> <li>• Solenoid valve is not receiving electrical power.</li> <li>• Water shut-off valve is not open.</li> <li>• Water is being drained permanently from the outlet. Pump is not operating.               <ul style="list-style-type: none"> <li>– Steam hose installed sags.</li> <li>– Pressure in duct too high. (Maximum duct pressure 1500 Pa)</li> </ul> </li> </ul>	<p>Clean or exchange solenoid valve. Flush water supply pipe, if necessary.</p> <p>Measure the coil and exchange solenoid valve if necessary.</p> <p>Check cable connections.</p> <p>Open shut-off valve.</p> <p>Remove blockage in steam hose. See chapter 2.6 "Installation Examples".</p> <p>Lengthen drain hose. Contact HYGROMATIK if necessary.</p>
<p><b>Fault RH Sensor</b> Fault Humidity Sensor</p> <p>Unit is automatically switched off after one hour.</p> <p>Red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Humidity sensor or connection cable defective.</li> <li>• Cable connections sensor are not correct.</li> <li>• Plug for float switches is not connected to the control.</li> </ul>	<p>Check humidity sensor and connection cable. Exchange if necessary. Check cable connections.</p> <p>Connect plug to the control.</p>
<p><b>Fault Sensor Level</b> Red LED is flashing.</p> <p>Unit is automatically switched off after one hour.</p>	<ul style="list-style-type: none"> <li>• Floats switches are defective.</li> <li>• Wiring of the level control system (float switches) is not correct.</li> </ul>	<p>Check float switches.</p> <p>Check wiring. Refer to chapter 4.10 "Wiring diagrams".</p>
<p><b>Steam down time exceeded</b> Red LED is flashing.</p> <p>Unit is automatically switched off after one hour.</p>	<ul style="list-style-type: none"> <li>• Temperature cut-outs have been triggered.</li> <li>• Heater is defective.</li> <li>• One phase is missing (external safety fuse is defect).</li> <li>• Heaters are not supplied with electrical power.</li> <li>• Main contactor is defective.</li> <li>• Pcb does not control main contactor. (Sticking relay on main board.)</li> </ul>	<p>Switch off power supply. Press down rod with a pair of small pliers.</p> <p>Measure resistance of heater. Exchange heater, if necessary. Resistance Heater 4,5 kW: 36 Ohm and heater 6 kW: 25 Ohm</p> <p>Replace safety fuses.</p> <p>Check cable connection. Measure voltage / power.</p> <p>Check main contactor. Exchange, if necessary.</p> <p>Measure voltage between terminals 12, 13, 14 on the pcb and N. Exchange pcb, if necessary.</p>

Fault	Causes	Measures
<p><b>Service</b> The red LED is flashing.</p>	<ul style="list-style-type: none"> <li>• Service interval has been exceeded.</li> </ul>	<p>Maintain or check steam humidifier. Service interval is reset by parameter P3. Using parameter P2, the maintenance interval can be adjusted to suit water quality.</p>
<p><b>Max. Level</b> Humidifier is working.</p> <p>Water is continuously discharged from the drain.</p>	<ul style="list-style-type: none"> <li>• Water continues to flow when main switch is switched off. Solenoid valve remains open.</li> <li>• Solenoid valve receives a permanent electrical signal. (Water stops flowing when main switch is switched off.)</li> </ul>	<p>Clean solenoid valve. See chapter 1.21.6 "Cleaning the Solenoid Valve".</p> <p>Check whether relay on the pcb operates (clicks). Measure voltage between terminal 11 and N. If necessary change pcb.</p>
<p><b>Max. Level</b></p> <p>Operating with tap water</p>	<ul style="list-style-type: none"> <li>• <i>Large residual deposits are hindering or adversely affecting the periodical blow-down. Maximum water level is reached due to the extra water introduced by SUPER FLUSH during blow-down.</i></li> </ul>	<p><i>Clean humidifier and drain (blow-down pump, cylinder base and drain hose). Regard chapter 1.21.2 "Maintenance when using Tap Water".</i></p>
<p><b>Dry Level</b></p> <p>Heaters are not supplied with power.</p>	<ul style="list-style-type: none"> <li>• Water shut-off valve is not open.</li> <li>• Solenoid valve or water supply pipe is blocked.</li> <li>• Coil is defective.</li> <li>• Water is being drained permanently from the outlet. Pump is not operating. <ul style="list-style-type: none"> <li>– Water feed hose from filling cup to cylinder base is blocked.</li> <li>– Steam hose installed sags.</li> <li>– Pressure in duct too high. (Maximum duct pressure 1500 Pa)</li> </ul> </li> </ul>	<p>Open shut-off valve.</p> <p>Clean or exchange solenoid valve. Flush water supply pipe, if necessary.</p> <p>Measure the coil and exchange solenoid valve if necessary.</p> <ul style="list-style-type: none"> <li>– Check, clean hose or exchange hose, if necessary.</li> <li>– Remove blockage in steam hose. See chapter 2.4 "Installation Examples".</li> <li>– Lengthen drain hose. Contact HYGROMATIK if necessary.</li> </ul>
<p>No steam produced</p> <p>Display shows: <b>No Demand</b></p>	<ul style="list-style-type: none"> <li>• The humidifier switches off at a (controller)signal below 20 % and on again at 25 %. The demand is too low.</li> <li>• Incorrect control signal levels</li> </ul>	<p>Increase set value, if necessary.</p> <p>Check parameters "E3" and "U6". See also chapter 1.14 "Parameter Settings with using Code".</p>



Fault	Causes	Measures
<p>No steam produced.</p> <p>Display shows <b>Stand By</b>.</p> <p><b>Note:</b> Running "Sensor Test" and "Demand Test" give additional pointers for possible cause of fault. See chapter 1.18 „System Test“.</p>	<ul style="list-style-type: none"> <li>• The safety interlock system has been triggered.</li> <li>• 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.</li> <li>• If the humidity exceeds the value set on the hygostat or controller there is no demand for steam.</li> <li>• If a proportional controller is fitted the humidifier cannot start if there is a mismatch of set and actual controller signal.</li> </ul>	<p>Look for failing function and remedy. Insert a bridge between the terminals 1 and 2 on the terminal block.</p> <p>Insert a bridge between the terminals 1 and 2 on the terminal block.</p> <p>Check the setting and if necessary operation of the sensor and controller.</p> <p>Check parameters "E3" and "U6". See also chapter 1.14 "Parameter Settings with Code".</p>
<p>Humidity level too low</p>	<ul style="list-style-type: none"> <li>• Steam output limiting function of the unit is preventing full output.</li> <li>• Despite full output being attained humidity cannot be achieved due to incorrect output parameters.</li> <li>• If one heater is out of operation the desired output is reduced.</li> <li>• Temperature cut-outs have been triggered. Refer to "<b>Low water level</b>".</li> <li>• A long steam hose passing through cold and drafty rooms can lead to increased condensation levels.</li> <li>• Incorrect installation of steam distributors can lead to condensation in the air duct.</li> <li>• If a proportional controller is fitted the humidifier cannot start if there is a mismatch of set and actual controller signal.</li> </ul>	<p>Check parameter P1 "Output limitation". See chapter 1.13 "Parameter Settings without using Code".</p> <p>Check steam output data.</p> <p>Check fuses, temperature cur-outs and heaters.</p> <p>Switch off power supply. Press down rod with a pair of small pliers.</p> <p>Reposition humidifier, insulate hose.</p> <p>Check system layout and installation.</p> <p>Check setting and parameter "E3".</p>
<p>Humidity level too high</p>	<ul style="list-style-type: none"> <li>• Steam output limitation set too high can lead to poor control characteristics and even cause condensation in ducts.</li> <li>• Controller parameters set incorrectly can lead to poor control characteristics and even cause condensation in ducts.</li> </ul>	<p>Check parameter P1 "Output limitation". See chapter 1.13 "Parameter Settings without using Code".</p> <p>Check parameters "E3" and "U6". See also chapter 1.14 "Parameter Settings with Code".</p>

Fault	Causes	Measures
<p>Water collecting on base plate of the steam humidifier</p>	<ul style="list-style-type: none"> <li>• The cylinder was reassembled incorrectly after maintenance:               <ul style="list-style-type: none"> <li>– O-ring seal damaged or not replaced.</li> <li>– The flange itself is damaged.</li> <li>– <i>Scale has collected in the flange.</i></li> </ul> </li> <li>• Cylinder is incorrectly inserted into the base.</li> <li>• Discharged water cannot flow freely.</li> </ul>	<p>Look for faults and eliminate. Re-assemble cylinder as described in chapter 1.21.3 "Cleaning Steam Cylinder" .</p> <p>Insert the cylinder correctly with a new o-ring in the cylinder base.</p> <p>Insure proper draining. See chapter "Water Discharge". See chapter 3.3</p>
<p>Water leaks from the top part of the cylinder</p>	<ul style="list-style-type: none"> <li>• Hose clamps for the steam and condensate hose are not tightened</li> <li>• Heaters or temperature cut-outs are not installed correctly.</li> <li>• Adapter for the steam hose has not been fitted correctly or the o-ring was not exchanged during maintenance.</li> <li>• If the condensate is not being returned to the cylinder then a condensate sealing cap is used.</li> </ul>	<p>Tighten clamps.</p> <p>See chapter 1.11.7.</p> <p>Fit or exchange o-ring. See chapter 1.21.3 "Cleaning Steam Cylinder".</p> <p>Insure that condensate sealing cap is fitted..</p>
<p>No steam from steam distributor</p> <p>Permanently there is water being drained from the outlet. Pump is not operating.</p>	<ul style="list-style-type: none"> <li>• Steam hose installed sags.</li> <li>• Pressure in duct too high (Maximum duct pressure: 1500 Pa)</li> </ul>	<p>Remove blockage in steam hose. See chapter 2.6 "Installation Examples".</p> <p>Lengthen drain hoses. Please contact HYGROMATIK, if necessary.</p>

## 1.21 Maintenance

The HYGROMATIK steam humidifier is largely maintenance free. Nevertheless, operational faults can occur, which have to do with insufficient or improper maintenance. With proper maintenance the unit will operate longer so regular maintenance is essential.



**Attention:** during maintenance:

Only qualified and authorised personnel should work on the unit.

- Pay attention to safety regulations.
- Take unit out of operation for maintenance work and secure against restarting.
- After maintenance work the unit should be rechecked by qualified personnel for operational safety.

The operating characteristics and maintenance intervals of the steam humidifier are mainly dependent on the existing water quality (total hardness, conductivity) and the amount of steam generated since the last maintenance. Different qualities can lengthen or shorten the period. The residues found in the steam cylinder provide an indication of future maintenance intervals. The latest point in time at which a cylinder must be cleaned is:

- the display shows **Service** and
- the **red LED permanently lights** in the operating panel.

### 1.21.1 Maintenance when using Demineralized Water / Condensate

Any information concerning life time as well as cleaning and maintenance periods of the electrodes is only based on typical empirical data.

Cycle	Maintenance Work
<b>4 weeks after commissioning</b>	<p>Visual inspection of electrical and mechanical components, cables, connections, etc.</p> <p>Visual inspection of water level control.</p> <p>Visual inspection of interior of steam cylinder.</p>
<b>Once a year</b>	<p>Visual inspection of electrical and mechanical components, cables, connections, etc.</p> <p>Visual inspection of water level control.</p> <p>Visual inspection of interior of steam cylinder.</p>

### 1.21.2 Maintenance when using Tap Water

*No exact maintenance intervals can be given as these are always dependent upon water quality and amount of steam generated. Be sure to use feed water with a maximum total hardness of 15°dH. It is therefore advisable to assess maintenance intervals according to individual and specific application cases.*

*The first maintenance should be done after approximately 500 service hours. The residues in the cylinder and on the heating elements will give a good indication of the maintenance intervals required in your specific application.*



**Note:** In some cases a maintenance period extension can be achieved by moderately shortening the blow-down cycle periods. Please contact HYGROMATIK.

*Typical maintenance intervals lie in the range of 500 - 6000 service hours.*

## **Blow-down cycle periods**

*The steam process causes solid hardening elements of different structures to be deposited in the steam cylinder. Cyclical blow-downs with subsequent fresh tap water filling - and supported by the HYGROMATIK SUPER FLUSH system and a high performance drain pump - remove most of these elements.*

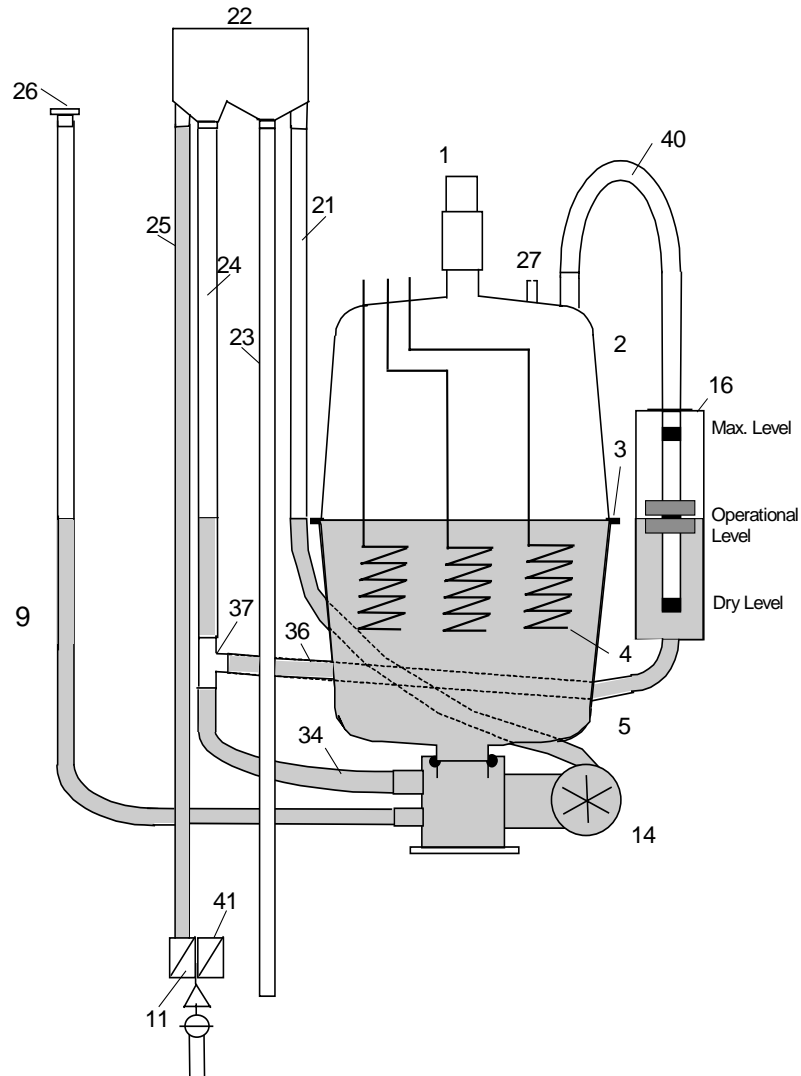
*The SUPER-FLUSH system generates a strong whirlpool effect on the cylinder base using tangential jets. This helps remove deposited scales during the blow-down process. The jets, which are integrated into the cylinder base are operated via an additional solenoid valve and are connected in parallel to the pump.*

## **Water quality**



*When using tap water it is essential to note that the cleaning intervals are shorter as the carbonate hardener contents of the water increase.*

*It is always advisable to use fully demineralised water as the operation is then not affected by water hardening elements and flushing losses are reduced to a minimum.*

## 1.21.3 Cleaning the Steam Cylinder



### Disassembly

- ≈ Switch on humidifier with the control switch.
- ≈ Drain residual water in the cylinder. Press simultaneously  and  on the control panel.
- ≈ Disconnect steam humidifier from power supply. Control switch OFF and remove safety fuse F1. Secure against restart.
- ≈ Check that unit is without power.
- ≈ Remove power supply cables from the temperature cut-outs.

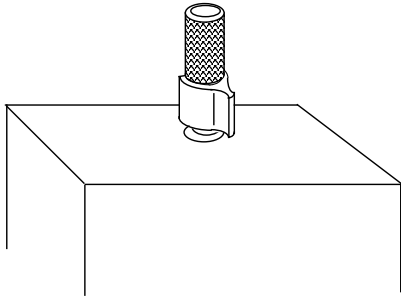


**Attention:** Wait some minutes after operation, because steam cylinder could be still hot.

- ≈ Disconnect connection hoses (4) to water level control (6).
- ≈ Remove clip (2) between adapter and cabinet.
- ≈ Push steam hose adapter upwards. (Steam hoses shorter than 0,5 m should be remove before.)



**Note:** Push clip on to steam hose adapter on top of cabinet to prevent adapter from sliding back.



- ≈ Lift steam cylinder (5+9) out of the base (11) and adapter (2) and remove from humidifier.
- ≈ Remove all cylinder bolts and open the cylinder (7).

## Cleaning



**Note:** When cleaning do not use acids or other chemicals!

- ≈ Remove all scale and sludge from cylinder. Small amounts of scale on the heaters (8) are acceptable.

## Reassembly

- ≈ Replace the flange o-ring (7) with original HYGROMATIK solvent-free o-ring.



**Note:** When joining the cylinder the upper and lower parts must have a firm fit.

- ≈ Connect upper and lower parts (5+9) with bolts.
- ≈ Remove o-ring (12) from the lower part of the cylinder.
- ≈ Insert a new solvent-free, moistened HYGROMATIK o-ring into the cylinder base.
- ≈ Remove o-ring from the upper part of the cylinder.
- ≈ Insert a new solvent-free, moistened HYGROMATIK o-ring into adapter (2).
- ≈ Refit cylinder into adapter (11).



**Note:** Connection for the condensate hose (28) must be positioned at the front on the left side.

- ≈ Position cylinder vertically and then settle firmly into cylinder base.
- ≈ Push adapter downwards onto the steam outlet.
- ≈ Fix adapter with clip.
- ≈ Connect the steam and condensate hoses as well as the connection hoses (4) to the water level control (6).

- ≈ Connect the power supply cables to the temperature cut-outs.
- ≈ Push in safety fuse.



Switch on the unit and operate for 15 to 30 minutes. Check for any leaks.

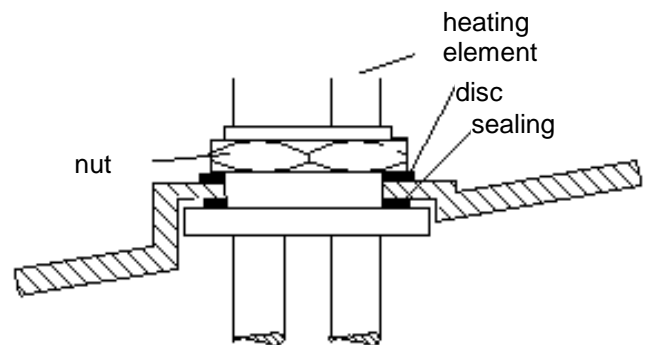


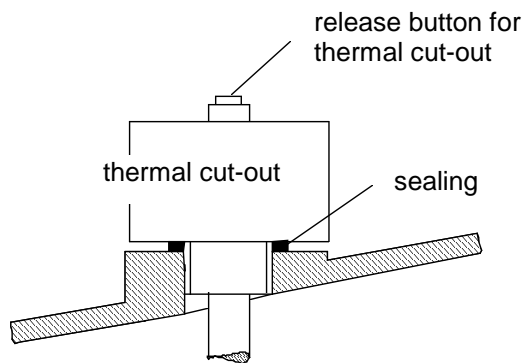
**Attention:** The cover is securely electrically earthed only when the lock is in a locked position.

## 1.21.4 Replacing Heaters and Cut-Outs

### Disassembly

- ≈ Drain residual water in the cylinder. Press simultaneously  and  on the control panel.
- ≈ Disconnect steam humidifier from power supply. Control switch OFF and remove safety fuse F1. Secure against restart.
- ≈ Check that unit is without power.
- ≈ Disassemble steam cylinder, as described in chapter 1.21.3 "Cleaning the Steam Cylinder".
- ≈ Remove wires between heaters and cut-outs.
- ≈ Remove cut-out actuator wires from heaters.
- ≈ Remove heaters and cut-outs.





**Attention:** Do not bend the capillary tube of the cut-outs!



## Assembly

- ≈ Reassemble heaters and cut-outs.  
Do not overtighten nuts.
- ≈ Assemble steam cylinder, as described in chapter 1.21.3 "Cleaning the Steam Cylinder".
- ≈ Connect the wires between heaters and cut-outs.
- ≈ Push in safety fuse F1.

Switch on the unit and operate for 15 to 30 minutes. Check for any leaks.

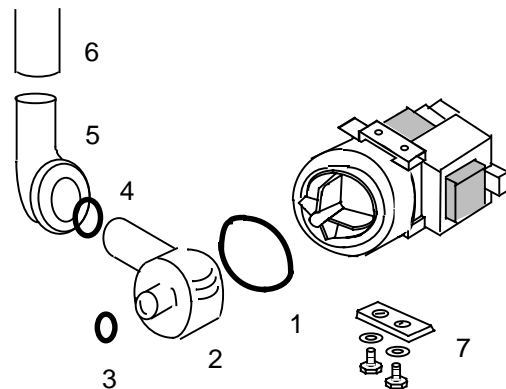
If there is a leakage, switch off the power and observe safety regulations governing work carried out with live components.

## 1.21.5 Cleaning the Pump

- ≈ Drain residual water in the cylinder. Press simultaneously  and  on the control panel.
- ≈ Disconnect steam humidifier from power supply. Control switch OFF and remove safety fuse F1. Secure against restart.
- ≈ Check that unit is without power.
- ≈ Disassemble the cylinder, as described in chapter 1.21.3 "Cleaning the Steam Cylinder".
- ≈ Remove electric cable from pump.
- ≈ Remove adapter (5) from pump.
- ≈ Remove screws (7) and the pump from cylinder base.
- ≈ Open pump (bayonet joint).
- ≈ Remove residues from discharge hoses and pump. Replace o-ring (1), or body (2) as necessary if any of these parts are no longer in perfect condition.



- ≈ Reassemble the pump.
- ≈ Insert moistened o-ring (3) in the cylinder base lateral opening.
- ≈ Insert pump into cylinder base and fasten pump with screws (7).
- ≈ Slide the moistened o-ring (4) on to the pump inlet opening.
- ≈ Push adapter (5) over the pump outlet opening.
- ≈ Connect electric cable to pump.
- ≈ Assemble cylinder, as described in chapter 1.21.3 "Cleaning the Steam Cylinder".

Switch on unit and operate for 15 to 30 minutes. Check for any leaks.

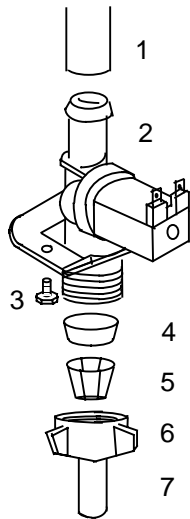


## 1.21.6 Cleaning the Solenoid Inlet Valve

### Disassembly

- ≈ Drain residual water in the cylinder. Press simultaneously  and  on the control panel.
- ≈ Disconnect steam humidifier from power supply. Control switch OFF and remove safety fuse F1. Secure against restart.
- ≈ Check that unit is without power.
- ≈ Disassemble cylinder, as described in chapter 1.21.3 "Cleaning the Steam Cylinder".
- ≈ Turn off water supply and loosen nut to the fresh water connection (6).
- ≈ Release connecting hose (1) to cylinder base.
- ≈ Pull out cable plugs.
- ≈ Remove fitting screws from solenoid valve (3).
- ≈ Remove solenoid valve.
- ≈ Remove filter (5) in the inlet and clean. Exchange filter, if necessary.

≈ Remove capacity limiter (4) in the inlet and clean (only DBV-P).



## Assembly

- ≈ Insert through-flow limiter (4) and filter (5).
- ≈ Insert solenoid valve into unit.
- ≈ Firmly fasten solenoid valve with screws (3).
- ≈ Connect water supply (6).
- ≈ Connect cable plugs to solenoid valve.
- ≈ Connect connection hose (1) to solenoid valve.
- ≈ Assemble cylinder as described in chapter 1.21.3 "Cleaning the Steam Cylinder".
- ≈ Open water supply.
- ≈ Switch on the unit and operate for 15 to 30 minutes. Check for any leaks.



**Note:** The SUPER FLUSH double solenoid through-flow limiter is located on the outlet side.



## 1.21.7 Check Cable Connections and Heater Cables

≈ Check all connections to be firmly tightened.

**Attention:** Loose cable connections lead to excessive contact resistance and overheating of the contact surface.

## 1.21.8 Check Heating Element thermic cut-out Switches

Check overheat switch with empty cylinder. See also chapter 4.10 "Wiring Diagram".

- ≈ Drain residual water in the cylinder. Press simultaneously  and  on the control panel.
- ≈ Disconnect steam humidifier from power supply. Control switch OFF and remove safety fuse F1. Secure against restart.
- ≈ Check that unit is without power.
- ≈ Remove contactor "Dry Level".
- ≈ Connect "Operational" terminals 23 with 21.
- ≈ Switch on humidifier. Hygostat or controller has to call for humidity.
- ≈ After approx. 60 sec. temperature cut-outs should trip. A small rod appears on the top of the thermostat.
- ≈ After max. 90 sec. switch off unit to protect heaters and steam cylinder for damage.
- ≈ Re-establish wiring according to chapter 4.10 "Wiring diagrams".
- ≈ Open water supply and refill cylinder with water.
- ≈ Switch off power supply.
- ≈ Press down rod with a pair of pliers to re-engage contacts.



## 1.21.9 Access Electric Compartment

The control is attached to a mounting plate, which in turned is fastened with two screws at the divider plate between electric and steam compartment.



**Note:** When removing the upper screw only the complete control assembly can be rotated to a vertical position to gain easy access to the components installed at the back wall of the compartment.



**Attention, High Voltage:** Switch power off before installing or dismantling the controls assembly. The assembly is not properly earthed when dismantled. Earthing is accomplished by the screws.

## 1.21.10 Checking Operation

Start the steam humidifier and operate for a few minutes at maximum output if possible.

≈ Check safety devices.

≈ Check hose connections for any leaks.

## 1.22 Dismantling

Removing the steam humidifier follows the same sequence as installing, only in reverse order



**Attention:** Dismantling the unit should only be carried out by qualified personnel. The electrical supply should only be disconnected by a qualified electrician.

Pay attention to the "Safety Notes" chapter 1.2, particularly to those referring to disposal.

## Electric Heater Steam Humidifiers

### Series DBV-66P - DBV-526P

for use with fully demineralised water or purified condensate

### Series DBV-U66P - DBV-U526P

for use with tap water

## Operation and Maintenance Instructions

### Installation

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## 2. Installation



**Attention:** Installing this unit should only be carried out by qualified personnel. We accept no liability for damages caused by faulty installation.

Observe all safety and warning notices found on the unit.

Do not connect the unit to electrical power before final installation.

Additional equipment may not be installed inside the unit without prior written consent by HYGROMATIK.

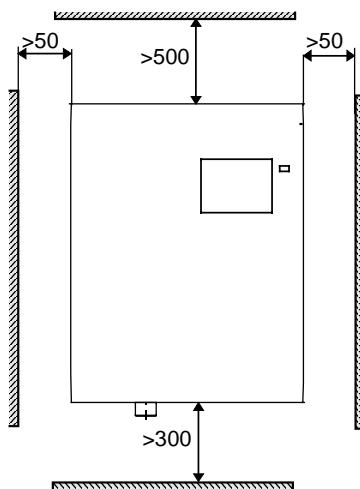
### 2.1 Steam Humidifier



**Note:** Be aware of the following when selecting the steam humidifier installation location.

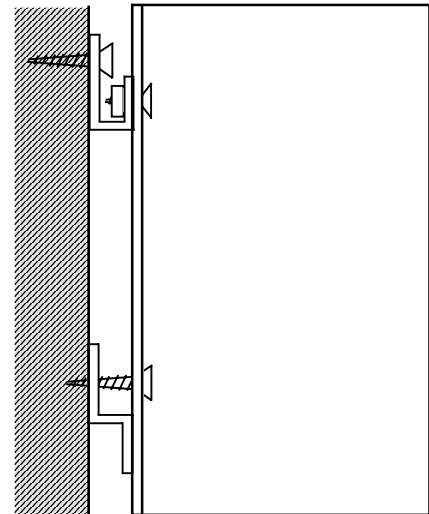
- Ambient temperature 5 to 40 °C.
- Relative humidity below 80 %R.H.
- Distances to the walls in compliance with those in the diagrams.
- The steam manifold should be joined to the steam humidifier using the shortest possible lengths of steam and condensate hoses.
- The hoses must be without sags and kinks and be laid with a continuous slope of 5-10% (otherwise sags will be formed).

#### Wall Distances



**Note:** It is often advantageous to use existing water connections (feed and drain) when selecting the steam humidifier.

#### Wall Mounting



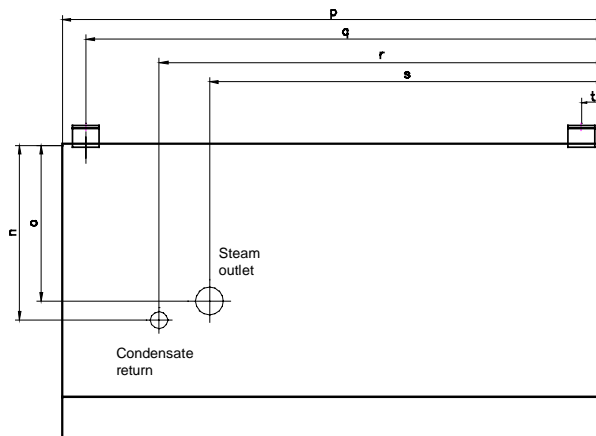
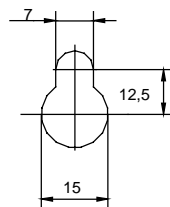
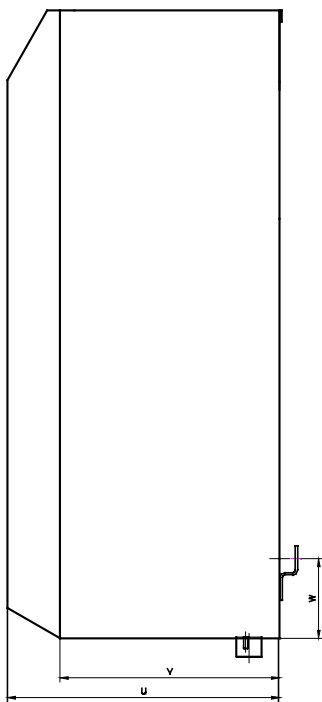
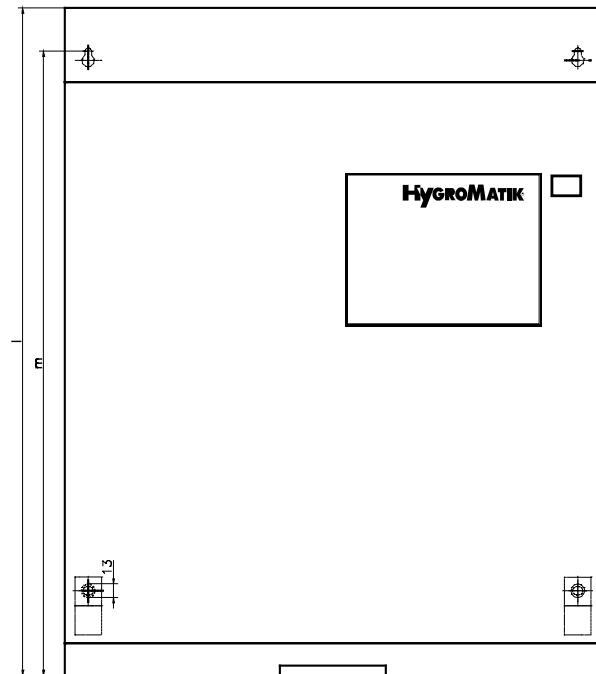
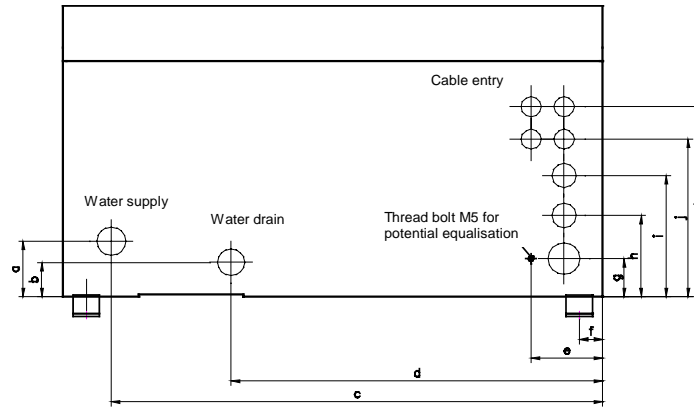
**Note:** To function properly the steam humidifier must be installed vertically.

- » Position the steam humidifier in the desired location, adjust with spirit level and mark position of hanging bolts. See "Equipment Dimensions" chapter 2.1.1.
- » Hang the unit onto bolts screwed into the marked position and tighten.
- » Fix the unit at the lower brackets.

If there is no suitable wall, it is recommended that the equipment is installed on brackets which can be embedded in the floor.

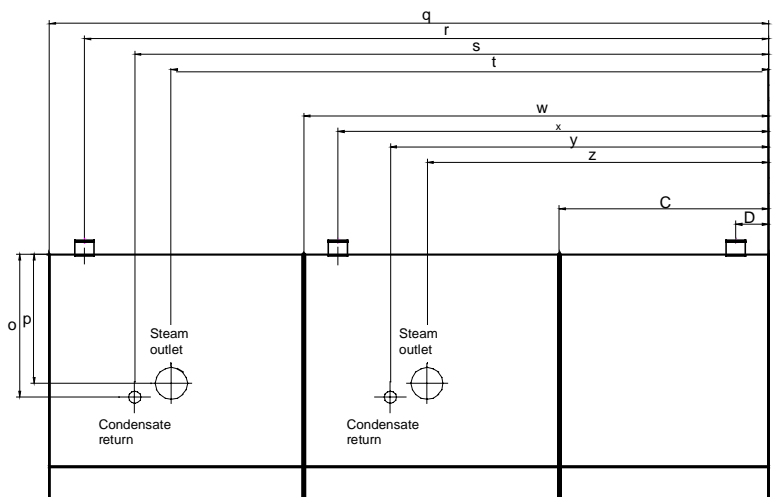
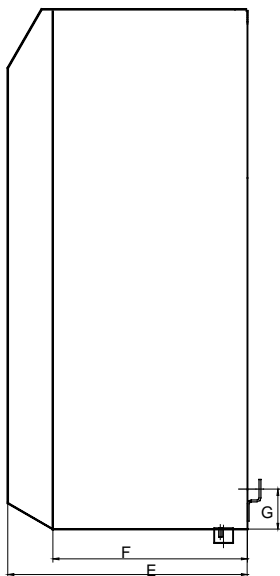
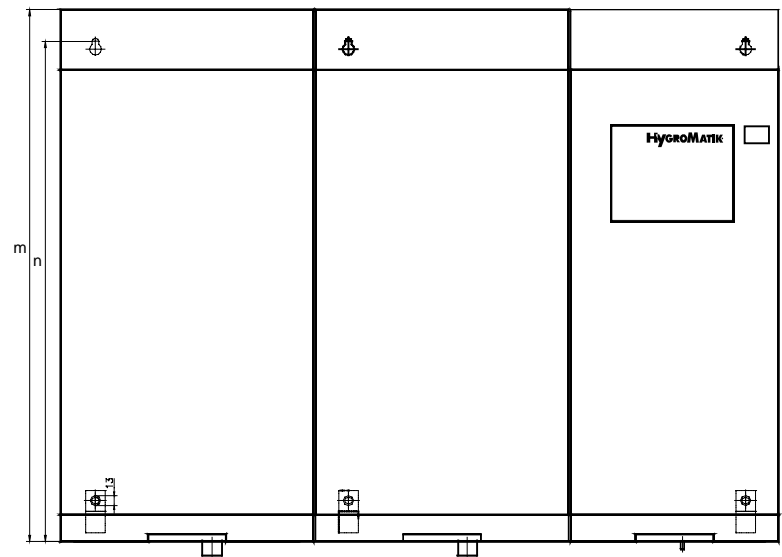
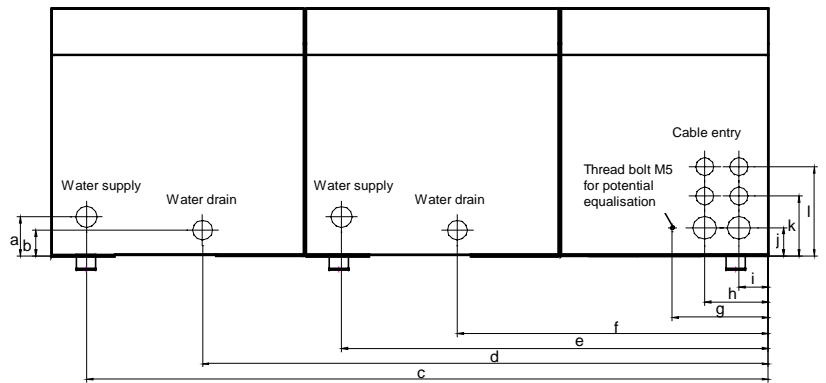
## 2.1.1 Equipment Dimensions DBV-(U)66P - DBV-(U)266P

	DBV-(U)66 - DBV-(U)266
a	49
b	32
c	488
d	368
e	68
f	40
g	37
h	78
i	116
j	150
k	181
l	689
m	649
n	189
o	167
p	550
q	508
r	438
s	391
t	42
u	319
v	259
w	54
all dimensions in mm	



## 2.1.2 Equipment Dimensions DBV-(U)306P - DBV-(U)526P

	DBV-(U)306 - DBV-(U)526
a	51
b	33
c	878
d	729
e	556
f	399
g	120
h	79
i	35
j	36
k	77
l	115
m	690
n	649
o	183
p	165
q	923
r	830
s	813
t	766
w	592
x	503
y	483
z	435,5
C	261
D	131
E	317
F	258
G	53
all dimensions in mm	



## 2.2 Fan Unit (option)



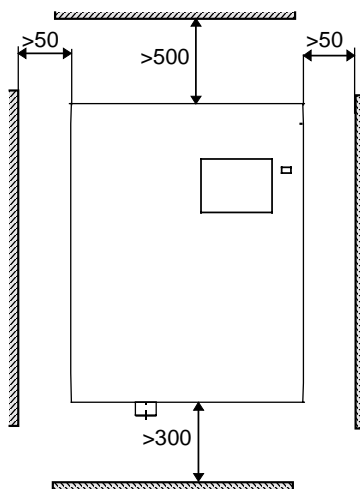
**Note:** The fan unit should be positioned such that draught effects are avoided. A minimum height of 2 m is generally sufficient.

- Install the fan unit directly on a wall.

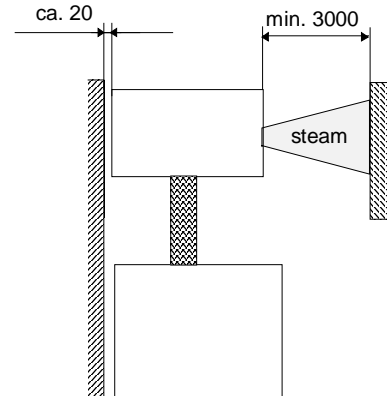
Type	Fan Unit*
DBV-(U)66	VG 08
DBV-(U)96-176	VG 17
DBV-(U)266	VG 30
DBV-(U)306	2 x VG 17
DBV-(U)356-526	2 x VG 30

\* See also Technical Data.

- The fan unit is mounted above the steam humidifier.
- When using a number of fan units simultaneously a maximum distance of 5 m from the steam humidifier should not be exceeded.
- The distances to the walls must comply with the figures in the diagrams.



Fan unit, wall mounted [mm]



Side view, wall mounted fan unit [mm]

## 2.3 Steam Manifolds

- Install steam manifolds close to the steam humidifier.
- Position control sensors and limiting devices at the proper distance from the last manifold, taking into account the complete steam absorption distance.

The quantity and size of available steam manifolds and the nominal diameter of the relevant steam and condensate hoses can be taken from the table.

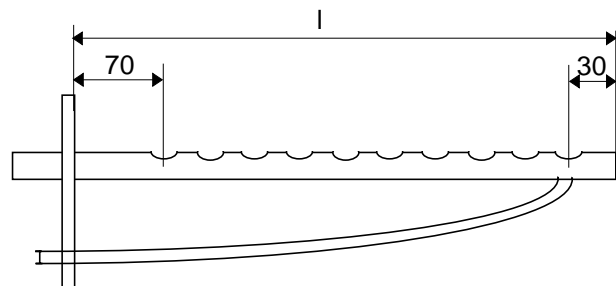
DBV-(U)	66-126	176-266	306-526
Steam manifold	1x25	1x40	2x40
Steam hose	DN25	DN40	2xDN40
Condensate hose	DN12	DN12	2xDN12



**Note:** With the units DBV-(U) 66-126 an adapter 40/25, a steam hose DN40 and two hose clamps are delivered to reduce the steam outlet from DN 40 to DN 25.

### Steam Manifold Lengths [mm]

l	220	400	600	900	1200	1500
DN25	x	x	x	x	x	x
DN40	x	x	x	x	x	x



Steam distributor dimensions: see chapter 2.9 "Drill pattern".

## 2.3.1 Installation

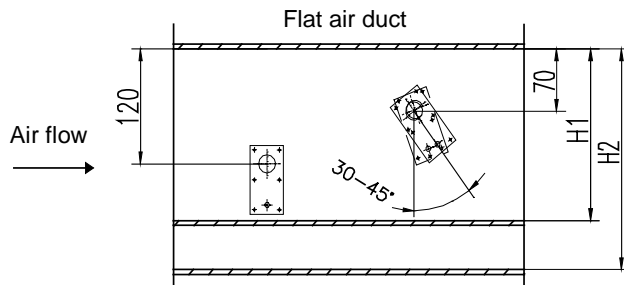
- Steam manifolds should be fitted preferably on the fan discharge side in an air duct with pressure up to 1200 Pa max.
- If fitted on the fan suction side a maximum pressure of -500 Pa is permitted.

For high pressure systems extensions should be made to the feed and drain hoses depending on the actual total pressure. Detailed information is available on request.

Please ensure the air duct is up to the latest technical standard.

When installing the steam manifolds, please pay attention to the following:

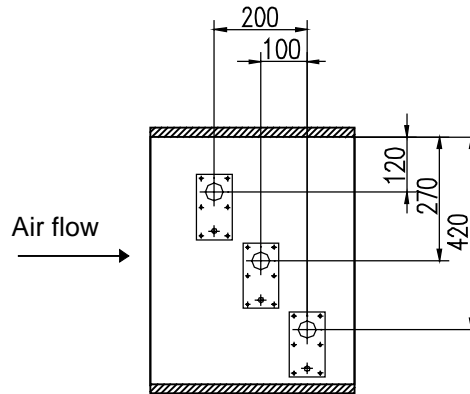
- Steam manifolds are always installed horizontally in the side wall of the duct.
- The air flow may be from either direction.
- A minimum distance of 120 mm to the top of the air duct should be observed.
- The minimum distance may be reduced to 70 mm if the steam manifold is turned to an angle of 30 - 45° to the direction of the air flow.



	H1 [mm]		H2 [mm]
	30°	45°	
DN25	182	168	225
DN40	193	179	230

- Ensure uniform steam distribution in the air duct.

Air Duct	Installation Point
Flat	Different lengths, next to one another
Narrow, high	Equal lengths, above one another. Displaced sideways if possible
Square-shaped	Equal lengths, displaced in height and sideways
Flat, very wide	Opposite one another



If the installation conditions are not particularly favourable always check the air flow carefully, in particular for possible risk of condensation in the air duct.

Depending on the duct dimensions an additional fastening of the steam manifolds could be required.

## 2.4 Steam Hose



**Note:** When installing the steam hose, please pay attention to the following:

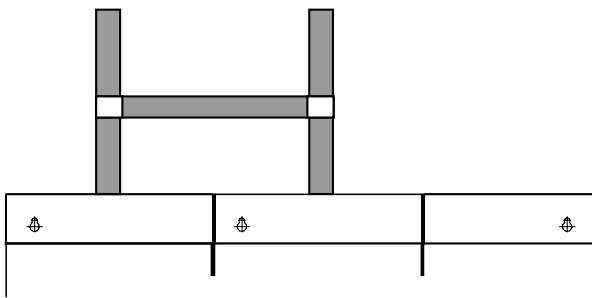
- The steam hose diameter may not be smaller than the steam outlet of the HYGROMATIK steam humidifier (do not restrict the cross-section, otherwise back pressure will increase).
- The steam hose must be without sags and kinks and be laid with a continuous slope of 5-10% (otherwise sags will be formed). See 2.6.
- The steam hose should be as short as possible. In case of lengths of over 5 m the hose should be insulated to avoid excess condensation.
- In the case that steam output is distributed on two steam manifolds the T-pieces for the steam and condensate hose should be installed near the manifolds. If the installation is carried out in this way only one steam hose is necessary for the main part, loss of condensate will be decreased.
- Depending on how the hose is laid, hose clips should be set at intervals of approx. 500 mm.
- Allow access to the steam hose, so that it can be inspected later.
- In case of straight lengths of several meters, it is recommended to place the steam hose in temperature resistant plastic pipe (40 mm dia for hose DN25; 60 mm dia for hose DN40) or to use copper pipe.
- Only genuine HYGROMATIK hoses are capable of withstanding the operating conditions.
- Allow for minimum bending radii:
  - Steam hose DN 25: Rmin = 200 mm
  - Steam hose DN 40: Rmin = 400 mm

## 2.4.1 Pressure Equalisation

Rapid pressure surges within the airduct can, in 2-cylinder units, cause momentary imbalances in the level control cylinder forcing the float beyond the middle level sensor. At this point water is fed to the system until it is stopped by the high level sensor and all functions stop.

We therefore recommend the installation of a pressure equalisation hose above the humidifier between the two steam hoses.

- » Install the pressure equalisation hose just above the humidifier between the two steam hoses.



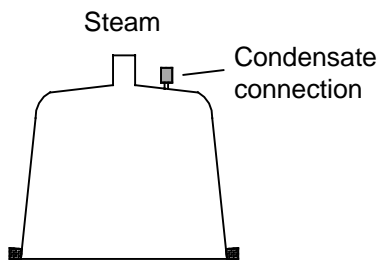
## 2.5 Condensate Hose



**Note:** When installing the condensate hose, please pay attention to the following:

**If the steam manifold is positioned higher than 500 mm above the steam humidifier:**

- » Remove condensate plug from connection on the cylinder.



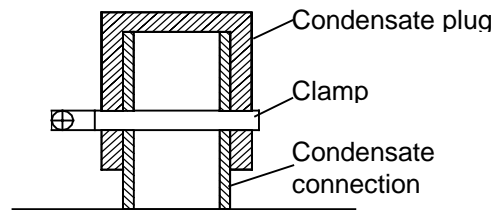
- » Lay the condensate hose with a slope of 5-10% to the steam cylinder so that condensate can flow back unrestricted.



**Note:** It is recommended to form a loop of 200 mm diameter as a vapour trap provided there is enough space. Regard also chapter 2.6. "Installation Examples". Possible operating noises can be reduced in this manner.

**If the steam manifold is positioned lower than 500 mm above the steam humidifier:**

- » Let the condensate flow into a drain.
- » In order to avoid steam losses, a loop of at least 200 mm diameter should be formed.
- » The loop in the condensate hose should be located away from the steam manifold connection.
- » Ensure that the condensate connection on the steam cylinder is closed with a plug.

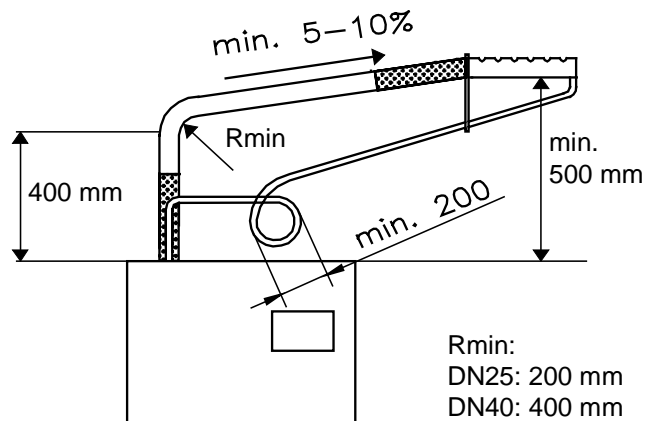


- » Use hose clips at intervals of approx. 500 mm depending on type of hose.

## 2.6 Installation Examples

**If the steam manifold is positioned higher than 500 mm above the steam humidifier:**

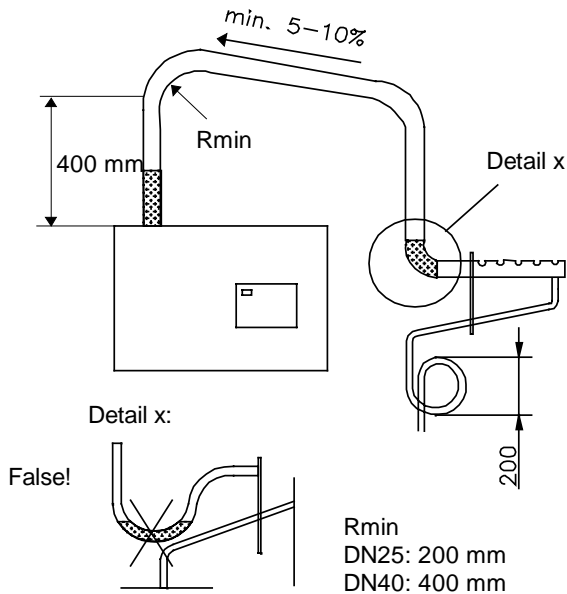
- » Lay the steam hose at a height of at least 400 mm above unit and then connect to the steam manifold with a constant rise or fall.
- » Lay condensate hose with a slope to the steam cylinder.





## If the steam manifold is positioned lower than 500 mm above the steam humidifier:

- » Lay steam hose at a height of at least 400 mm above unit and then connect to the steam manifold with a constant fall.
- » Lay condensate hose with a loop of 200 mm diameter (vapour trap) to the drain. The distance between vapour trap and steam manifold should have at least 1m.

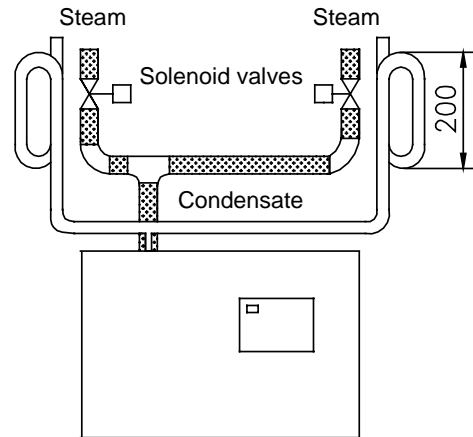


## 2.7 Steam Solenoid Valves

When humidifying a number of loads, which are to be controlled separately, using a single steam humidifier, steam solenoid valves can be included in the steam hoses. Valve control has to be provided by the customer.

- Install the vertical risers with flow from bottom to top.
- The best position is just above the steam humidifier.

Hose nozzles are included with the steam solenoid valves for easy installation in the steam hose. Please refer to chapter 2.5 and 2.6 for the correct installation of the condensate hose.



## 2.8 Checking



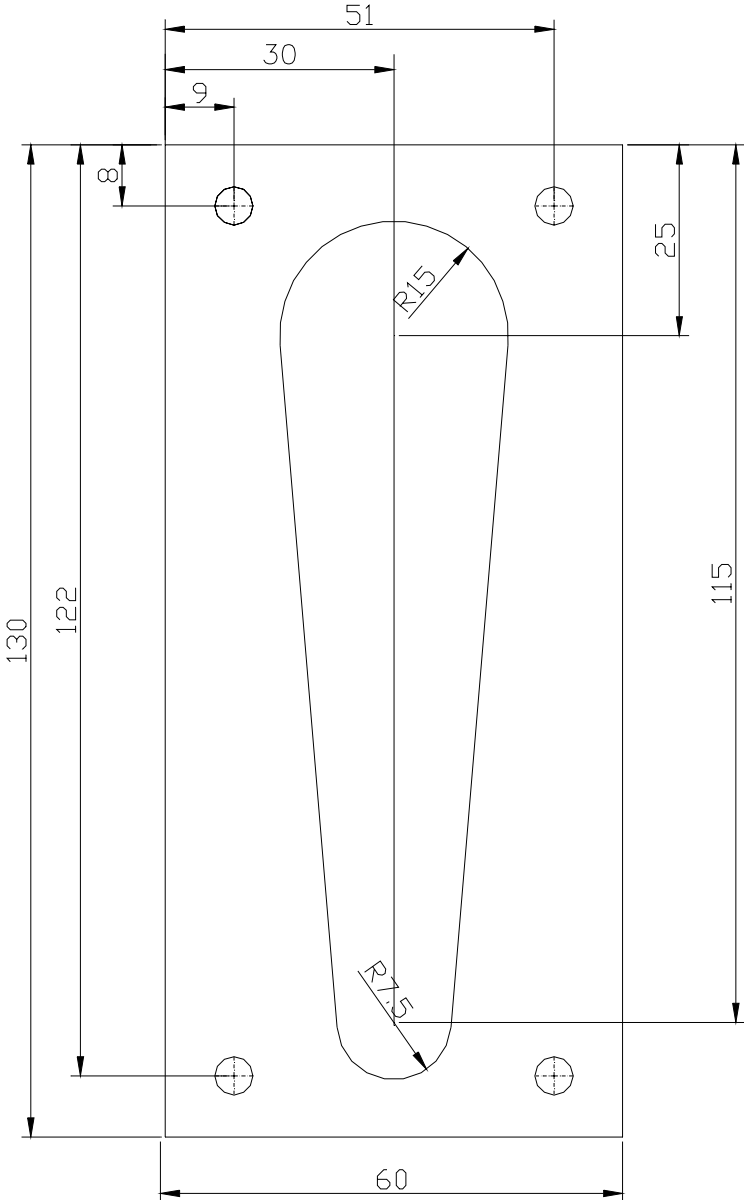
**Attention:** This unit may only be operated by qualified and properly trained personnel.

Please check the installation using the following list:

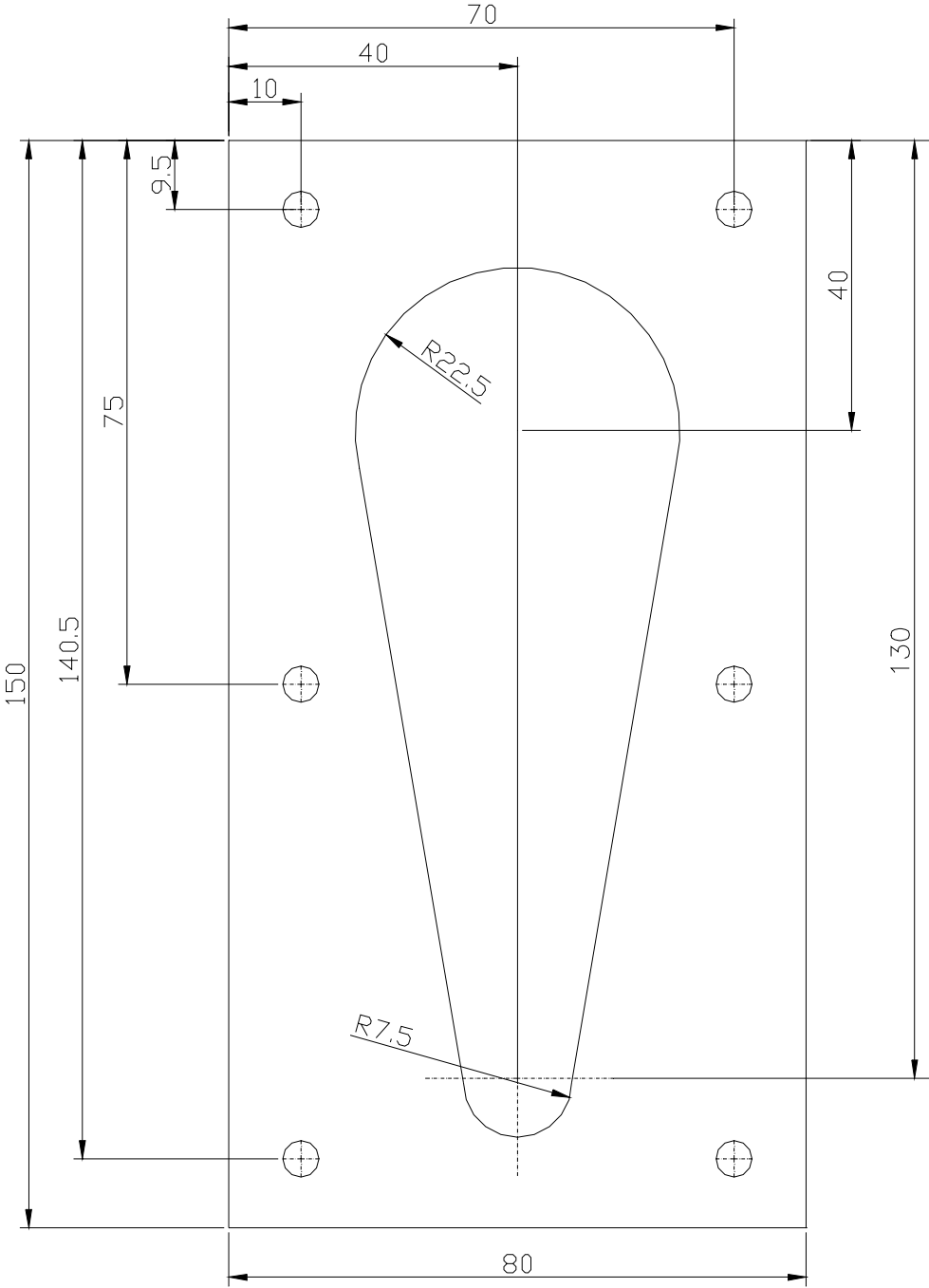
- Does unit hang vertically?
- Are wall distances to the unit within the range (see 2.1.1)?
- Does steam hose have a slope of 5-10%?
- Is condensate hose installed with a loop of min. 200 mm?
- Is steam manifold positioned correctly?
- Are all bolts and clamps tightened?

## 2.9 Drill Pattern

### 2.9.1 Drill Pattern DN 25



## 2.9.2 Drill Pattern DN40



## Electric Heater Steam Humidifiers

### Series DBV66P - DBV526P

for use with fully demineralised water or purified condensate

### *Series DBV-U66P - DBV-U526P*

*for use with tap water*

## Operation and Maintenance Instructions

## Plumbing Instructions

<b>3.</b>	<b>Water Installation .....</b>	<b>2</b>
<b>3.1</b>	<b>Water Treatment.....</b>	<b>2</b>
<b>3.2</b>	<b>Water Inlet .....</b>	<b>2</b>
3.2.1	Water from the Supply Tank .....	3
<b>3.3</b>	<b>Water Discharge .....</b>	<b>3</b>
<b>3.4</b>	<b>Filling Cup.....</b>	<b>4</b>
<b>3.5</b>	<b>Checking .....</b>	<b>4</b>

## 3. Water Installation



**Attention:** During installation please observe:

- All work must be carried out by qualified and authorised personnel.
- Switch off the unit beforehand.
- Observe local regulations of water works or municipalities.
- Each DBV-(U) humidifier has a standard filling cup in accordance with DIN 1988, part 1.
- Depending on local regulations, a pipe bow extending 300 mm above the cabinet (with automatic vacuum breaker and non-return valve) should be installed.
- The inlet water temperature may be up to 60 °C.
- The discharge shall flow freely into the drain.
- The supply line shall have a minimum diameter of DN 12 (3/8").
- Hygienic generation of steam can be guaranteed only if there are no (chemical) additives in the water.
- Use only demineralised water or condensate. Maximum conductivity may not exceed 20 µS/cm.
- If the humidifier is supplied with demineralized water or purified condensate do not use copper or brass fixtures for the inlet to the steam humidifier as these materials can be corroded by demineralised water. Suitable materials are high-grade steel or plastic-pipes.
- Water inlet pressure: 0.2 - 10 bar. Optionally the steam humidifier can be fitted to an inlet pressure of 0.05 - 3.5 bar.
- *When using tap water the pressure may be in the range of 0, 2- 10 bar.*

### 3.1 Water Treatment

Use the following table for the water treatment system and the supply tank dimensions.

The figures are based on:

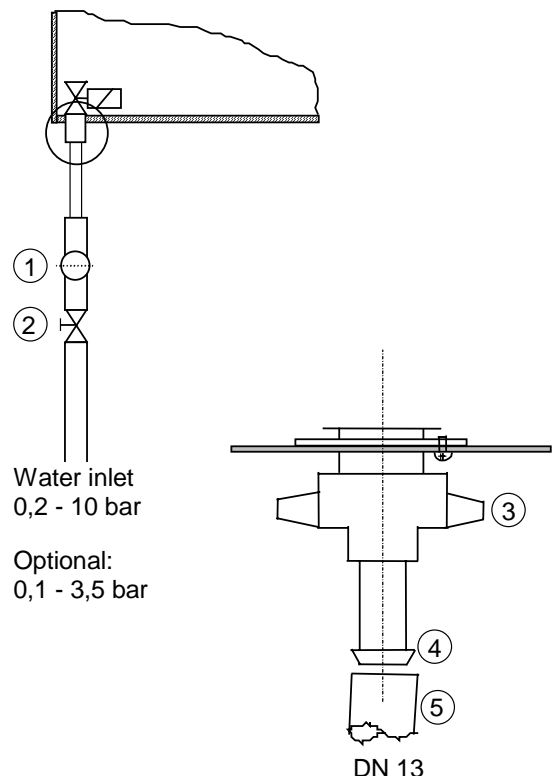
- The humidifier runs for 24 hours with a performance of 100%.
- It takes 1 hour for the water treatment system to replenish the water and 1 hour to fill the supply tank.

DBV	Water Consumption within 24 Std. [l]	Water Treatment System [l]	Supply Tank [l]
66	162	243	30,2
96	234	351	36,2
126	306	459	42,2
176	426	639	52,2
266	642	963	70,2
306	738	1107	96,2
356	858	1287	106,2
436	1050	1575	122,2
526	1256	1899	140,2

### 3.2 Water Inlet

- » Install a shut-off valve (2) in the supply hose
- » Install a water filter (1) if the water quality requires it.

**Note:** Shut-off valve (2) und water filter (1) are the customer's responsibility.



The inlet connection of the water solenoid valve extends through the bottom tray.

- » Screw on fitting using plastic nut (3). Tighten by hand.



**Note:** Over-tightening will destroy the fitting. The strainer must be in the solenoid valve.

» Push pipe (6) of 13 mm inside diameter over the inlet connection of the solenoid valve (4). Fasten hose with clamp.

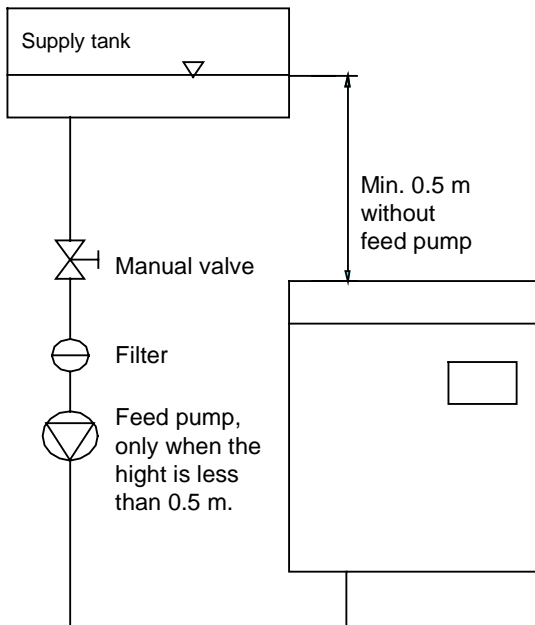


**Attention:** Make sure that no adhesive gets into the solenoid valve!

### 3.2.1 Water from the Supply Tank

The solenoid valve 0.05 - 3.5 bar can be used for a feed height of min. 0.5 m from the top of the humidifier to the min. water level in the supply tank (optional).

If the feed height is lower than 0.5 m a feed pump should be installed or the humidifier lowered.



### 3.3 Water Discharge

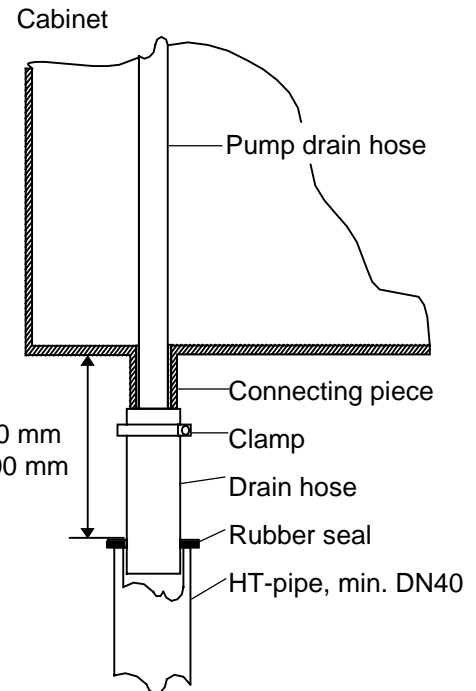


**Attention:** Discharged water must flow freely!

For the water drain, we recommend using a drain hose (flexible hose).

**Attention:**

- Do not bend, shorten or lengthen the discharge hose.
- Water drain shall withstand temperatures up to 95°C.



Install the water drain system as follows:

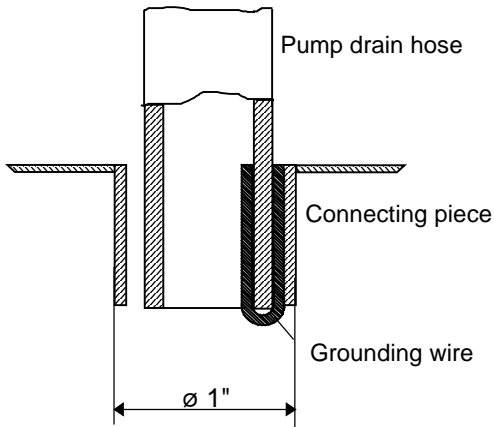
- Drain hose 1" extending 150 - 500 mm from the outlet of the housing, so that the discharge can flow freely into a pipe having a minimum inside diameter of 40 mm. Place a rubber seal between pipe and hose.

Type	Discharge Hose
DBV-(U)65 - 265	1 x DN 1"
DBV-(U)305 - 525	2 x DN 1"

- Push the drain hose 1" over the discharge hose and fasten at the connecting piece.

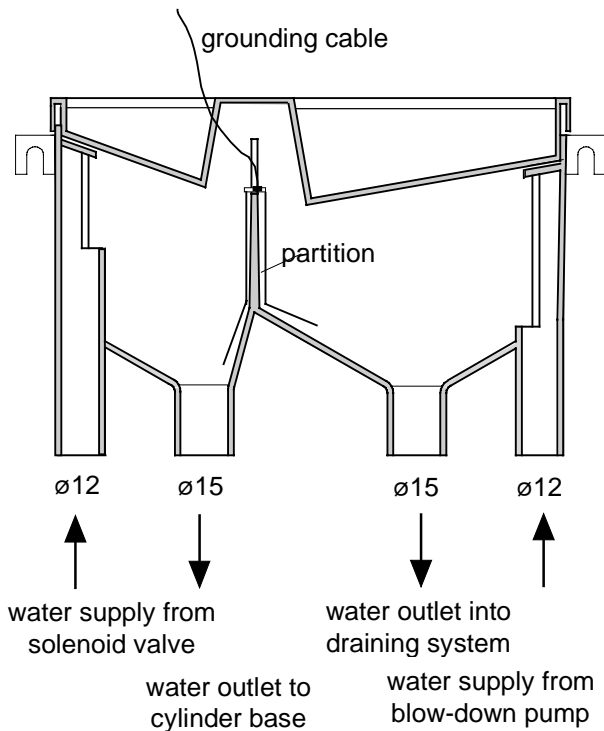
On the inside of the connecting piece there is a grounding wire. The end of the pump drain hose is pushed over the grounding wire. During blow-down the grounding wire will be in direct contact with the water. Any residual currents are thereby grounded.

Between the discharge hose and the inside of the connecting piece there is a clearance. In the case of water collecting on the plate, it will flow through the clearance into the draining system.



## 3.4 Filling Cup

A filling cup made of recyclable plastic is installed in the DBV-(U).



The functions of the filling cup are:

- Supply of water into the cylinder
- Free drain of discharged water
- Grounding of residual currents
- Positive air gap between feed water supply line and cylinder intake, according to DIN-DVGW 689
- Overflow if cylinder intake connection is blocked.

### Supply of Water into the Cylinder

Filling is done in the left hand side of the cylinder. When the solenoid valve opens, water flows through the filling cup into the cylinder. The cylinder is filled by the static pressure of the water.

If the water level in the filling cup gets too high, the water flows over the partition into the draining side.

### Free Drain of Discharged Water

Draining takes place in the right hand part of the filling cup.

Upon blow-down, water flows from the pump through the filling cup and into the drain.

If the draining system is blocked, the surplus water will flow over the partition and back into the cylinder.

### Grounding of Residual Currents

In the filling cup there is a grounding strip connected to the cabinet by a cable. Any residual currents are grounded during blow-down or filling.

## 3.5 Checking

Check the installation in accordance to the following:

- Are the screws and clamps tightened?
- Is the water supply connection correctly installed and can the water discharge flow freely?
- Are the water supply and discharge hoses free from any leakage?
- Is the water supply pipe flushed ?



**Attention:** The water supply pipe should be flushed before connection at the solenoid valve, particularly in the case of a newly installed one. This measure prevents possible early damage.

## Electric Heater Steam Humidifiers

### Series DBV66P - DBV526P

for use with fully demineralised water or purified condensate

### Series *DBV-(U)66P - DBV-(U)526P*

*for use with tap water*

## Operation and Maintenance Instructions

### For the Electrician

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4.2	Safety Switch .....	2
4.3	Fan Unit .....	2
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4.5	Control.....	3
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4.5.4	Proportional Control with Integral Controller and Proportional Max. Limiter.....	4
4.5.5	1step Control De-humidifier .....	4
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4.7	Checking .....	5
4.8	Description DBV-P and DBV-(U)P .....	6
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4.10	Wiring Diagrams .....	7



**ATTENTION:** All work must be done by qualified personnel.

All electrical installations and work on electrical components of this unit must be carried out by a qualified electrician.

Switch power off beforehand!



## 4. Electrical Installation



**Attention:** Please pay attention to the following while installing:

- All electrical installation and work on electrical components of this unit must be carried out by qualified electricians.
- Observe local regulations regarding the installation of electrical appliances or equipment.
- Switch power off beforehand and secure against restart.
- Check the unit is off.
- Switch power before installing or dismantling the control assembly. Refer also to chapter 1.21.9 "Access Electric Compartment".
- Electrical connections must be done by qualified personnel.
- Electrical connections shall correspond to the wiring diagrams.
- Internal power supply transformer may not be used for other purposes (controller).
- For ratings over 33 kW only a permanent connection to a permanently laid installation is allowed (German rule).
- Ensure that all cable connections are tight.

### 4.1 Installation

- » Safety fuses require a contact aperture of min. 3 mm. per pole.
- » Each steam cylinder requires its own main power connection including fuses, main breaker, etc.
- » Potential equalisation is to be connected to the threaded bolt outside the cabinet.

Type	Main Power Supply
DBV66-266	1 x 400V/3Phases/N
DBV306-526	2 x 400V/3Phases/N

Other voltages are available upon request.

Select fuses with quick or medium blow characteristics (applicable only for the above voltage).

Type	Nominal Current	Fuses
DBV-(U) 66	11,3 A	3x16 A
DBV-(U) 96	16,3 A	3x20 A
DBV-(U) 126	19,5 A	3x25 A
DBV-(U) 176	28,2 A	3x35 A
DBV-(U) 266	28,2 A	3x35 A
DBV-(U) 306	39,0 A	6x25 A
DBV-(U) 346	44,5 A	6x35 A
DBV-(U) 436	56,4 A	6x35 A
DBV-(U) 526	56,4 A	6x35 A

### 4.2 Safety Switch

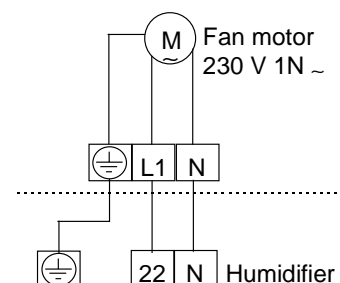
After removal of the steam panel the unit is switched off by the microswitch, which is placed in the top of the partition.



**Attention:** Safety switch is not to be taken out of operation.

### 4.3 Fan Unit

» Connect fan unit in accordance with the wiring diagram.



Fan unit is operation parallel to humidification demand.

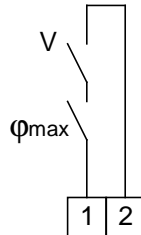
The fan phase can also be connected to terminal 2. In this case the fan unit will be switched by the safety interlock.

## 4.4 Safety Interlock

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



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



## 4.5 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).

The HYGROMATIK control type DBV-P can be programmed for the following control modes. Parameter **Control** (U6) has to be set according to chapter 1.14 "Parameter Settings using Code".

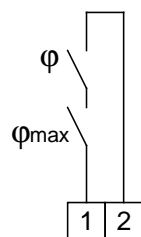
DBV-(U)P Controls (U6)
1step Control
Proportional Control with External Controller
Proportional Control with Integral Controller
Proportional Control with Integral Controller and Proportional Max. Limiter

### 4.5.1 1step Control

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



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



### 4.5.2 Proportional Control 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.

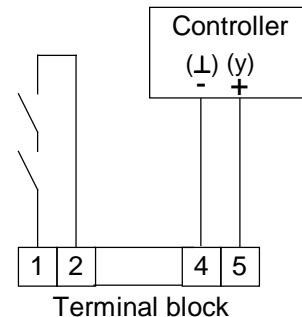
The parameter **Control signal** (E3) has to be set according to chapter 1.14 "Parameter Settings using Code" to match the humidifier to the control signal.

External control Signal (E3)
0(2) - 10 V DC (min. 0,5 mA)
0(4) - 20 V DC (min. 1,0 mA)
0 - 20 V DC (Phase angle, Staefa)
0 - 140 Ω*
0(2) - 10 mA DC (min. 2,5 V)
0(4) - 20 mA DC (min. 5 V)

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

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

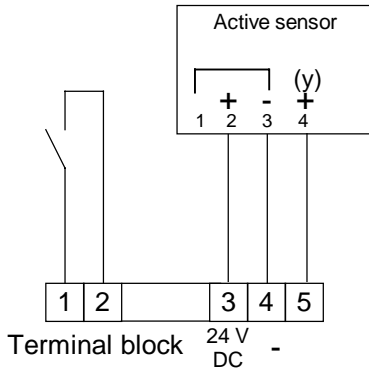
Connect to terminal block according to diagram:



External control signal

## 4.5.3 Proportional Control with Integral Controller

The sensor supplied upon request to operate the internal software PI controller has an output signal of 0 - 10 V. A signal of 0 V demands 100 % output from the humidifier.



Active sensor - voltage output



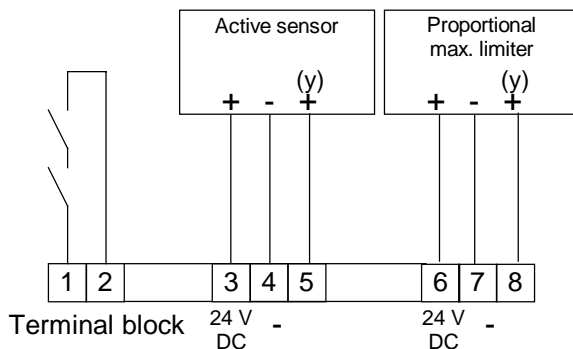
**Note:** Up to four one-cylinder units can be controlled with one single HYGROMATIK active sensor.

If other sensors are used it is necessary to adjust parameter E3 accordingly.

External control Signal (E3)
0(2) - 10 V DC (min. 0,5 mA)
0(4) - 20 V DC (min. 1,0 mA)
0 - 20 V DC (Phase angle, Staefa)
0(2) - 10 mA DC (min. 2,5 V)
0(4) - 20 mA DC (min. 5 V)

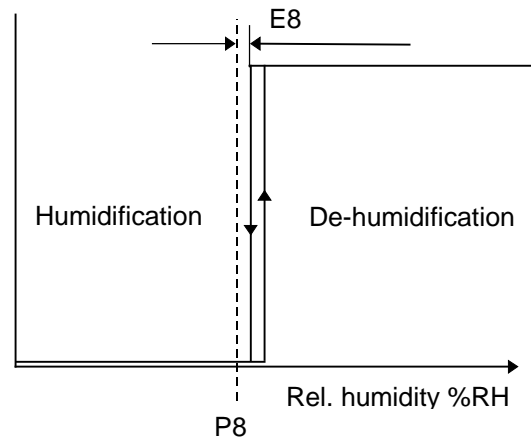
## 4.5.4 Proportional Control with Integral Controller and Proportional Max. Limiter

Connect active sensor and proportional max. limiter according to diagram:



## 4.5.5 1step 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 **Setpoint rel. Humidity** and E8 **Offset for de-humidification**. The hysteresis between humidification and de-humidification of 1% is fixed.



### Example:

P8 Setpoint 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%.

## 4.6 Potential free Signal Outputs

The maximum contact load is 250V/8A.

The control type DBV-P2 is equipped with three relays (change-over contacts). The terminals 28 - 36 are available in the unit.

Relay / Contact	Terminals	Description
Main contactor*	Contacts main contactor	Humidification
Relay 1	28,29,30	Collective Fault: – Blow-down Fault – Max. Level – Fault Filling – Fault RH Sensor – Fault Sensor Level – Steam-down time exceeded
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.

For programming see chapter 1.14 "Parameter Settings using Code".

## 4.7 Checking

All work - especially electrical - must be carried out by properly qualified personnel in accordance with the safety regulations.

- The supply voltage must correspond to the specified voltage on the name plate.
- All electrical connections must correspond to the wiring diagrams.
- Cable connections as well as plugs and their connections must be tightened.
- The unit must be connected to ground.



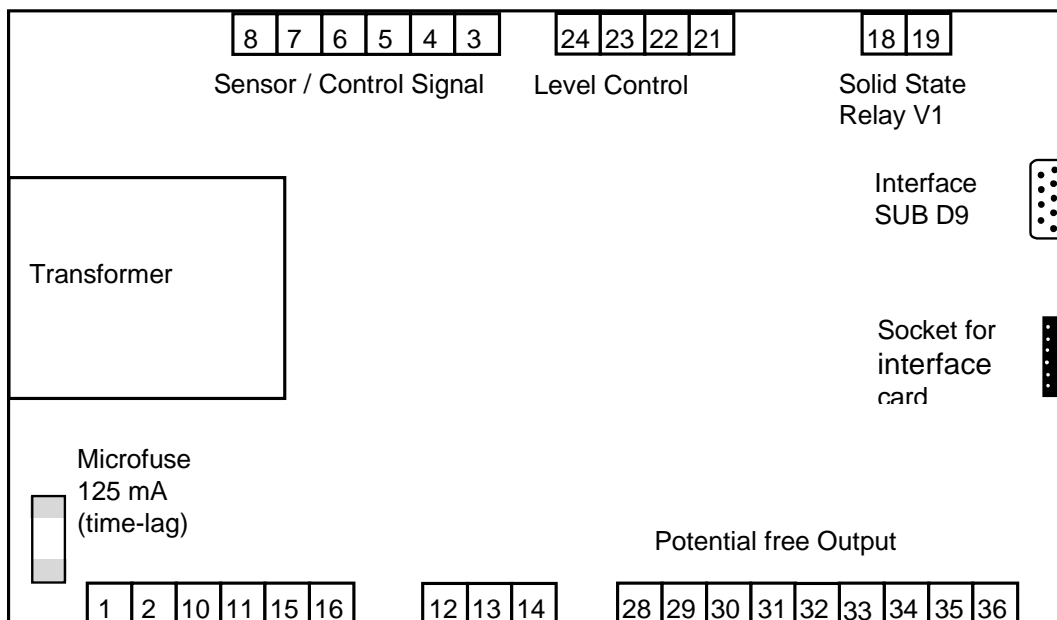
**Attention:** The cover is securely electrically earthed only when the lock is in a locked position.

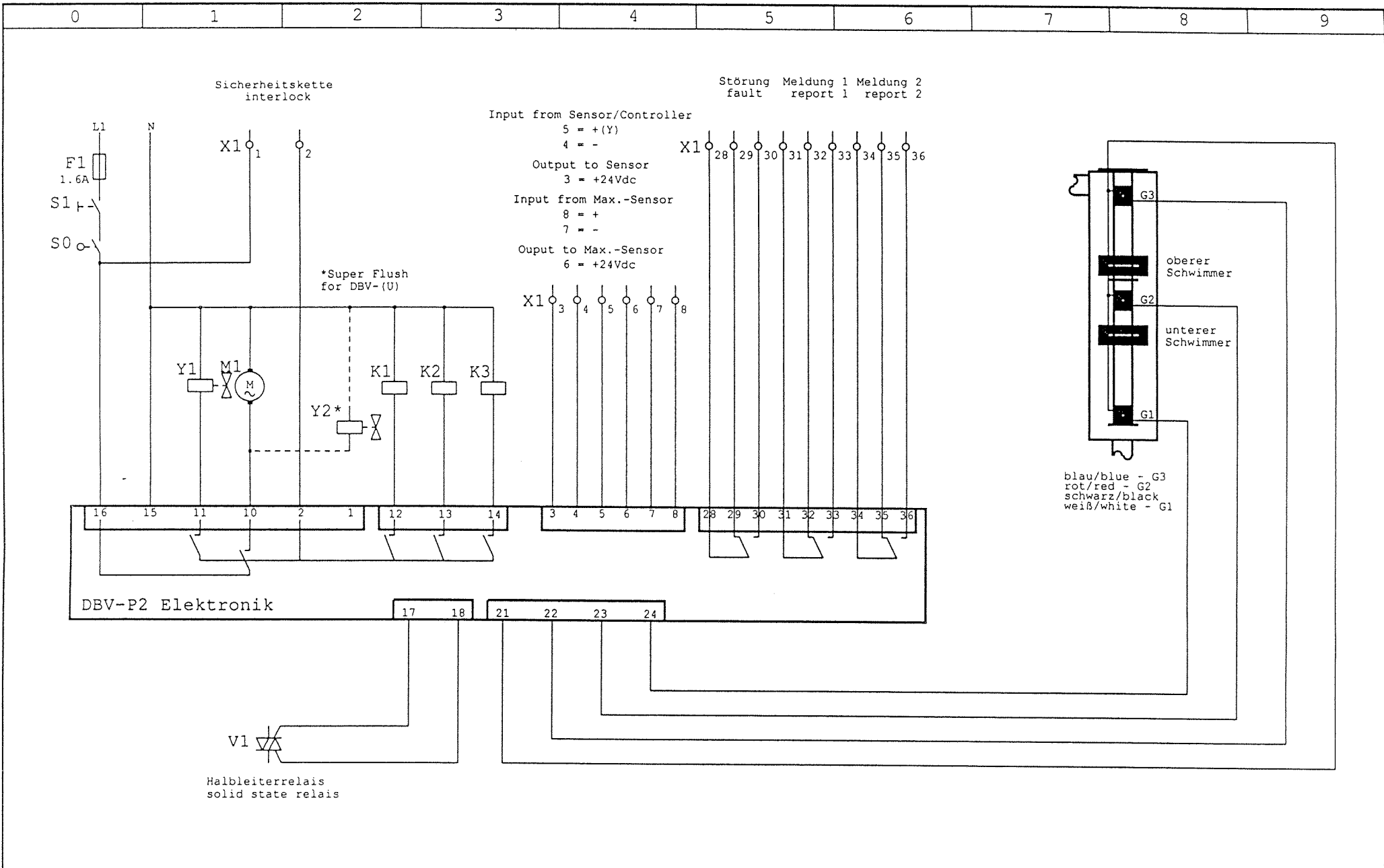
You can now switch on the steam humidifier.

## 4.8 Description DBV-P and DBV-(U)P

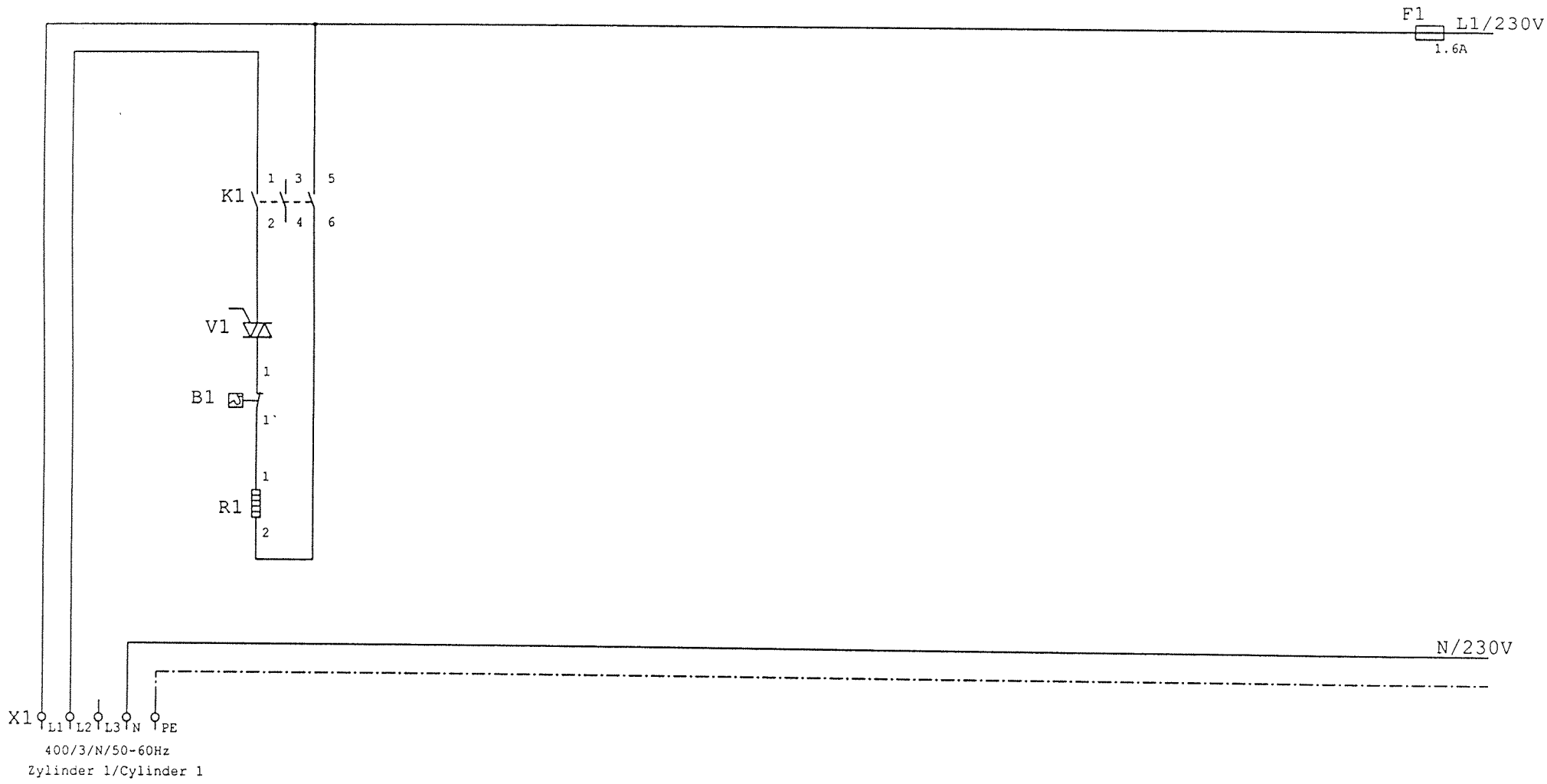
Control DBV-P		Steam Humidifier	
2	Supply solenoid valve, blow-down pump, main contactor(s) K1, K2, K3	F1	Control Fuse 1,6 A
3-5	Input external controller signal or active sensor signal	G1	Sensor Low Level
6-8	Input active max.-limiter signal	G2	Sensor Operational
10	Output drain pump	G3	Sensor High Level
11	Output solenoid valve	K1-3.2	Main contactor(s)
12-14	Output main contactor(s) K1, K2, K3	L1-L3	Main terminals
15-16	Power supply	N	Neutral
17-18	Control solid state relay	S0	Micro switch (Safety switch)
21	Mutual ground of reed-contacts (float switch) G1, G2, G3	S1	Control switch ON/OFF
22	NO-contact reed-contact (float switch) G3	M1	Blow-down pump
23	NO-contact reed-contact (float switch) G2	1-2	Terminals for hygrostat and safety interlock
24	NO-contact reed-contact (float switch) G1	3-5	Terminals for proportional control signal or active sensor signal
28-30	Potential free output collective fault	6-8	Terminals for max.-limiter, input signal 0 - 10 V DC
31-33	Potential free output (free programmable)	28-30	Terminals for Collective fault
34-36	Potential free output (free programmable)	31-33*	Terminals Potential free output (free programmable)
		34-36	Terminals Potential free output (free programmable)
		Y1	Solenoid valve

## 4.9 Connections Control Type DBV-P2



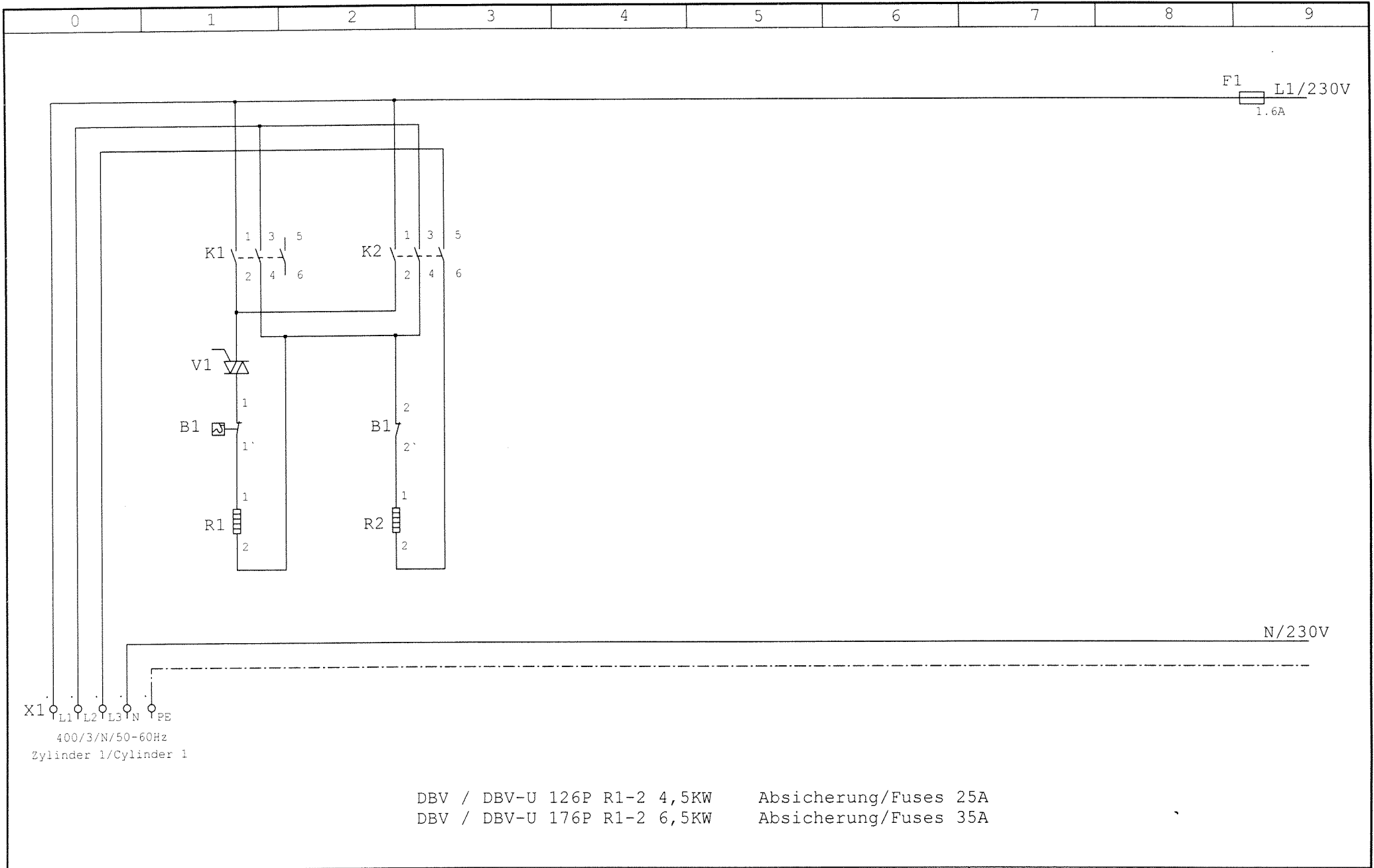


a	Freigabe	22.07.99	Kral	Datum	22.07.99	(Benennung)	(Zeichnung Nr.)	HYGROMATIK Oststraße 55 D-22844 Norderstedt Tel. 040-526833-0 Fax. 040-526833-33		
				Bearb.	Kral	DBV-(U) P2	S-992507			
				Gepr.	Kral					
Zust.	Änderung	Datum	Name	Norm	Urspr.	Ers.f	Ers.d	(Datei)	S992507A.001	Blatt 1 von 1 Bl.



DBV / DBV-U 66P R1 4,5KW    Absicherung/Fuses 16A  
 DBV / DBV-U 96P R1 6,5KW    Absicherung/Fuses 20A

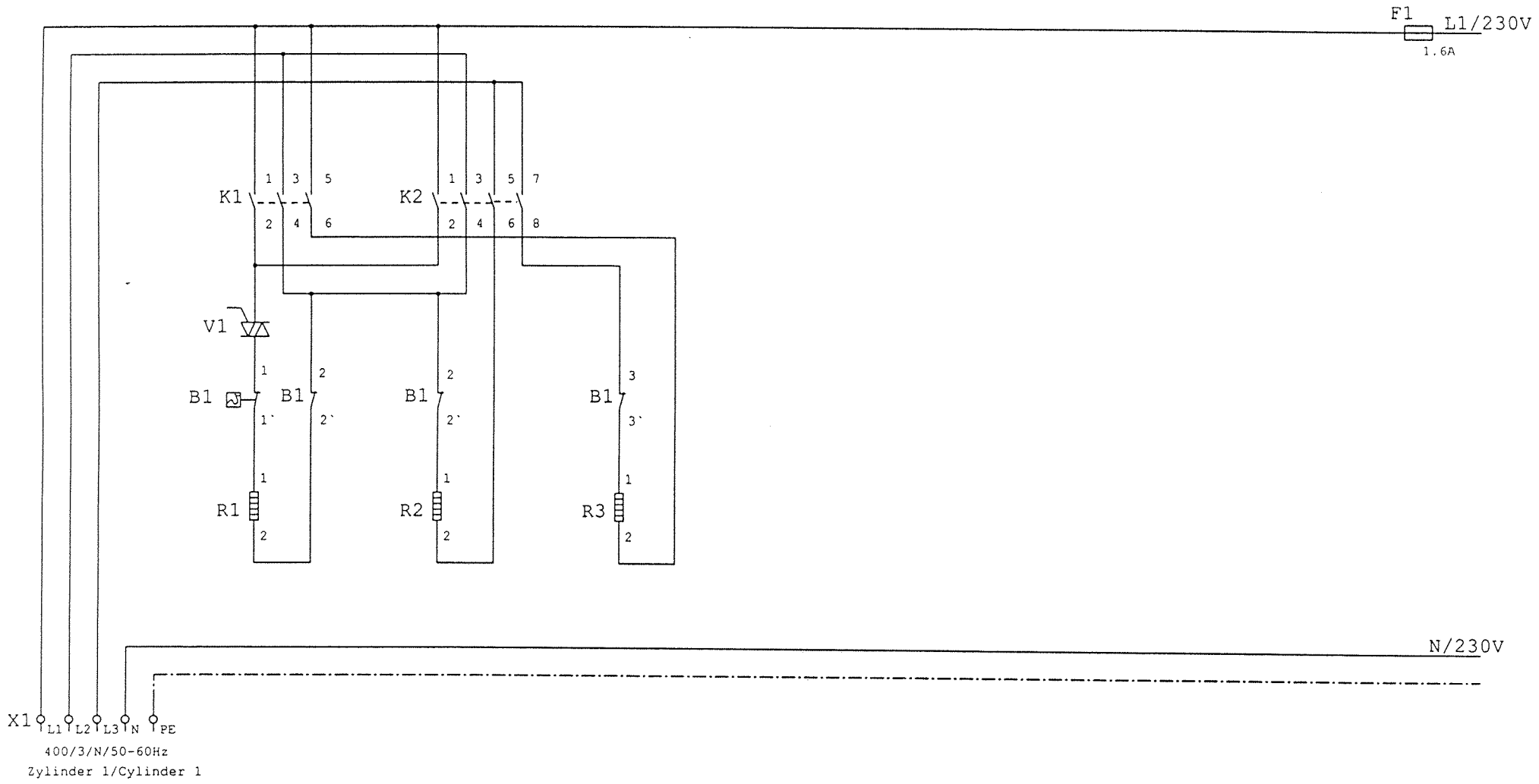
a	Freigabe	01.06.99	Kral	Datum	01.06.99	(Benennung) Leistungsteil/Power Part (Zeichnung Nr.)	HYGROMATIK Oststraße 55 D-22844 Norderstedt Tel. 040-526833-0 Fax. 040-526833-33			
b				Bearb.	Kral	DBV-(U) 66/96P für 400V/3/N	S-992501			
c				Gepr.	Kral					
Zust.	Änderung	Datum	Name	Norm		Urspr. Schumann	Ers.f	Ers.d	(Datei) S992501A.001	Blatt 1 von 1 Bl.



DBV / DBV-U 126P R1-2 4,5KW      Absicherung/Fuses 25A  
 DBV / DBV-U 176P R1-2 6,5KW      Absicherung/Fuses 35A

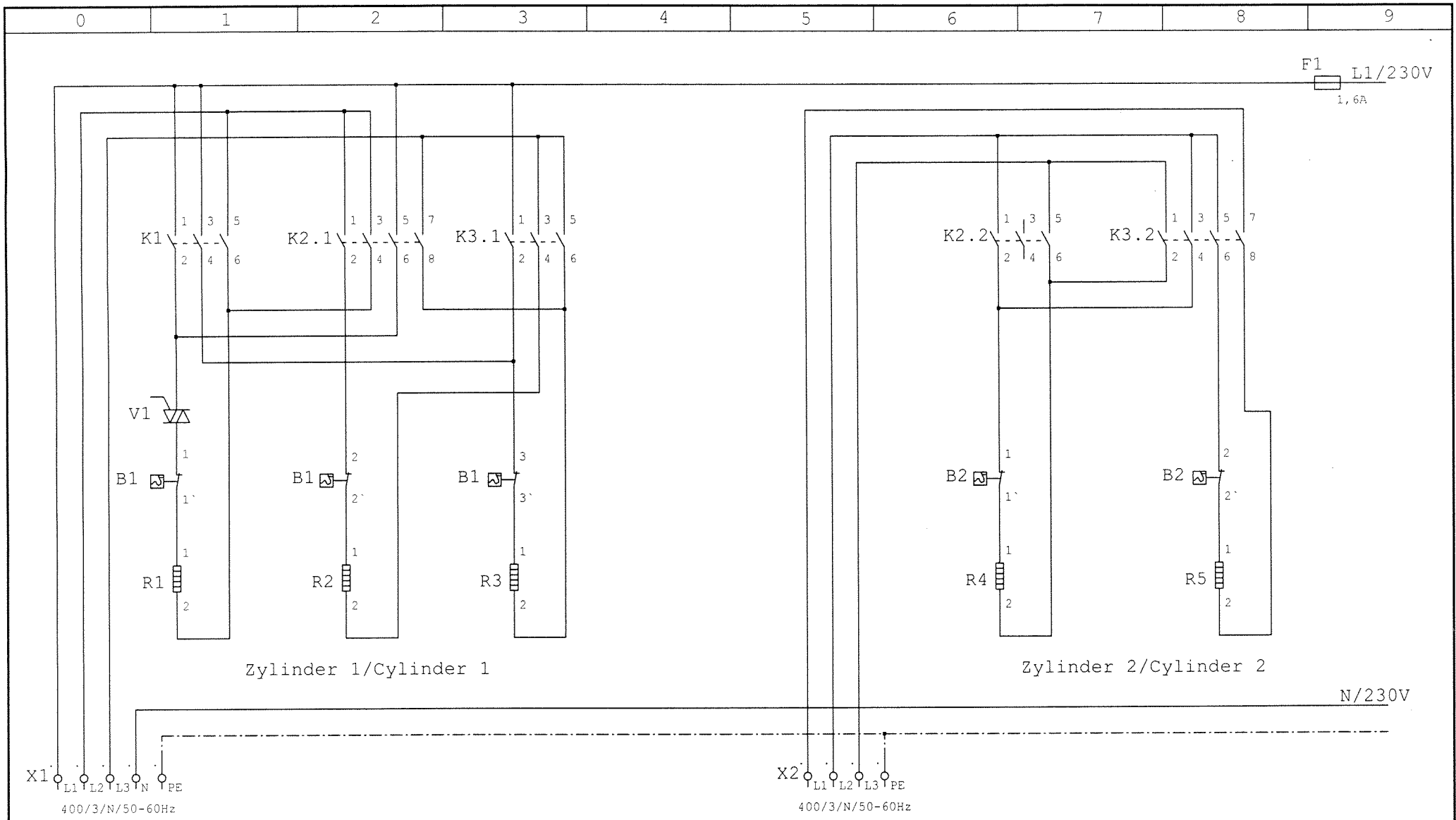
a	Freigabe	01.06.99	Kral	Datum	01.06.99	(Benennung)Leistungsteil/Power Part	(Zeichnung Nr.)	HYGROMATIK	Telefax	Phone
b	25A	05.03.01	Lue	Bearb.	Lue	DBV- (U) 126/176P für 400V/3/N	S-992502	Lise-Meitner-Str. 3	+49-(0)4193 / 895 - 33	+49-(0)4193 / 895 - 0
c				Gepr.	Lue			D-24558 Henstedt-Ulzburg		(Datei)
Zust.	Änderung	Datum	Name	Norm		Urspr. Schumann	Ers.f	Germany		von 1 Bl.
							Ers.d			





a	Freigabe	01.06.99	Kral	Datum	01.06.99	(Benennung) Leistungsteil/Power Part	(Zeichnung Nr.)	HYGROMATIK		
b				Bearb.	Kral	DBV-(U) 266P	S-992503	Oststraße 55		
c				Gepr.	Kral	für 400V/3/N		D-22844 Norderstedt		
Zust.	Änderung	Datum	Name	Norm		Urspr. Schümann	Ers.f	Ers.d	(Datei)	S992503A
										Blatt 1 von 1 Bl.

Tel. 040-526833-0  
Fax. 040-526833-33



Zylinder 1/Cylinder 1

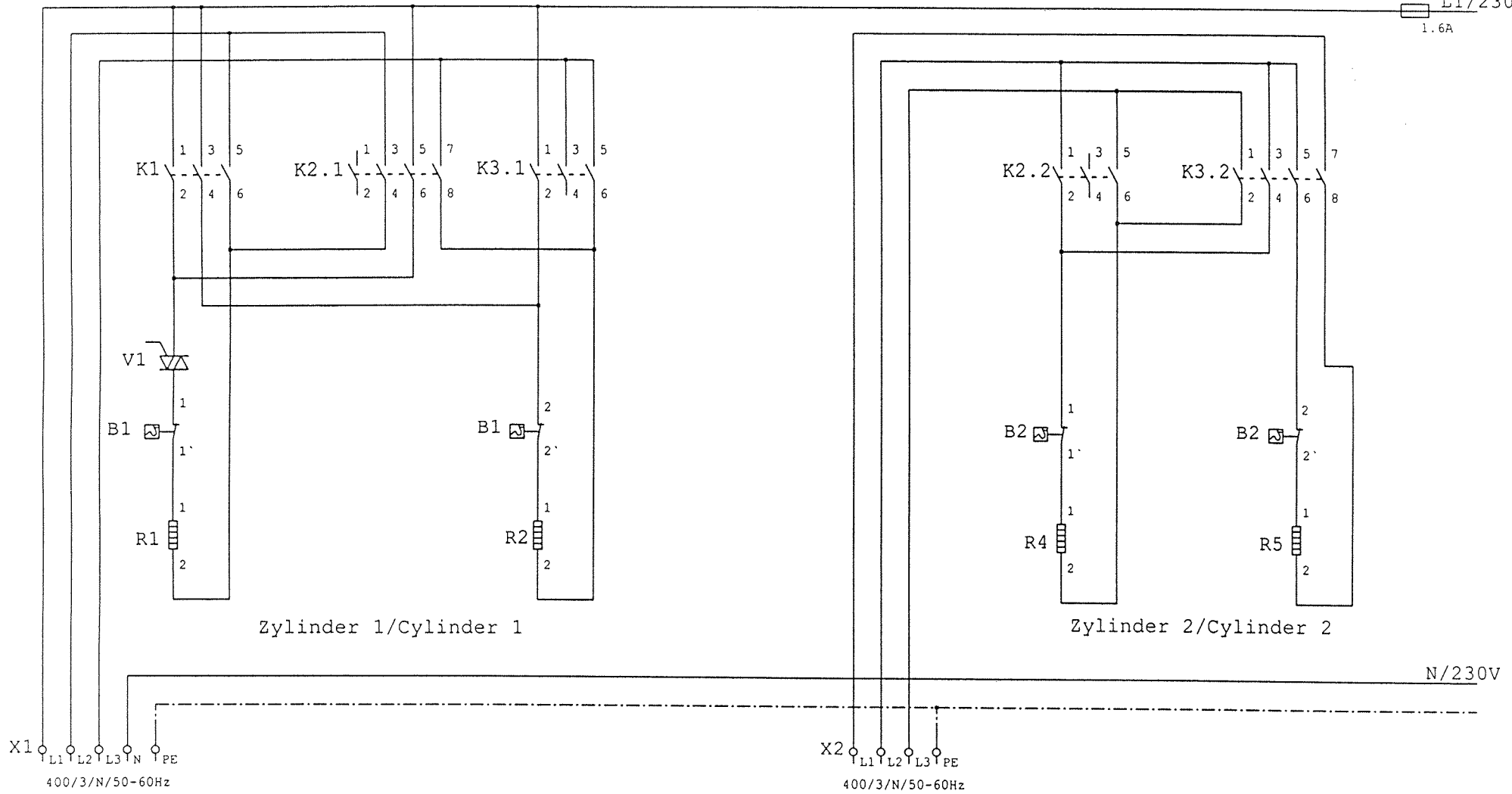
Zylinder 2/Cylinder 2

N/230V

DBV / DBV-(U) 306P R1-5 4,5KW Absicherung/Fuses 25A  
 DBV / DBV-(U) 436P R1-5 6,5KW Absicherung/Fuses 35A

a	Freigabe	22.07.99	Kral	Datum	05.03.01	(Benennung)Leistungsteil/Power Part (Zeichnung Nr.)	HYGROMATIK	Telefax	Phone	
b	25A	05.03.01	Lue	Bearb.	Lue	DBV-(U) 306/436P für 400V/3/N	Lise-Meitner-Str. 3 D-24558 Henstedt-Ulzburg Germany	+49-(0)4193 / 895 - 33	+49-(0)4193 / 895 - 0	
				Gepr.	Lue					S-992504
Zust.	Änderung	Datum	Name	Norm		Urspr. Schümann	Ers.f	Ers.d	von 1	Bl.

F1 L1/230V  
1.6A



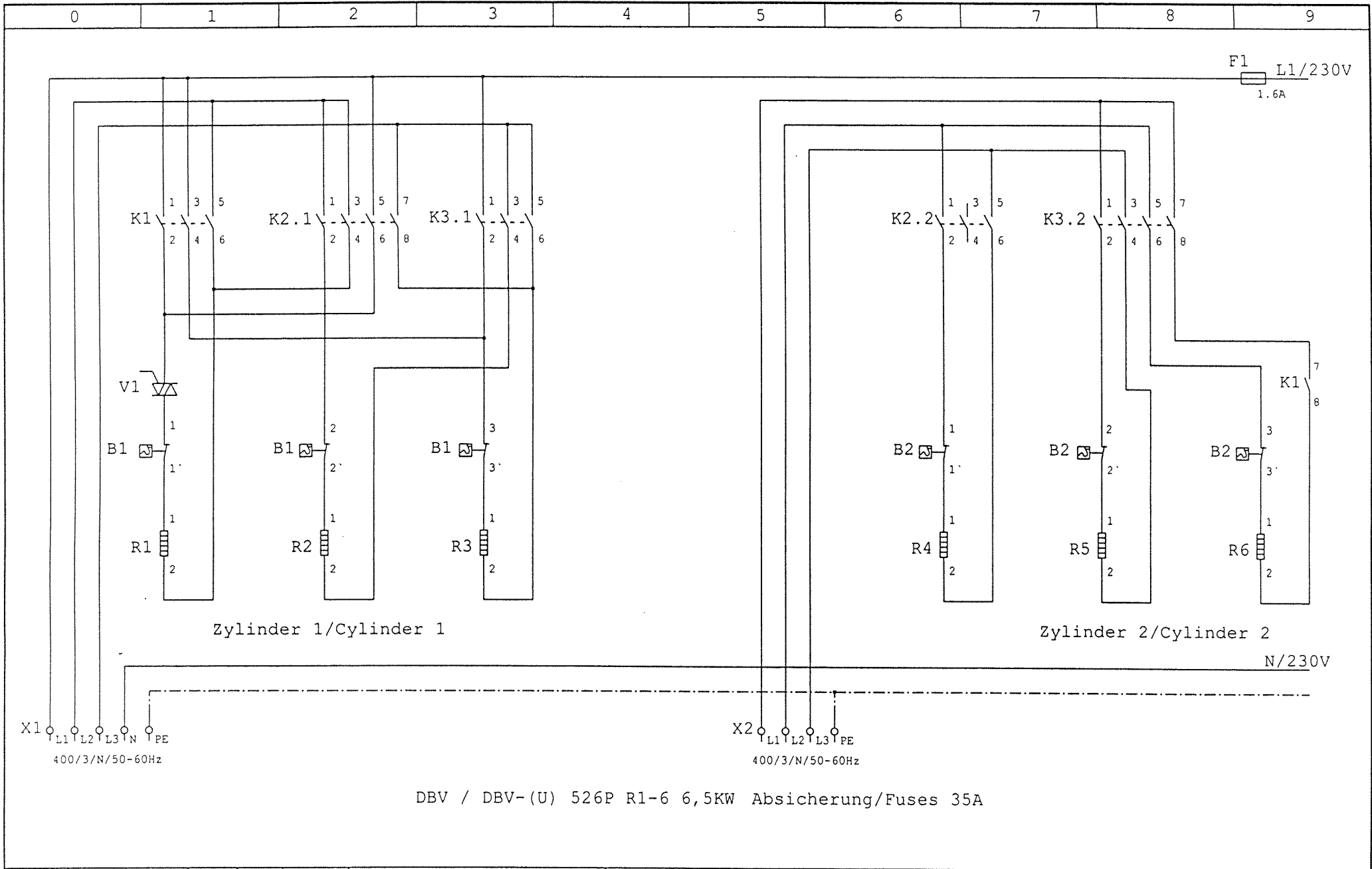
Zylinder 1/Cylinder 1

Zylinder 2/Cylinder 2

DBV / DBV-U 356P R1,2,4,5 6,5KW Absicherung/Fuses 35A

a	Freigabe	22.07.99	Kral	Datum	22.07.99	(Benennung) Leistungsteil/Power Part	(Zeichnung Nr.)	HYGROMATIK	
				Bearb.	Kral	DBV-(U) 356P für 400V/3/N	S-992505	Oststraße 55	
				Gepr.	Kral			D-22844 Norderstedt	
Zust.	Änderung	Datum	Name	Norm		Urspr. Schumann	Ers.f	Ers.d	
									(Datei) S992505A.001
									Blatt 1 von 1 Bl.

400/3/N/50-60Hz  
400/3/N/50-60Hz



a	Freigabe	22.07.99	Kral	Datum	22.07.99	(Benennung) Leistungsteil/Power Part	(Zeichnung Nr.)	HYGROMATIK		
				Bearb.	Kral	DBV-(U) 526P	S-992506	Oststraße 55		
				Gepr.	Kral	für 400V/3/N		D-22844 Norderstedt		
Zust.	Änderung	Datum	Name	Norm	Urspr.	Schümann	Ers.f	Ers.d	(Datei)	S-992506
										Blatt 1
										von 1 Bl.

Tel. 040-526833-0  
Fax. 040-526833-33

## Electric Heater Steam Humidifiers

**Series DBV66P - DBV526P**

**for use with fully demineralised water or purified condensate**

***Series DBV-U66P - DBV-U526P***

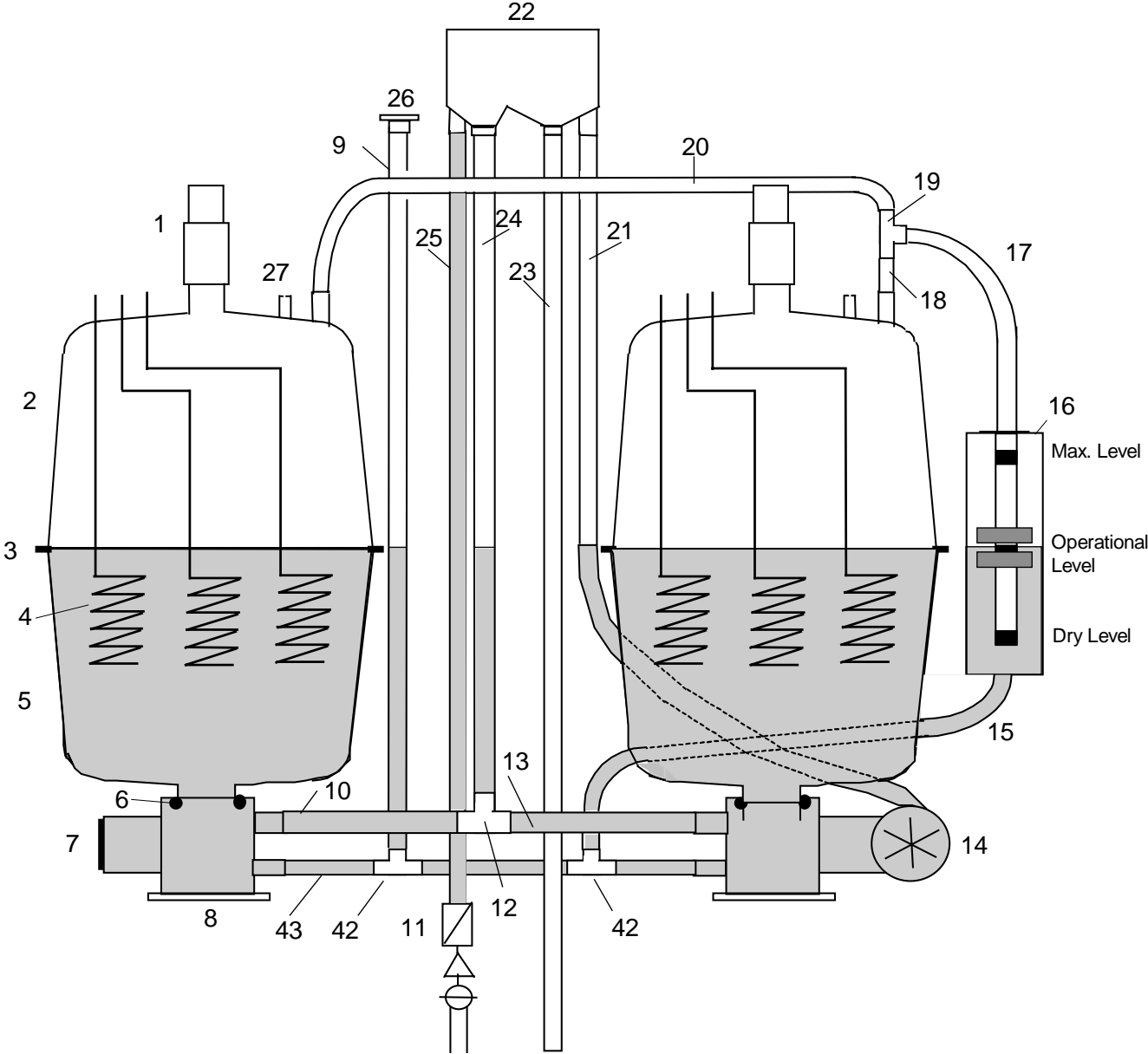
***for use with tap water***

### Operation and Maintenance Instructions

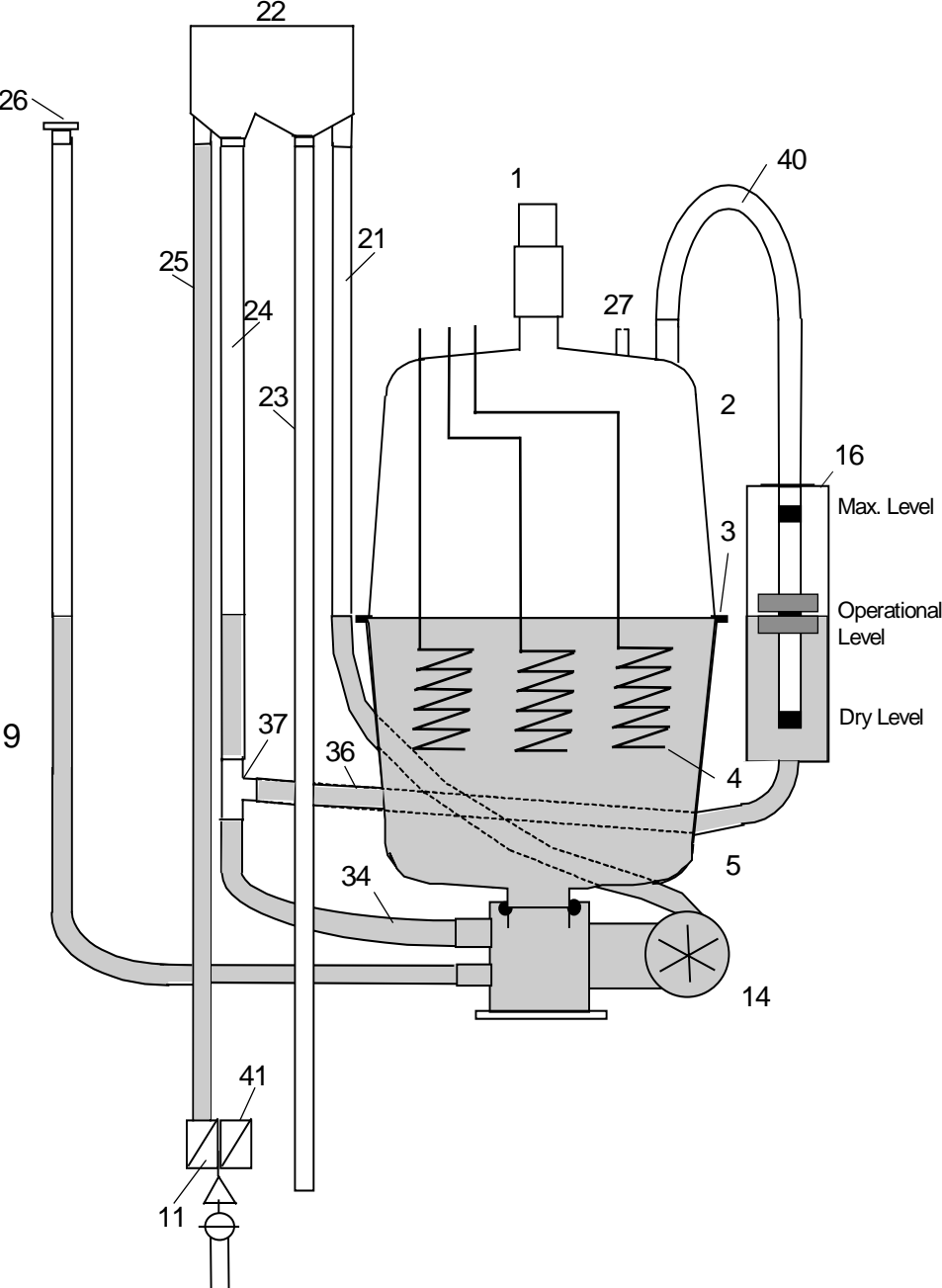
### Spare Parts List

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## 5.1 Illustration DBV-P



## 5.2 Illustration DBV-UP



*	DBV-(U)										Article No.	Description
	66	96	126	176	266	306	356	436	526			
												<b>Cabinet</b>
	1	1	1	1	1						B-2120407	Cabinet DBV 66-266
						1	1	1	1		B-2120607	Cabinet DBV 306-526
											E-2124010	Keys for safety, set = 2 pc.
											E-2124012	Safety lock incl. 2 keys
												<b>Steam Generation</b>
	1										B-2205067	DBV cylinder compl. with 1 heater 4.5 kW and 1 thermal monitor
			1			1					B-2205069	DBV cylinder compl. with 2 heaters 4.5 kW and 1 thermal monitor
		1				1					B-2205071	DBV cylinder compl. with 3 heaters 4.5 kW and 1 thermal monitor
								2	1		B-2205061	DBV cylinder compl. with 1 heater 6.5 kW and 1 thermal monitor
				1						2	B-2205063	DBV cylinder compl. with 2 heaters 6.5 kW and 1 thermal monitor
					1					1	B-2205065	DBV cylinder compl. with 3 heaters 6.5 kW and 1 thermal monitor
2	1	1									B-2205101	Top part of DBV cylinder, empty, for 1 heater and 1 thermal monitor
2			1	1		1	2	1			B-2205105	Top part of DBV cylinder, empty, for 2 heaters and 1 thermal monitor
2					1	1		1	2		B-2205107	Top part of DBV cylinder, empty, for 3 heaters and 1 thermal monitor
5	1	1	1	1	1	2	2	2	2		E-2204036	Lower part of DBV cylinder
4		1		2	3		4	5	6		E-2204003	Heater 400V / 6,5 kW
4	1		2			5					E-2204004	Heater 400V / 4,5 kW
	2	2	4	4	6	10	8	10	12		E-2204006	Gasket for heater
	1	1	2	2	3	5	4	5	6		E-2204007	Mounting nut for heater
	1	1	1	1	1	2	2	2	2		E-2205024	Thermal cut-out
	1	1	2	2	3	5	4	5	6		E-2205028	Clamps for thermal monitor
	1	1	2	2	3	5	4	5	6		E-2205030	Gasket for thermal monitor
	18	18	18	18	18	36	36	36	36		E-2204040	Screws for cylinder flange M6x20
	18	18	18	18	18	36	36	36	36		E-2204041	U-washer for cylinder flange Ø6,2
	18	18	18	18	18	36	36	36	36		E-2204042	Nut for cylinder flange M6
3	1	1	1	1	1	2	2	2	2		E-2204019	O-ring seal for cylinder flange
6	1	1	1	1	1	2	2	2	2		E-2204022	O-ring seal for cylinder base
8	1	1	1	1	1	1	1	1	1		E-2206086	Cylinder base DN40/25i/15/12, double cylinder unit: right cylinder
						1	1	1	1		E-2206092	Cylinder base DN40/25i/15/12, left cylinder only DBV-P
						1	1	1	1		E-2206086	Cylinder base DN40/25i/15/12, left cylinder only DBV-(U)P
	1	1	1	1	1	2	2	2	2		B-2214023	Mounting set for cylinder base
	2	2	2	2	2	4	4	4	4		E-2204034	Plastic blind nut M5 for mounting cylinder base
	1	1	1	1	1	2	2	2	2		E-2205026	Mounting kit for heaters with 3 clamps
	1	1	1	1	1	2	2	2	2		E-2204009	Connecting piece 1/4" for level control cylinder, steamside
27	1	1	1	1	1	2	2	2	2		E-2204035	Condensate plug
1	1	1	1	1	1	2	2	2	2		E-2209012	Adapter steam hose DN40
	1	1	1	1	1	2	2	2	2		E-2209002	Clip for adapter DN40
	1	1	1	1	1	2	2	2	2		E-2209010	O-ring seal for adapter steam hose DN40
	1	1	1								E-2604031	Reducing piece DN40/DN25 steam hose
												<b>Water Feed</b>
11	1	1	1	1	1						B-2304021	Solenoid valve DBV, 0,2-10 bar, 2,5 l/min
11						1	1	1	1		B-2304023	Solenoid valve DBV, 0,2-10 bar, 3,5 l/min
	x	x	x	x	x	x	x	x	x		B-2304105	Solenoid valve DBV, 0,0-3,5 bar, optional
	1	1	1	1	1	1	1	1	1		E-2304029	Fine filter in solenoid valve inlet
	1	1	1	1	1	1	1	1	1		E-2304103	Captive coupling ring for solenoid valve 3/4"
	1	1	1	1	1	1	1	1	1		E-2304107	Gasket for inlet screwed fitting, solenoid
	1	1	1	1	1	1	1	1	1		E-8501034	Hose collar for inlet screwed fitting, 3/4", Solenoid
	1	1	1	1	1	1	1	1	1		E-2304036	Rubber seal solenoid valve - cabinet
	1	1	1	1	1	1	1	1	1		B-2304040	Mounting set for solenoid valve
22	1	1	1	1	1	1	1	1	1		B-3320406	Filling cup
25	x	x	x	x	x	x	x	x	x		E-2604014	Connecting hose solenoid valve - filling cup

\* see illustration 5.1 and 5.2



*	DBV-(U)										Article No.	Description
	66	96	126	176	266	306	356	436	526			
<b>Water Feed DBV-P</b>												
24						x	x	x	x		E-2604010	Connecting hose filling cup - T-piece, cylinder base
	x	x	x	x	x						E-2604010	Connecting hose filling cup - cylinder base
10						x	x	x	x		E-2604010	Connection hose T-piece, cylinder base - left cylinder
13						x	x	x	x		E-2604010	Connection hose T-piece, cylinder base - right cylinder
12						1	1	1	1		E-2604024	T-piece TS 14
16	1	1	1	1	1	1	1	1	1		B-2504125	Water level control cylinder, compl. with flow-switch
	1	1	1	1	1	1	1	1	1		E-2504124	Water level control cylinder, without flow-switch
	1	1	1	1	1	1	1	1	1		E-2525246	Flow-switch for DBV
	1	1	1	1	1	1	1	1	1		E-2304038	Rubber seal for water level control
17						x	x	x	x		E-2604014	Connecting hose water control cylinder, steamside - T-piece
20						x	x	x	x		E-2604014	Connecting hose T-piece - left cylinder
18						x	x	x	x		E-2604014	Connecting hose T-piece - right cylinder
19						1	1	1	1		E-2604021	T-piece TS 12: left cylinder - right cylinder - water level control
37	1	1	1	1	1						E-2604024	T-piece TS 14: filling cup - cylinder base - water level control
7						1	1	1	1		E-2206090	Stopper, conical (closing cylinder 2)
9						x	x	x	x		E-2604014	Hose for manual drain
26						1	1	1	1		E-2604060	Stopper, conical for hose for manual drain
<b>Water Feed DBV-UP</b>												
41	1	1	1								B-2304063	<i>SUPER FLUSH complete</i>
41				1	1						B-2304065	<i>SUPER FLUSH complete</i>
	x	x	x	x	x						E-2604014	Connecting hose <i>SUPER FLUSH</i> cylinder 1
	1	1	1								B-2304061	Double solenoid valve for <i>SUPER FLUSH</i>
				1	1						B-2304069	Double solenoid valve for <i>SUPER FLUSH</i>
	1	1	1	1	1						E-3220434	Flow rate controller 3,3 l/min
	1	1	1	1	1						E-2304103	Captive coupling ring for solenoid valve
	1	1	1	1	1						E-2304107	Gasket for captive coupling ring of solenoid valve
	1	1	1	1	1						E-8501034	Hoze nozzle for captive coupling 3/4", solenoid valve
	1	1	1	1	1						E-2304036	Rubber seal solenoid valve - cabinet
22	1	1	1	1	1						B-3320406	Filling cup
25	x	x	x	x	x						E-2604014	Connecting hose solenoid valve - filling cup
24	x	x	x	x	x						E-2604010	Connecting hose filling cup - T-piece
34	x	x	x	x	x						E-2604010	Connecting hose T-piece - cylinder base
36	x	x	x	x	x						E-2604010	Connecting hose T-piece - water control cylinder
37	1	1	1	1	1						E-2604024	T-piece TS 14
16	1	1	1	1	1						B-2504125	Water level control cylinder, compl. with float switch
	1	1	1	1	1						E-2504124	Water level control cylinder, without flow-switch
	1	1	1	1	1						E-2525246	Flow-switch for DBV
	1	1	1	1	1						E-2304036	Ruber seal for water level control
	x	x	x	x	x						E-2604014	Connecting hose water control cylinder, steamside - cylinder
9	x	x	x	x	x						E-2604014	Hose for manual drain
26	1	1	1	1	1						E-2604060	Stopper, conical for hose for manual drain

\* see illustration 5.1 and 5.2

*	DBV-(U)									Article No.	Description
	66	96	126	176	266	306	356	436	526		
<b>Water Drain DBV-P</b>											
14	1	1	1	1	1	1	1	1	1	B-2404021	Drain pump 230V/50Hz without mounting set
14	1	1	1	1	1	1	1	1	1	B-2404021	Drain pump 230V/60Hz without mounting set
	1	1	1	1	1	1	1	1	1	B-2424014	Mounting set for drain pump
	1	1	1	1	1	1	1	1	1	E-2404008	Drain pump housing
	1	1	1	1	1	1	1	1	1	E-2404024	O-ring seal for drain pump
	1	1	1	1	1	1	1	1	1	E-2425002	Adapter pump - drain hose, straight model, connections DN25/13
43						2	2	2	2	E-2604021	T-piece TS 12
21	1	1	1	1	1	1	1	1	1	E-2604014	Connecting hose filling cup - drain pump
23	1	1	1	1	1	1	1	1	1	E-2604014	Connecting hose filling cup - outward
42						x	x	x	x	E-2604014	Connection hose cylinder base1 - cylinder base 2
	1	1	1	1	1	1	1	1	1	E-3220005	O-ring for adapter pump - drain hose
	1	1	1	1	1	1	1	1	1	E-3220005	O-ring for cylinder base - pump
<b>Water Drain DBV-UP</b>											
14	1	1	1	1	1					B-2404021	Drain pump 230V/50Hz without mounting set
14	1	1	1	1	1					B-2404021	Drain pump 230V/60Hz without mounting set
	1	1	1	1	1					B-2424014	Mounting set for drain pump
	1	1	1	1	1					E-2404008	Drain pump housing
	1	1	1	1	1					E-2404024	O-ring seal for drain pump
21	1	1	1	1	1	1	1	1	1	E-2604014	Connecting hose filling cup - drain pump
23	1	1	1	1	1	1	1	1	1	E-2604014	Connecting hose filling cup - outward
	1	1	1	1	1					E-2425002	Adapter pump - drain hose straight model, connections DN25/13
	1	1	1	1	1					E-3220005	O-ring for adapter pump - drain hose
	1	1	1	1	1					E-3220005	O-ring for cylinder base - pump
<b>DBV-P2 Electronic</b>											
	1	1	2	1	1	5	4	5	6	E-2501006	Main contactor 400V/24A, 230V
				1	1					E-2505007	Main contactor 400V/40A, 230V
	1	1	1	1	1	1	1	1	1	E-2505206	Control fuse 1,6 A, 5x20 mm
	1	1	1	1	1	1	1	1	1	E-2522412	Cowling microswitch
	1	1	1	1	1	1	1	1	1	E-2502414	Control switch, double-pole, black
	1	1	1	1	1	1	1	1	1	E-2525230	Electronic DBV-P2 incl. display and control panel
	1	1	1	1	1	1	1	1	1	E-2525252	Output relay (solid state relay)
	1	1	1	1	1	1	1	1	1	B-2120853	Mounting plate for electronics with foil
<b>Electrical supply 440V</b>											
	1	1	2	1	1	5	4	5	6	E-2507018	Main contactor 690V/25A, control voltage 230V
				1	1					E-2507022	Main contactor 690V/40A, control voltage 230V
14	1	1	1	1	1	2	2	2	2	B-2404023	Drain pump 230V/60Hz without mounting set
<b>Accessories</b>											
	x	x	x	x	x					E-2604012	Steam hose DN 25, per m
						x	x	x	x	E-2604013	Steam hose DN 40, per m
	x	x	x	x	x	x	x	x	x	E-2604014	Condensate hose DN 12, per m
	x	x	x	x	x					E-2404004	Steam hose clamp DN 25
						x	x	x	x	E-2604016	Steam hose clamp DN 40
	x	x	x	x	x	x	x	x	x	E-2304015	Condensate hose clamp DN 12
	x	x	x	x	x					E-2604019	Steam connector, T-piece DN 25
						x	x	x	x	E-2604023	Steam connector, T-piece DN 40, stainless steel
	x	x	x	x	x	x	x	x	x	E-2604021	Condensate connector, T-piece DN 12
	x	x	x	x	x					B-2604026	Steam solenoid valve 0 - 0.4 bar, compl. for steam hose DN 25
						x	x	x	x	B-2604040	Steam solenoid valve 0 - 0.4 bar, compl. for steam hose DN 40
										E-2604029	Hose nozzle DN 25
						1	1	1	1	B-2604032	Pressure equalisation for steam hoses, set
	1	1	1	1	1	2	2	2	2	B-2304031	Water connection hose, flexible, 0.6 m 3/4", with connector

\* see illustration 5.1 and 5.2



Lise-Meitner-Str. 3  
24558 Henstedt-Ulzburg  
Tel. 04193/895-0

<p><b>Fax Form</b></p> <p>Please copy, fill in and fax to</p> <p>Fax.No. <b>+49(0)4193/895-33</b></p>
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## Order for spare parts

unit type \* \_\_\_\_\_ serial no. \* \_\_\_\_\_

commission: \_\_\_\_\_ order no: \_\_\_\_\_

quantity	article	article no

date of delivery \_\_\_\_\_ forwarder \_\_\_\_\_ shipment by \_\_\_\_\_

delivery address (if different from invoice address)

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company stamp (invoice address)
date/signature

\* Order can only be processed if unit type and unit serial number are filled in.

## Electric Heater Steam Humidifier Type DBV-(U)P

### Technical Data

Technical Data DBV66(U)P - DBV526(U)P									
Type	DBV66	DBV96	DBV126	DBV176	DBV266	DBV306	DBV356	DBV436	DBV526
Steam Output [kg/h]	6	9	12	17	26	30	35	43	52
Electrical Supply*	400V/3/N 50Hz								
Electrical Power [kW]	4,5	6,5	9,0	13,0	19,5	22,5	26,0	32,5	39,0
Current [A]	11,3	16,3	19,5	28,2	28,2	2x19,5	2x28,2	2x28,2	2x28,2
Fuse [A]	3x16	3x20	3x25	3x35	3x35	6x25	6x35	6x35	6x35
Control Type	P2-control								
Number of Steam Cylinder	1			2					
Number of Heaters	1	1	2	2	3	5	4	5	6
Steam Hose Connec. [mm]	1x25		1x40			2x40			
Condensate Hose Connection [mm]	1x12			2x12					
Empty Weight [kg]	30,0	30,0	31,4	31,4	32,8	55,2	53,8	55,2	56,6
Operational Weight [kg]	48,5	48,5	49,4	49,4	51,3	92,2	90,8	92,2	93,6
Dimensions Height [mm]	707			707					
Width [mm]	550			927					
Depth [mm]	336			336					
Water Supply DBV-P	Fully demineralised water or pure condensate, 1 - 10 bar **, 13 mm pipe								
Water Supply DBV-(U)P	Fully demineralised water or pure condensate, 1 - 10 bar **, 13 mm pipe Tap Water, max. total hardness 15°dH, 1 - 10 mm pipe								
Fan Unit, wallmounted	VG8	VG17	VG17	VG17	VG30	2 x VG17		2 x VG30	

\* Other voltages on request.

\*\* Special inlet solenoid-valve for 0,05 - 3,5 bar are available.

HYGROMATIK-Lufttechnischer Apparatebau GmbH

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