HYGROMATIK

Manual

Electric Heater Steam Humidifier

HeaterCompact

Installation → yellow
Plumbing → blue
Electrics → red
Maintenance → green
General Information → white

2. Safety Notes

2.1 Overview

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

Warnings and Safety Symbols

The safety symbols below identify sections containing warnings about hazards or potential dangers. Please familiarize yourself with these symbols.

Warning: Failure to observe this warning may result in serious injury or death and/or damage to the unit.

Danger, Hazardous Voltage: Hazardous electrical current! Failure to observe this warning may result in injury or even serious injury or death.

Warning: Failure to follow these instructions may result in damage to the unit due to electrostatic discharge. The electronic components of the humidifier control are very sensitive to electrostatic discharges. In order to safeguard these components during installation and servicing, steps must be taken to protect against ESD.

Reminder: Materials and consumables must be handled and/or disposed of as required by law.

Note: Appears before explanations or cross-references which refer to other sections of the operating instructions.

2.2 Guidelines for Safe Operation

Overview

Obey all safety notes and warnings present on the unit. In case of a malfunction, switch off the unit immediately and prevent a restart. Repair malfunctions promptly. After any repair work, have qualified personnel check the safe operation of the unit.

Use original spare parts only. Additional national safety regulations also fully apply to the operation of this unit.

This unit is not designed for the use by persons (also children) with limited physical, sensory and mental abilities - or without knowledge and experience. Unless they are supervised or trained by a person, who is responsible for their safety.
Supervise children in order to ensure that they will not play with the unit.

The unit is only allowed to work with connected steam hose that

safely leads the steam.

HygroMatik steam humidifiers are IP20-protected. Make sure that the unit is protected from drips in its installed location.

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

Accident Prevention Regulations

Comply with the Accident Prevention Regulation Electrical Systems and Equipment to prevent injury to yourself and others.

Operation of the Unit:

Do not perform any work which compromises the safety of the unit. Regularly check that all safety and monitoring devices are functioning normally. Do not remove or disable safety devices.

Installation, Dismantling, Maintenance and Repair of the Unit:

Disconnect unit components from power supply prior to maintenance or repair work.

Attaching or installing **additional components** is permitted only with the **written consent** of the manufacturer.

Electrical

Work on the electrical system must be performed by qualified personnel.

Disconnect unit components from power supply prior to work.

It is not allowed to connect the unit to DC voltage supply.

In case of a malfunction in the electrical power supply, switch off the unit immediately. Use only original fuses with the appropriate amperage rating. Regularly check the unit's electrical equipment. Promptly repair any damage, such as loose connections, burned wiring or defective electrical insulation. After proper electrical installation or repair, test all safety mechanisms (such as grounding resistance).

2.3 Disposal after Dismantling

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

3. Transport

3.1 Overwiew

Note: Proceed carefully when transporting the steam humidifier in order to prevent damage from rough or careless loading and unloading.
If the transport of this unit is attempted by only one person there is a risk that the unit will drop down. We propose to transport the unit by two persons.

3.2 Transport Size and Weigth

Type*	depth [cm]	higth [cm]	width [cm]	weigth [kg]
HC03	360	651	507	16
HC06	360	651	507	16
HC09	360	651	507	16
HC06P	410	775	584	25
HC09P	410	775	584	25
HC12	410	775	584	26
HC18	410	775	584	26
HC27	410	775	584	27

* Dimensions and weigths can vary insignificantly

3.3 Packing

Note: Observe the symbols affixed to the box.

3.4 Interim Storage

Keep the unit dry and protect from frost.

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 match what is in the purchasing and delivery documents,
- equipment is complete and in perfect condition.

Note: In case of damage during shipment and/or missing parts, immediately file a written claim with your carrier or supplier.

Time limits for filing freight claims with shipping companies are*:

Transport Company	After Receipt of Goods
Mail	24 hours at the latest
Rail	7 days at the latest
Truck and railway companies	4 days at the latest
Parcel Service	immediatly

* Subject to change without prior notice.

3.6 Included in the Delivery

The delivery includes:

- Unit of the selected humidifier type including selected control.
- Water installation hose.
- Manuals for the steam humidifier and the control.
- Ordered accessories (steam manifold, steam hose, condensate hose, etc.).
- Maintenance o-ring set for steam cylinder.

4. Operation and Device Construction

4.1 Mode of Action

The Imersion Heater Principle

One to three heater elements (Pos. 8 in the exploded view, please see cover foldout) are placed in a closed cylinder and connected to alternating current. The cylinder is filled with tap water, fully demineralized water or partially softened water. Heat generated by the heater element increases water temperature to approx. 100°C.

When fully demineralized water is used, the feed water is practically free of minerals. This ensures long life for the cylinder and heater elements since virtually no mineral deposits can settle or build up. Fully demineralized water minimizes the number of service / maintenance checks.

When tap water is used, some of the minerals dissolved in the water will settle in the cylinder as solids of various compositions. Most of these scale deposits are removed by periodic flushing or use of a heavy-duty blow-down pump. See section "Servicing During Operation with Tap Water".

The generated steam has a temperature of about 100°C and minimal positive pressure ("pressureless” steam). It is virtually demineralized and germ-free.

4.2 Installation and Method of Operation

By pressing the control switch („Pos. I") the humidifier is turned on. When the hygrostat or controller signals a demand for humidification, the inlet solenoid valve (14) opens. The solenoid valve is designed for pressures from 100 x 10^3 to 100 x 10^4 Pascals (1 to 10 bar).

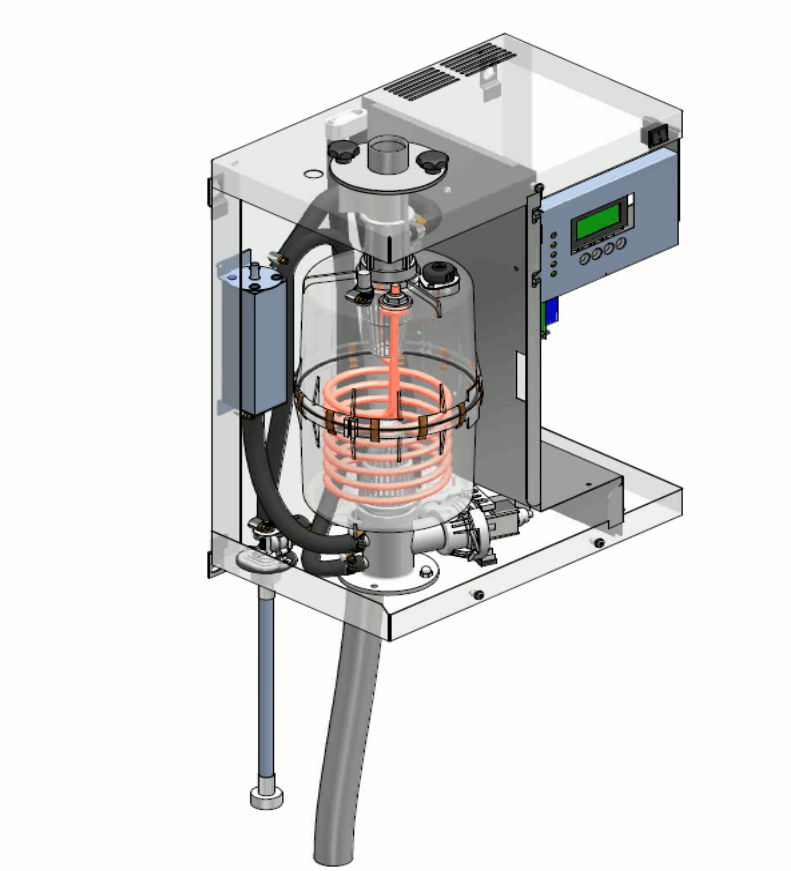
Water is fed into the cylinder.

The water level in the cylinder must be maintained within a specified range. If the water level is too high, the ellbow acts as a safety overflow for water drainage. If the water level is too low, it could cause the heater element (8) to overheat. Therefore, power supply to the heater element is shut off when water levels are too low.

The cylinder water level is controlled by a level control (27). The level control consists of a stainless steel cylinder with two float switches and three reed contacts. The float switches indicate the water level in the steam cylinder: "Dry Run", "Humidification" and "Max. Level". The control capsule is pressure-equalized.

At the standard setting, the inlet solenoid valve (14) opens when the water level remains below "humidification" level for 10 seconds. The water level then rises again to "humidification" level.

The steam cylinder consists of a top (16) and lower (9) part joined with a cylinder flange. The seal between the cylinder and cylinder base (11), as well as between the top and lower part of the cylinder, is maintained using an o-ring.



General survey

The heater elements are equipped with a mechanical high temperature safety. This mechanism provides a redundant safety system in the event of excessively low water levels (“Dry Run”).

The cylinder water is periodically flushed out with a heavy-duty blow-down pump (10).

Steam is fed into air-conditioning ducts through special steam hoses and steam manifolds. Under normal conditions, this steam has virtually no heating effect on the air to be humidified. Accumulated condensate can be returned to the steam cylinder via a condensate hose.

Direct room humidification (without ducts) is performed using fan units (with blower and nozzle). The steam generator is connected to the fan unit with steam and condensate hoses.

Steam lines in steam bath cabins employ special steam hoses and piping (if required). Accumulated condensate is normally routed into the steam cabin. At a relative humidity of 100%, the supplied steam is used to heat the steam bath.

Warning: Leakage of the steam cylinder can cause a serious hazard, such as giving an electric shock.

Warning: During blow down hot water with a temperature of about 95°C is being drained. This can cause burns to the skin at direct contact.

4.3 Internal Output Setting

Continuous control of the HeaterCompact Type steam humidifier is achieved by proportional control of the heater elements. In this way the humidifier can be proportionally operated across the entire output range of 5% - 100% nominal capacity.

5. Mechanical Installation

Warning: Installation of this unit should be performed by qualified personnel only. Hygromatik accept no liability for damage due to faulty installation.

Obey all safety instructions and warnings on the unit. During installation the unit must be disconnected from its power supply.

Accessory equipment may not be installed on or in the unit without prior written consent from HYGROMATIK. Otherwise the warranty is void.

Warning: If the installation of this unit is attempted by only one person there is a risk that the unit will drop down. We propose to carry out the installation by two persons.

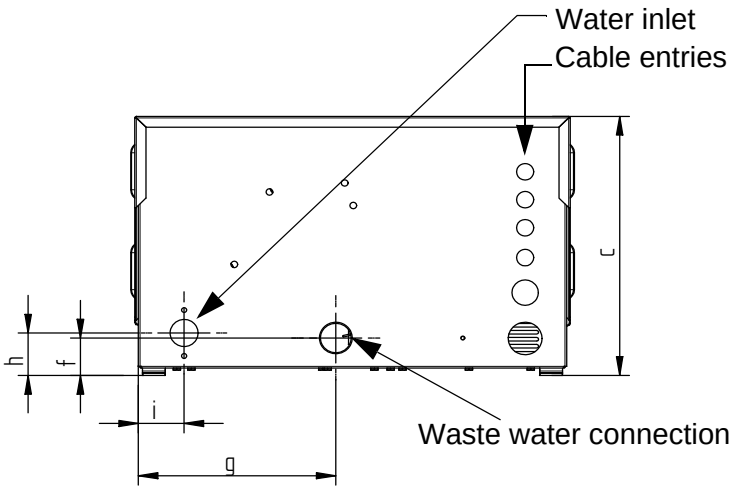
5.1 Steam Humidifier - environmental conditions

Note: When selecting the location for steam humidifier installation, be aware of the following:

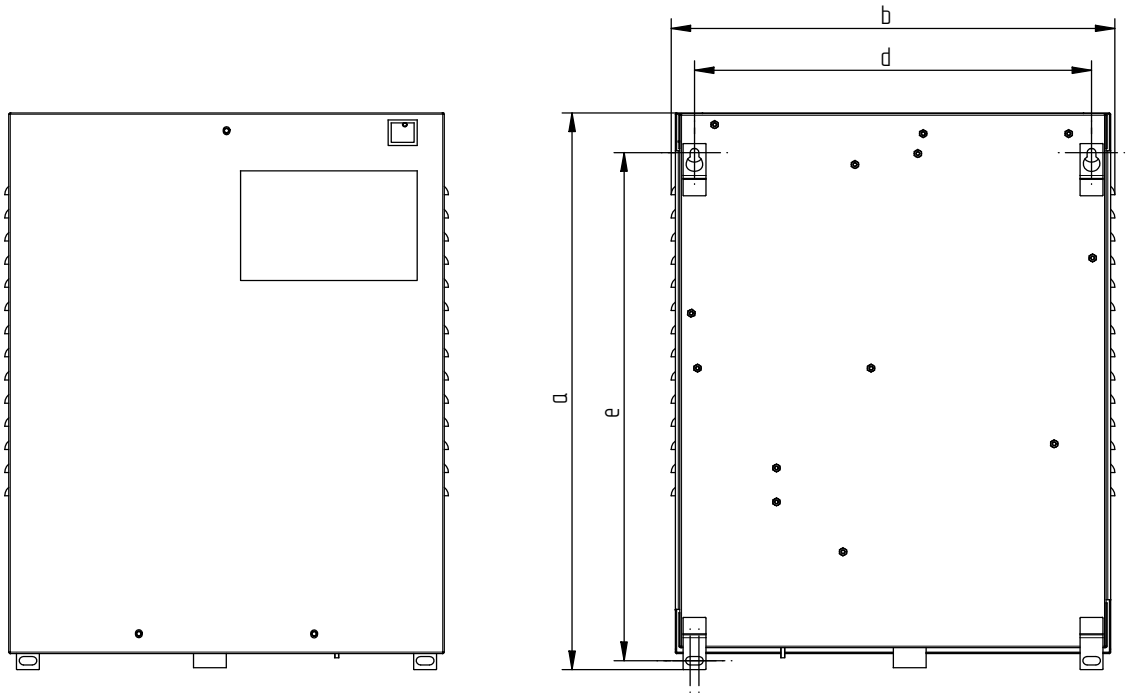
- Ambient temperature must be between +5 and +40 °C.
- Relative humidity may not exceed 80% RH.
- Observe clearances specified in the diagrams below to ensure adequate ventilation.
- An Installation in a closed room requires aeration and if neccessary temperature conditioning in order to reach the above mentioned environmental conditions.
- HygroMatik humidifiers are not suitable for direct outdoor installation.
- Install the steam humidifier as close as possible to the steam manifold. Use only short lengths of steam and condensate hose to ensure optimal performance.
- Hoses must be laid at a constant 5-10% grade to uniformly prevent sags and kinks.
- The back surface of the steam humidifier heats up during operation (to max. 70°C). Take care that the construction on which the unit is mounted is not made of temperature-sensitive material.
- Place the steam humidifier so that the unit is easily accessible with sufficient space to perform maintenance.
- The unit’s protection class is IP20.

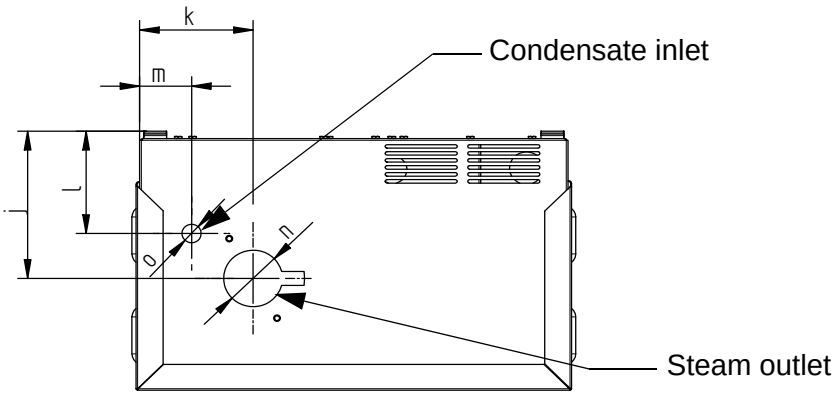
5.1.1 Equipment Dimensions HC

View from below



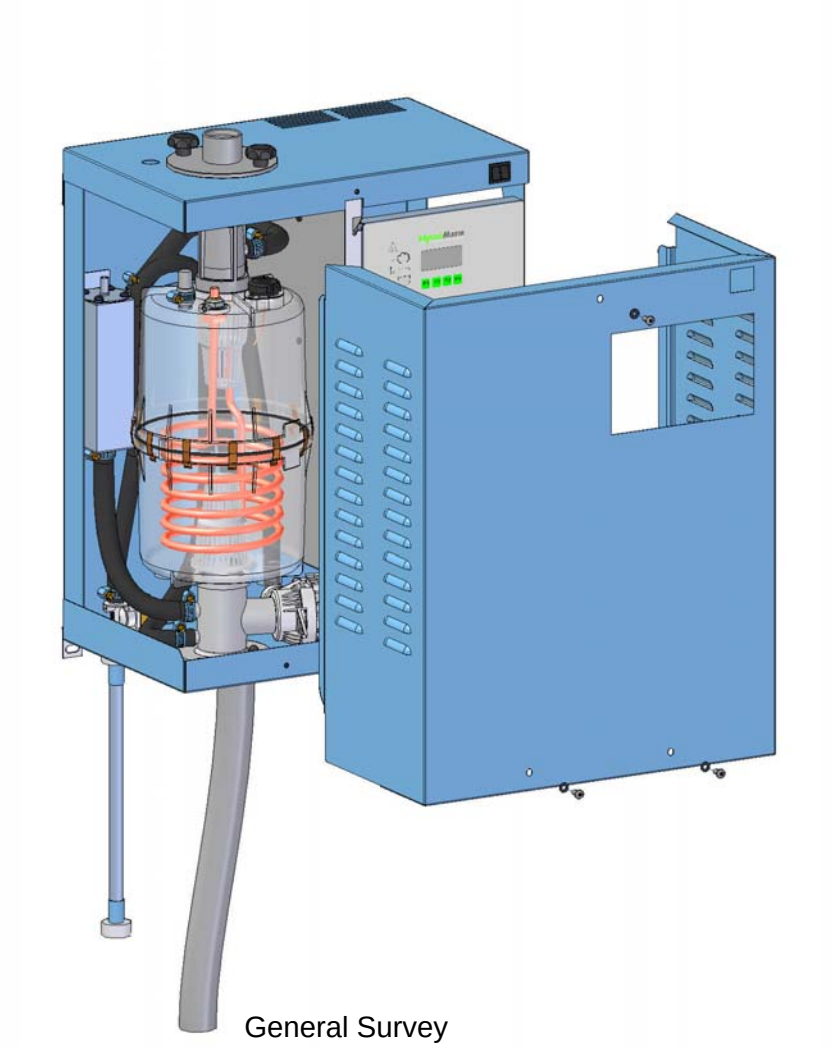
Rear view





View from top

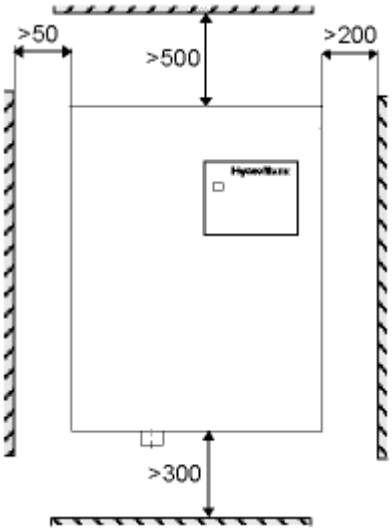
	HC03-09	HC06P-09P HC12-HC27
a	562	707
b	427	490
c	257	306
d	382	445
e	513	657
f	30	30
g	190	250
h	35	50
i	44	50
j	145	162
k	109	138
l	100	81
m	50	86
n	56	56
o	18	18
all dimensions in mm		



General Survey

5.1.2 Fitting Measures

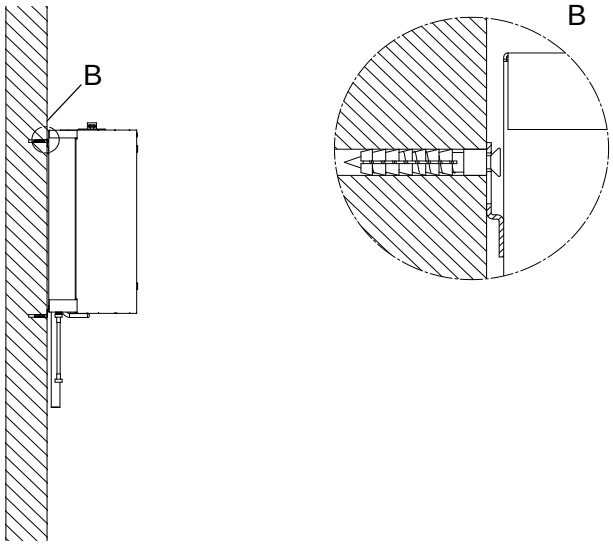
Wall Distance



(all dimensions in mm)

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.

Measures for drills for wall mounting please see table (measures d and e) in chapter „Equipment Dimensions”.If there is no suitable wall, it is recommended that the equipment is installed on brackets which can be embedded in the floor.

5.2 Absorption Distance B_N

The "absorption distance" (B_N) is defined as the distance from the steam feed to where the steam is completely absorbed in the treated air. Inside the absorption distance, steam is visible as mist in the air stream.

Condensation may collect on anything installed inside the absorption distance.

Although steam outside the absorption distance (B_N) is completely absorbed, it is not yet evenly diffused in the duct. If you plan to install any parts or devices inside the absorption distance, such as sensors or elbows, we recommend increasing the absorption distance using the formulae below. The absorption distances required for certain installed fittings are distinguished by separate symbols and calculated as a multiplier of the absorption distance B_N.

Absorption Distance	
B_N	for normal obstructions, such as sensors, ventilators, outlets
B_c = (1,5...2) x B_N	for fine filters, heat registers
B_s = (2,5...3) x B_N	for particle filters
B_d = (2,5...3) x B_N	for humidity sensors, duct humidistats

The absorption distance has no fixed value, but depends on many factors. These are depicted in the absorption distance nomogram below.

5.2.1 Determining the Absorption Distance

To determine the absorption distance, the following parameters are required:

- Air humidity before humidification x_1 in g/kg.
- Air temperature after humidification t_2 in °C (with steam humidifiers the change in air temperature due to humidification may be disregarded t_1 or t_2).
- Specific increase in humidity $\triangle x$ in g/kg (can be determined in the h,x diagram)
- quantity of steam introduced $\overset{o}{m}_D$ in kg/h.
- air speed w_L in m/s in air duct
- Total length l_D of the steam manifold installed in the air duct

Length l_D of the usable steam manifold depends on the dimensions of the air duct. The length of the absorption distance can be reduced by using multiple steam manifolds (also see section on the steam manifold).

Method:

Graphically determine absorption distance B_N using the absorption distance nomogram (also see Section „Absorption Distance Nomogramm“). Enter the value of the parameters enumerated above into the respective quadrants. The resulting point of intersection indicates the value of the desired absorption distance B_N.

Notes:

Air humidity before humidification x_1: _____[g/kg]

Air temperature after humidification t_2: _____[°C]

Specific increase in humidity $\triangle$ x:_____[g/kg]

quantity of steam introduced $\dot{m}_D^o$:_____[kg/h]

air speed t w_L: _____[m/s]

Total length of the steam manifold l_D: _____[mm]

5.3 Fan Unit (option)

Note: The fan unit should be positioned to avoid drafts. A minimum height of 2 m is generally sufficient.

- Install the fan unit directly on a wall.

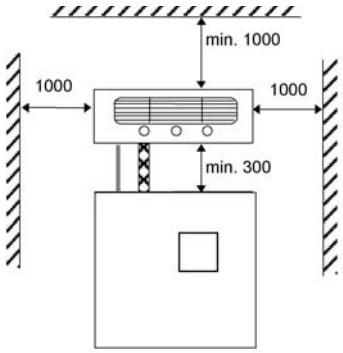
Type	Fan Unit
HC03, HC06(P)	VG 08
HC09(P), HC12	VG 17
HC18 - 27	VG 30

Warning:

- During operation and some time afterwards the steam nozzle is hot! This can cause burns to the skin at direct contact.
- During operation the cross-flow fan rotates. Do not touch the fan during operation.
- During operation hot steam discharges from the nozzle. In the field of the visible steam cloud contact can cause burns to the skin.
- During operation the cross-flow fan rotates. Do not touch the fan during operation.

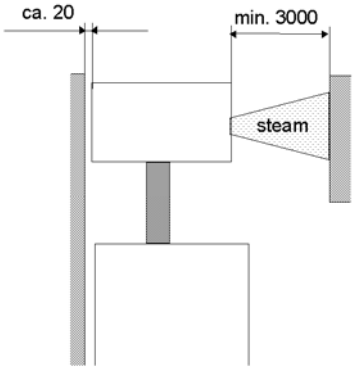
5.3.1 Fan Unit Type VG

- The fan unit is installed above the steam humidifier.
- When using multiple fan units, do not exceed a maximum distance of 5 m from the steam humidifier.
- Observe the clearances specified in the diagrams below.



(all dimensions in mm)

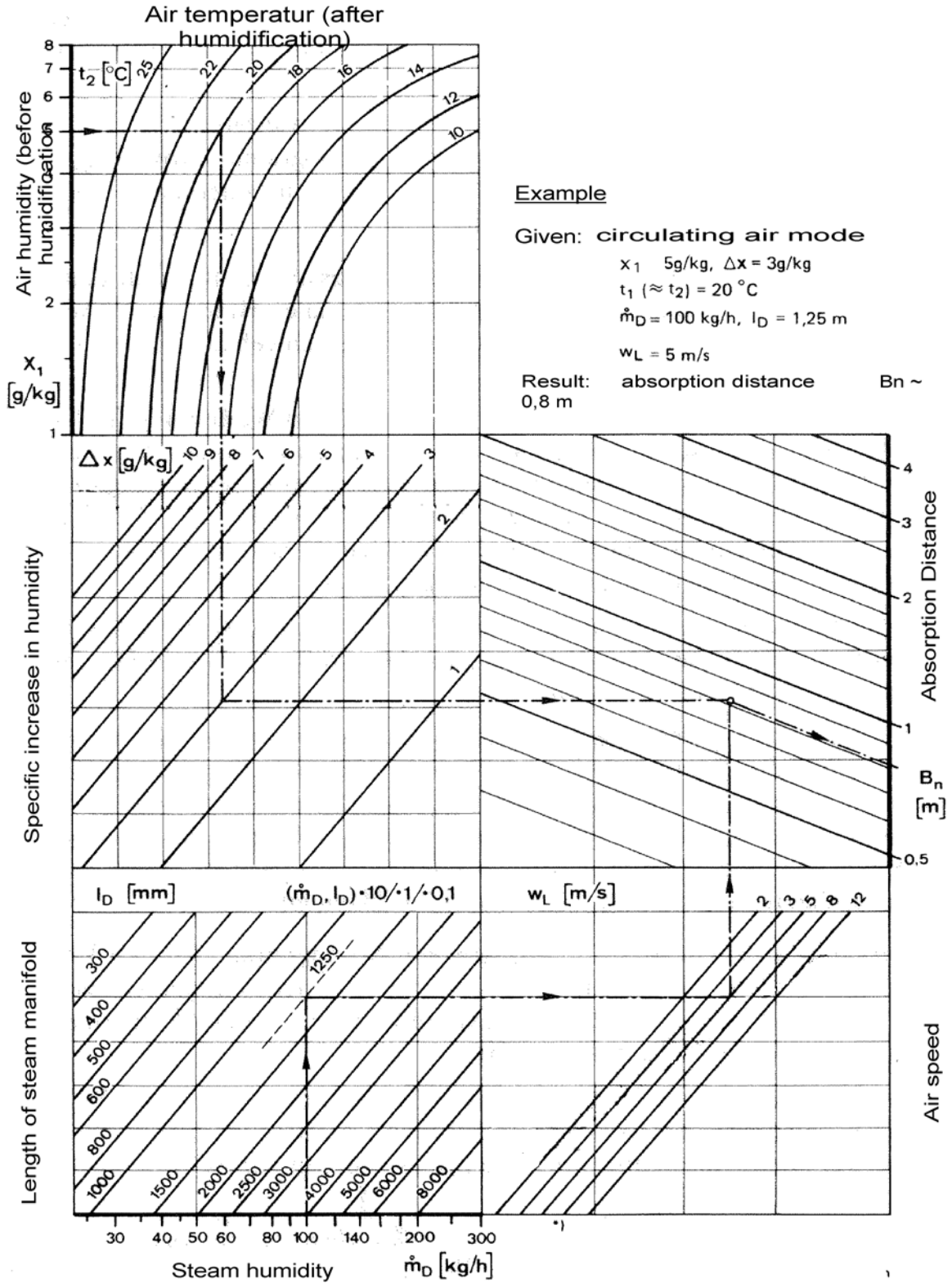
Fan unit, wall installation



Side view, wall-mounted fan unit

Technical Specifications Fan Unit VG				
Fan Unit		VG08	VG17	VG30
Quantity of Steam	[kg/h]	8	17	30
Steam Inlet	[mmϕ]	25	25	40
Condensate Outlet	[mmϕ]	12	12	12
Airflow Capacity	[cbm/h]	185	185	350
Nominal Output	[W]	35	35	67
Nominal voltage	[V]	230	230	230
Dimensions	W [mm]	441	507	550
	H [mm]	171	171	171
	D [mm]	180	237	277
Weight	[kg]	4,5	6	7

5.3.2 Absorption Distance Nomogram



Source: Henne, Erich: Luftbefeuchtung (Air Humidification), 3rd Edition 1984 (Page 101), Oldenbourg Industrieverlag, Munich

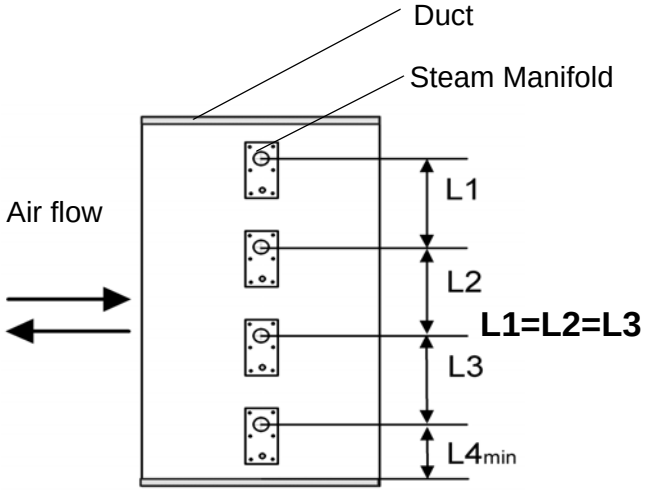
5.4 Steam Manifold

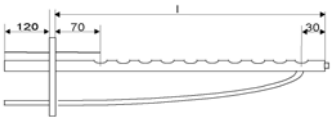
5.4.1 Notes on Installation

These notes are based on a homogeneous

Horizontal installation of steam manifold

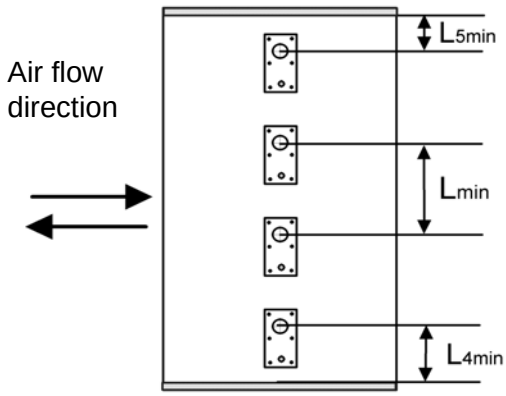
Standard steam manifold installation:





Steam Manifold

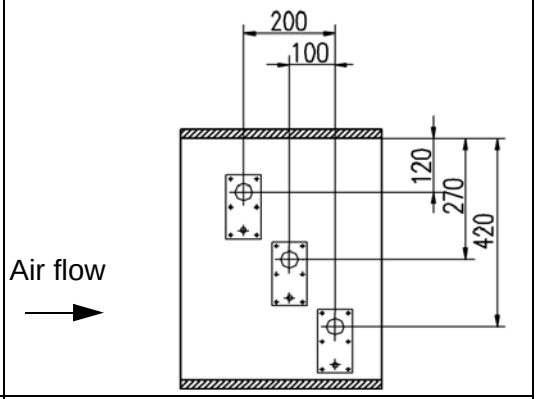
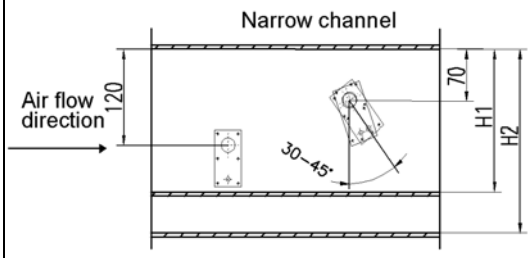
An even distribution of steam manifolds ensures a uniform steam distribution.
Please use the total hight of the duct!



Minimum distances in order to avoid condensation:

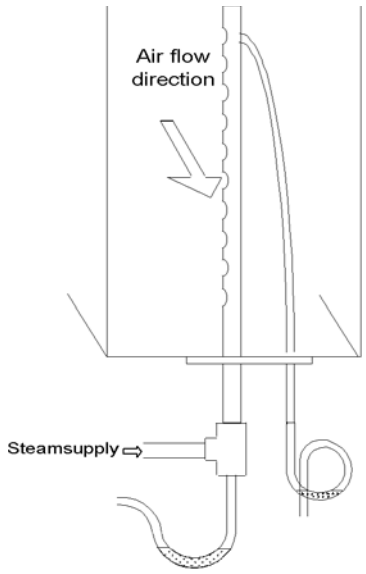
Lmin = 210mm: distance „ steam manifold - next steam manifold“

L4min = 120mm: distance „lowest steam manifold - duct bottom“:**L5min = 120mm**: distance „highest steam manifold - duct ceiling“Installations depending on special designs of air ducts:

<table>
<tr><th>Air duct</th><th>Positioning of steam manifolds</th><th>Sample</th></tr>
<tr><td>flat</td><td>Staggered vertically and laterally</td><td> 
</td></tr>
<tr><td>very flat</td><td>By tilting the steam manifold 30 - 45° towards the air flow direction, the minimum upper clearance can be reduced to 70mm.
<table>
<tr><th>min. distances:</th><th colspan="2">H1[mm]</th><th>H2[mm]</th></tr>
<tr><th></th><th>30°</th><th>45°</th><th></th></tr>
<tr><td>DN25</td><td>182</td><td>168</td><td>225</td></tr>
<tr><td>DN40</td><td>193</td><td>179</td><td>230</td></tr>
</table></td><td>very flat duct
 
</td></tr>
<tr><td>narrow, high</td><td>Identical lenghts one on top of the other. Staggered laterally if possible.</td><td></td></tr>
<tr><td>square</td><td>Identical lenghts, staggered vertically and laterally</td><td></td></tr>
<tr><td>low, very wide</td><td>facing each other</td><td></td></tr>
</table>

Vertical installation of steam manifold

Steam manifold placement:



Horizontal installation of the steam manifolds is preferred. However, installation from below into the air duct is possible.

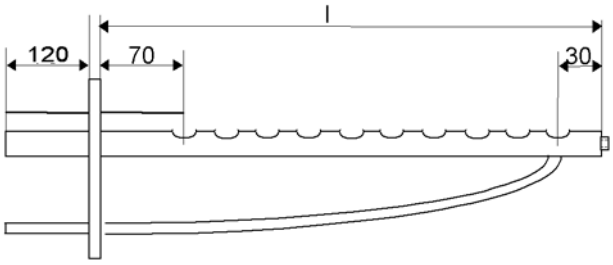
Note:

- Install the steam manifold horizontal with it ensure a clean steam out.
- Maximum allowable pressure in the air duct is 1200 Pa.
- On the return side, the maximum allowable negative air pressure is 500 Pa. Placement of the steam manifold on the supply side of the air duct is preferred.
- With high-pressure air-conditioning systems, the unit's drain hose system must be modified depending on the over pressure. When this is the case please consult HygroMatik.
- Install the steam manifold as close as possible to the steam humidifier in order to minimize steam loss through condensation.
- Depending on the design of the air duct, additional mounting of the steam manifold may be required. Shown installation and position dimensions are based on experimental values. Special environmental conditions could require adjustments.
- We note that the German Association of Engineers (VDI) Guideline 6022 specifies a water drain within the absorption distance inside the air duct.
- For steam bath applications: Install the steam manifold safe from contact with people in order to prevent injuries or burns. Do not install the steam manifold near a temperature sensor or inaccurate readings may result.
- Air flow rates over 3m/s can possibly lead to condensate drainage problems at the steam manifolds which may require adaptation measures.

Length of steam manifold [mm]*:

l	220	400	600	900	1200	1450
DN25	x	x	x	x	x	x
DN40	x	x	x	x	x	x

* special lenght on request



Note: At lengths of 600mm or more, steam manifolds are shipped with an extra alternative mounting fixture (Nut, M8) on the closed end.

The number and size of appropriate steam manifolds, as well the nominal width of their respective steam and condensate hoses, are found in the tables below.

HyLine:

Type	Steam Manifold	Steam Hose	Condensate hose
HY05-HY17	1xDN25	DN25	DN12
HY05DS - HY17DS (for SPA)	1xDN40	DN40	DN12
HY23-HY30	1xDN40	DN40	DN12
HY45-HY60	2xDN40	2xDN40	2xDN12
HY90-HY116	4xDN40	4xDN40	4xDN12

CompactLine:

Type	Steam Manifold	Steam Hose	Condensate Hose
C1-C17	1xDN25	DN25	DN12
C10-DS, C17DS (for SPA)	1xDN40	DN40	DN12
C22, C30	1xDN40	DN40	DN12
C45**	2xDN40	DN40	DN12
C58	2xDN40	2xDN40	2xDN12

HeaterCompact:

Type	Steam Manifold	Steam Hose	Condensate Hose
HC3-12*	1xDN25	DN25	DN12
HC16-27	1xDN40	DN40	DN12
HC3-27 (for SPA)	1xDN40	DN40	DN12

DBE:

Type	Steam Manifold	Steam Hose	Condensate Hose
DBE 1-6	1x25	DN25	DN9
DBE 10-17	1x25	DN25	DN12
DBE 30	1x40	DN40	DN12
DBE 45	2x40	DN40	DN12

HeaterLine:

Type	Steam Manifold	Steam Hose	Condensate Hose
HL 6-12 *	1xDN25	DN25	DN12
HL 6-12 (for SPA)	1xDN40	DN40	DN12
HL 18-30	1xDN40	DN40	DN12
HL 36-45 **	2xDN40	1xDN40	1xDN12
HL 60-90 ***	2x(2xDN40)	2x(1xDN40)	2x(1xDN12)

* For units HL 6 - 12 and HC3-12 HygroMatik delivers one adapter DN40 / 25 (but not for SPA applications)..

** For units HL 36 - 45 HygroMatik delivers one t-connector for separating the steam on two steam manifolds.

***Hl 60.-90 are double units and consist of Hl 30-45 units.

5.5 Steam Line

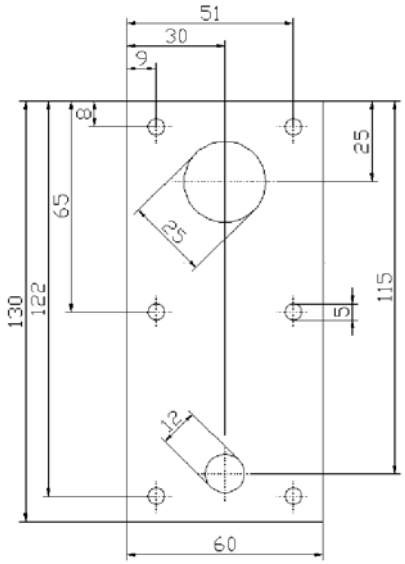
Note: When installing the steam hose, please pay attention to the following:

- 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).
- 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 Y-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. 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. In deviation of this the y-piece that is delivered ex works with a humidifier type C45, HL36, HL45 should be installed near the humidifier.
- 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.
- Device output, steam line installation, and the duct influence pressure condition in the duct. In an exeptional case this could mean to optimize ths steam line installation.
- 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

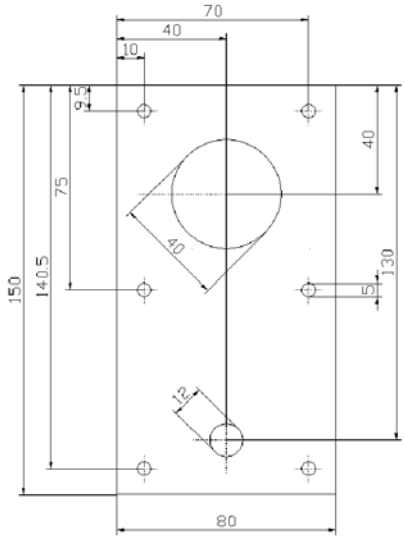
5.6 Cover Plate

HygroMatik flange plates may be used to neatly complete installation of the steam humidifier in the air duct.

Two-piece flange plates are available for the DN25 and DN40 steam manifolds.



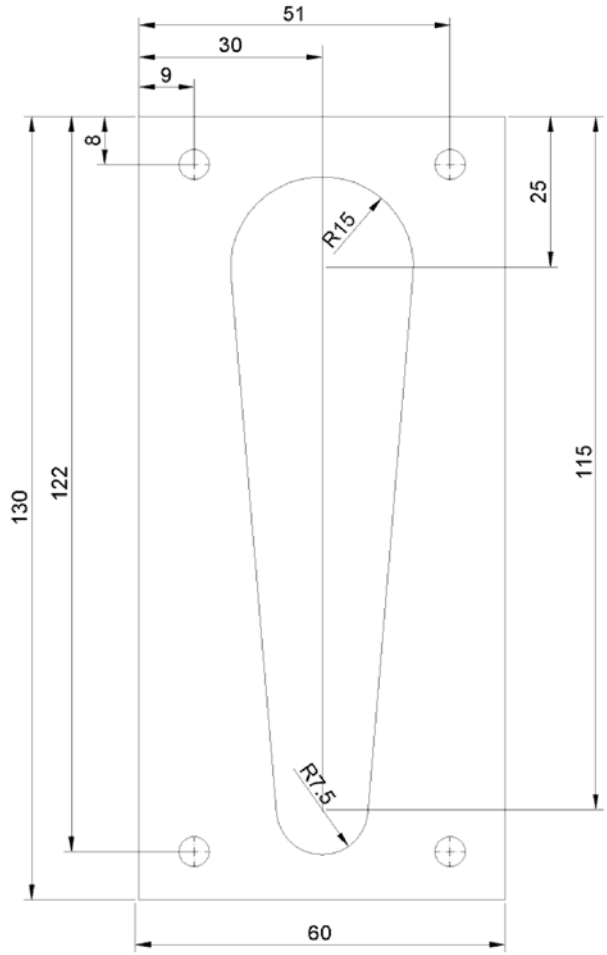
flange plate DN25 E-2604260



flange plate DN40 E-2604410

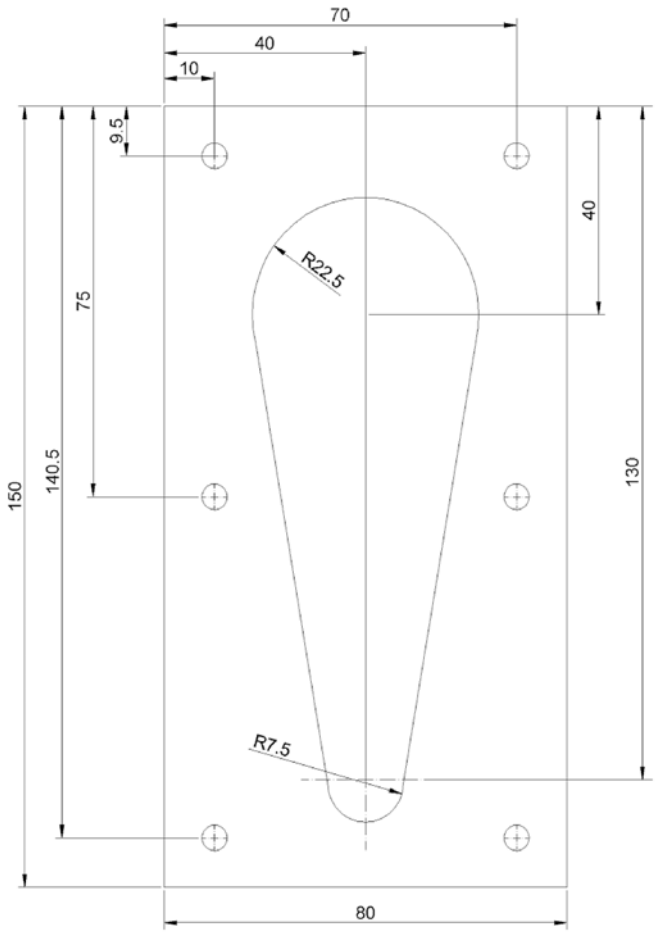
5.7 Drill Pattern

Drill Pattern DN25 (not to scale)



Note: Due to variable print media the dimensions are not to scale.

Drill Pattern DN40 (not to scale)



Note: Due to variable print media the dimensions are not to scale.

5.8 Condensate Hose

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

Warning: To keep condensate from accumulating in the duct, make sure condensate can drain freely.

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

» Remove the condensate plug (12) from the connection fitting on the cylinde.

» Lay the condensate hose at an approximate incline of 5-10% to the steam cylinder connection fitting, to allow the condensate to drain freely.

Note: It is recommended to form a loop of 200 mm diameter as a vapour trap provided there is enough space. Possible operating noises can be reduced in this manner.

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

» The condensate must be drained separately.

» To prevent steam loss, lay a loop at least 200 mm in diameter.

» To ensure condensate drainage, place the loop (vapor trap) as far away as possible below the steam manifold connection.

» The condensate connection on the steam cylinder must be closed with a sealing cap.

» Place hose clamps at intervals of at least 500 mm, depending on how the hose is laid.

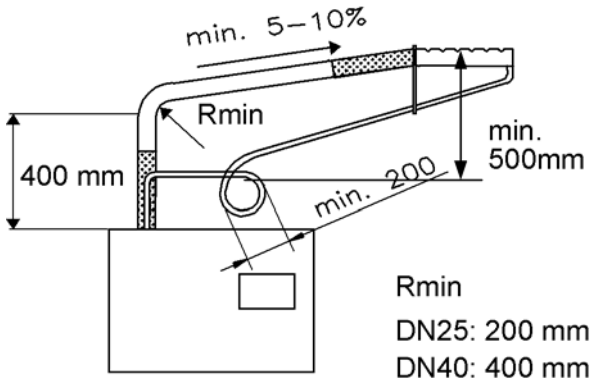
5.9 Types of Installation

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.

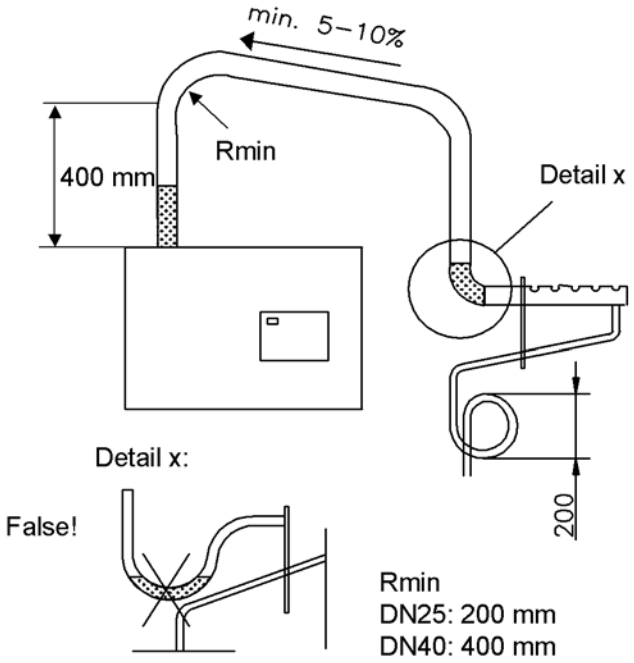
» If enough space is available, lay a loop as a vapor trap. The steam manifold must be at least 500 mm from the loop.



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 500mm.

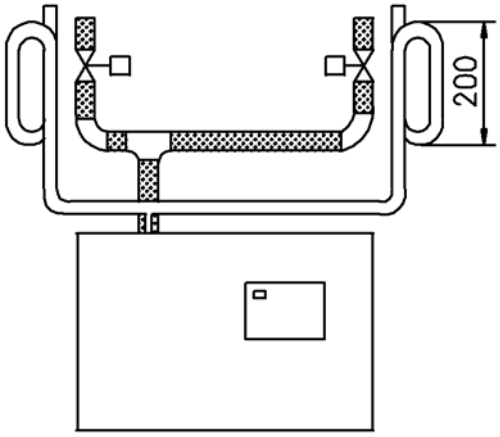


» Lay the loop of condensate hose 200 mm directly above the drain. Detail x

5.10 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 provided by the customer.

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



Installation of Steam Solenoid Valve

5.11 Unit Installation Check

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
- ☑ 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?

6. Water Installation

Warning: For installation, note the following:

- Have all work performed by a professional.
- Disconnect power supply prior to installation.
- Obey regulations of local public utilities. Verify that necessary safety measures have been taken - in compliance with either German Technical and Scientific Association for Gas and Water (DVGW) guidelines (DIN EN1717) or local regulations - to eliminate backflow of polluted water into drinking water treatment facilities. This can mean installing a backflow preventer. Within the humidifier, two double check valves (58) are located in the water supply lines. They prevent - in accordance with DIN EN 61770 - the backflow of water.
- The water supply temperature may not exceed 40 °C.
- Flushed-out water must be able to drain freely.
- The water supply line must have a minimum diameter of DN 12 (3/8").
- If (chemical) additives are present in the humidification water, health risks and/or impaired unit operation cannot be ruled out. Use of additives is not advised unless specifically recommended by the unit manufacturer.
- When employing demineralized water or purified condensate, do not use copper or brass in the supply or drain lines of the HeaterCompact unit. These materials can be corroded by demineralized water or purified condensate. Instead, use stainless steel or temperature-resistant plastic pipes.
- Water installation pressure: 1 to 10 bar ($100x10^3$ to $100x10^4$ Pa)1
- For water installation please use the water connecting hose that is delivered with the unit.

6.1 Water Quality

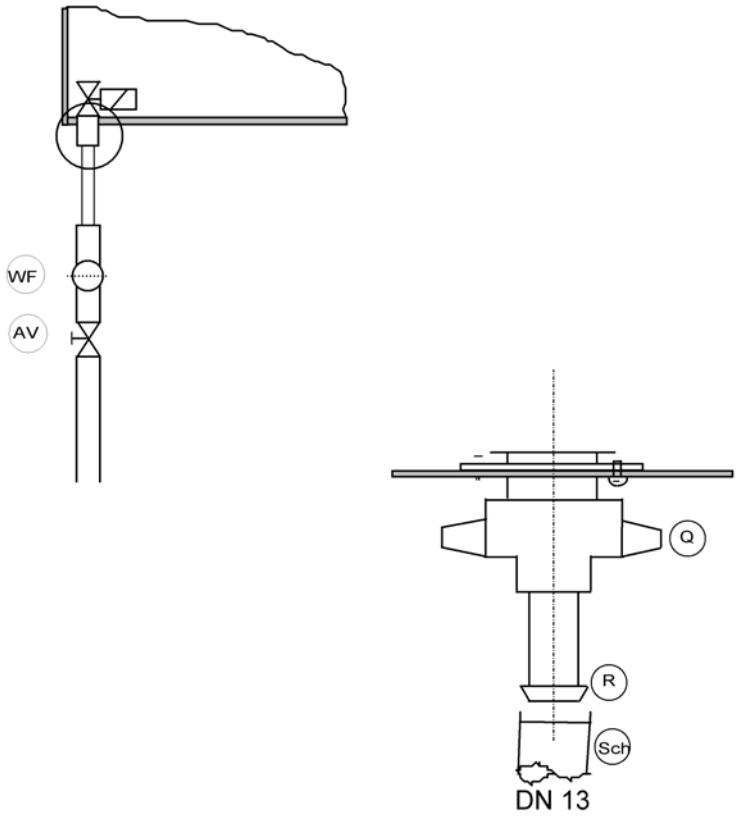
The HeaterCompact Type steam humidifier is designed for use with:

- tap water of different qualities
- demineralized water (min. conductivity 3µS/cm)
- fully cleaned condensate (min.conductivity 3µS/cm)
- partially softened water.

Boiling normal tap water always produces lime. Lime deposits on the surface of the heater elements may reduce their lifetime. We recommend to use a water treatment device in order to prevent scaling.

In case of any questions regarding water treatment devices please contact HygroMatik.

Water Supply (For Operation with Demineralized Water or Purified Condensate)



» Install a shut-off valve (AV) in the supply hose

» Install a water filter (WF) if the water quality requires it

» Make sure that a backflow preventer is installed in the water supply line.

Note: Shut-off valve (AV), water filter (WF) and backflow preventer are not provided by HygroMatik.

Install as follows:

» Check whether the valve strainer has been inserted in the solenoid valve.

» Screw cap nut (Q) onto the supply connection. Tighten by hand.

The supply connection protrudes from the intermediate tray.

Note: Excessive tightening will damage the threads.

» Slide 13mm inner diameter hose (SCH) over the pressure clip (R) and secure with a hose clamp.

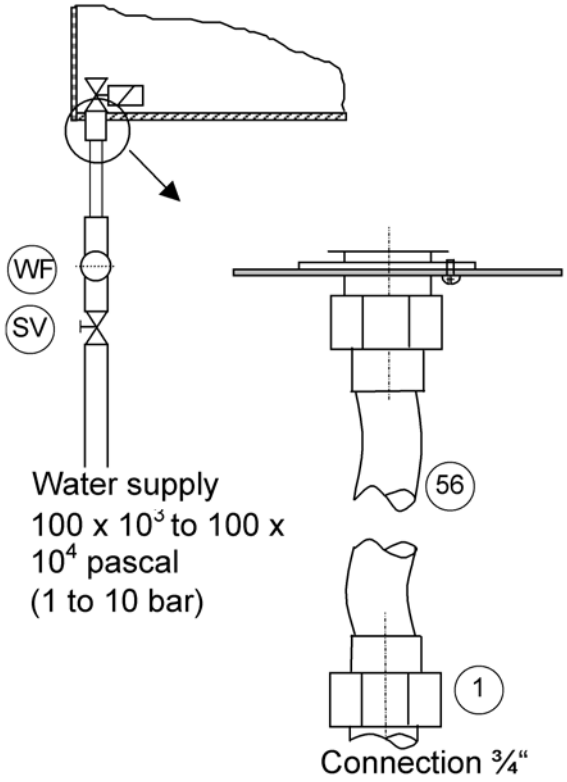
6.2 Water Supply (For Operation with Tap Water or Partially Softened Water)

» Install a shut-off valve (SV) in the supply line.

» Install a water filter (WF) if water quality requires it.

» Make sure that a backflow preventer is installed in the water supply line.

Note: Shut-off valve (SV) and water filter (WF) are not supplied with the unit



» HygroMatik provides a water hose (56) with a cap nut at both ends which can be used for water installation.

Install as follows:

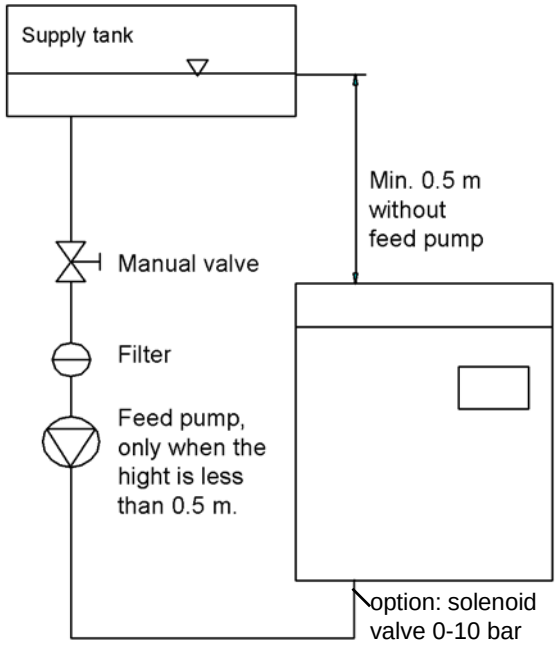
» Screw and tighten the cap nut with its inner seal ring around the water supply screw connection that protrudes from the base.

Note: Tightening too much will destroy the fitting. The valve strainer must be placed inside the solenoid valve.

» Use a cap nut (internal thread ¾“) with inner seal for a customer-provided water installation.

6.2.1 Feed from Holding Tank

If a holding tank will be used to supply water, the „option solenoid valve 0-10bar" must be ordered. Make sure that the feed height is at least 0.5 meter. If the height is less than 0.5 m, insert a feed pump or install the humidifier lower if possible.



6.3 Water Treatment

For water treatment system specifications, use the following table. The figures below assume that the humidifier has been running for 24 hours at 100% output.

HeaterCompact	Max. Water Consumption in over24 h [l]
3	83
6	166
9	248
12	331
18	497
27	745

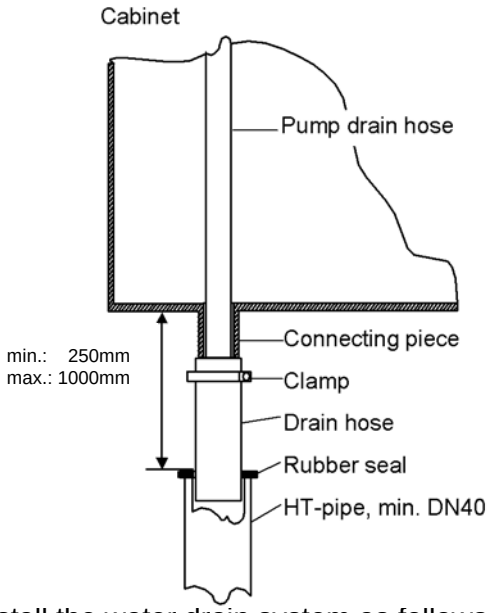
HeaterSlim	Max. Water Consumption in over24 h [l]
3	83
6	166
10	277

6.4 Water Discharge

Warning: Please pay attention to free and non-pressure drainage of the water! During blow down up to 0,3L/s is being drained. For water discharge, we recommend installation of a flexible water drain hose. Humidifier and waste water discharge must be on the same pressure level.

Please note:

- Do not bend, shorten or lengthen the drain hose.
- For the discharge line and drain pipe, select materials temperature-resistant up to 95°C.



Install the water drain system as follows:

- Run 250 - 1000 mm length of 1 1/4” drain hose loosely into a drainpipe with a minimum inner diameter of 40 mm.

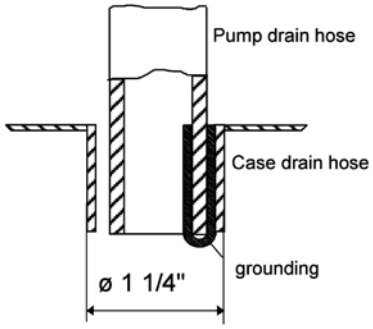
Type	Drain Hose
HC 3-27 HS 3-10	1 x 1 1/4"

- Slide the drain hose over the pump discharge hose and secure to the cabinet drain connection.

A grounding clip is fixed on the inner surface of the cabinet drain connection.Slide the end of the pump drain hose onto this clip. During blow-down, the grounding clip will be in direct contact with the water and will conduct any residual currents which may appear away from the cabinet.

There is a 3mm-wide gap between the pump drain hose jacket

and the inner surface of the cabinet drain connection. If water collects on the base plate, it will flow through this gap into the drainage system.



6.5 Checklist

Verify correct system installation using the checklist below:

☑ Can flushed-out water drain freely?

☑ Have all screws and clamps been properly tightened?

☑ Is the water supply line properly flushed out?

☑ Has the water installation been performed correctly?

Is the drainage system correctly installed?

Are the water supply and drain lines free of leaks?

Warning: Flush out the water supply line before connecting to the solenoid valve, especially when installing a new line. This prevents dirt particles from damaging the solenoid valve.

7. Electrical Installation

Warning, Hazardous Voltage! All work related to electrical installation may be performed by authorized personnel only (electricians or professionals with equivalent training). The customer is responsible for checking qualifications.**Warning, Hazardous Voltage!** Do not connect the steam humidifier to the power grid until after all installation work has been completed. Please obey all local regulations concerning electrical installation.

Warning: The electronic components of the humidifier control are very sensitive to electrostatic discharges. In order to safeguard these components during installation and servicing, steps must be taken to protect against ESD.

Warning: For installation, note the following:

- Disconnect power supply prior to installation and secure against restart.
- Verify the absence of electric current.
- Installation or removal of the display and control unit may only be performed when the unit is switched off. See also section "Access to Control."
- Electrical connector cables must be wired by qualified personnel.
- Install electrical connections as specified in the wiring diagrams.
- For units with power ratings over 33 kW, only a permanent connection to a permanent installation is permitted (observe European Directives shown in chapter „EC Declaration of Conformity“).
- Ensure that all terminals have been tightened.
- We recommend to install a fault current circuit breaker.

7.1 Electrical Installation

» Breakers must have a contact gap of at least 3 mm per pole.

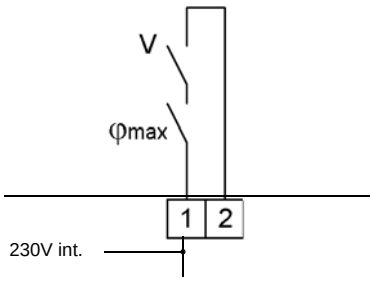
» Each steam cylinder requires a separate main power supply including main fuses, main breaker, etc.

» Connect potential equalization inside the unit to the external ground bolt (located on the underside of the cabinet beside the cable connections).

Observe European Directives shown in chapter „EC Declaration of Conformity.

We recommend using a main fuse with medium blow rating (applies only to the mains voltages above.) See table below indicating maximum power consumption corresponding to each type of circuit protection:

Type	Power Supply	Power Consumption	Fuses
HC03	230V/1Phases/N	9,8 A	1x10A
HC06	230V/1Phases/N	19,6A	1x20A
HC06(P)	400V/3Phases/N	11,3A	3x20 A
HC09(P)	400V/3Phases/N	16,9A	3x20 A
HC12	400V/3Phases/N	19,5A	3x25 A
HC18	400V/3Phases/N	29,3A	3x35 A
HC27	400V/3Phases/N	29,3A	3x35 A



Terminals Humidifier

7.2 Safety Interlock

Between terminal 1 and 2 of the humidifier the so called safety interlock is located. If the safety interlock is not closed the humidifier is not allowed to work.

Any additional safety devices (see below) have to be installed between those terminals. The safety interlock is also used for an On/Off control mode (remote switch).

There is no jumper between terminal 1 and 2 ex works.

If neither a Remote Switch nor any safety devices are wired to terminal 1 and 2 an electrical bridge has to be set.

Note: Install contact interlocks, i.e. max. hygrostat, vane relay, pressure controller, air interlock etc. in series between Terminals 1 and 2.

Warning: It is standard practice for air-conditioning to install a max. hygrostat in the safety interlock (not valid for steam bath applications). The max. hygrostat acts as a safety device in the event of a humidity sensor malfunction and protects against overhumidification.

Warning: Contacts laid between Terminals 1 and 2 must be potential free and rated for 230V switches. Terminal 1 is supplied with **230V** AC after switching on the humidifier.

7.3 Control Connection

Within the scope of this manual there is only a **short description** of the „Adjustment of the Control to the Control Signal" **at this point**. More detailed information please find in the technical manual for the control that is also delivered with the Heater Compact.

The Heater Compact is used in both applications for steam bath and air conditioning. As the Heater Compact is controlled via the temperature in steam bath applications and via the air humiditiy in air conditioning applications different types of controls are used. Therefore the descriptions of the Control Connections are also different:

7.4 Control Connection - Steam Bath Application

Valid for Controls: Basic-DS (B-DS), Comfort-DS (C-DS) und ComfortPlus-DS (CP-DS).

7.4.1 Temperature Sensor Connection

Connect the temperature sensor cable to the designated terminals 6 and 7 on the HygroMatik steam generator.

The factory setting for the value for the set point of steam bath temperature is 45°C. After switching the main switch to **I** (=ON) the humidifier starts to produce steam if the cabin temperature is a) below setpoint of temperature and b) if the safety interlock is closed (please see also chapter „Safety Interlock).

Connection for other steam bad components is described in the technical manual for the DS-Control.

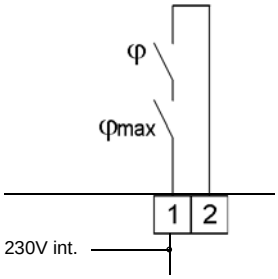
7.5 Control Connection - Air Conditioning Application

Valid for Controls: Basic (B), Comfort (C) und ComfortPlus (CP).

Note: The factory setting for the controls is to an „External control signal, 0-10 VDC" if no other setting is described in the delivery note of the humidifier.Within the scope of this technical manual there is only a short description of „Adjustment of Control to the Control Signal". For more detailed information please see the also delivered technical manual „Controls".

Warning: Set the control to prevent overly frequent activation and deactivation of the steam humidifier. Main contactors are wearing parts and are guaranteed by the manufacturer for 150,000 cycles. Operation which minimizes activation cycles will extend the life of the main contactors.

7.5.1 1-step control

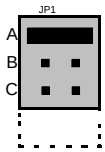


With 1-Step Controls, the external control hygrostat or control switch is wired in series with the contacts of the safety interlock.

Warning: Contacts laid between terminals 1 and 2 must be potentialfree and rated for 230V switches

Basic Control

By the use of a **Basic** control: For 1-step controls the jumpers must be set as indicated below:



Comfort Control

By the use of a **Comfort/Comfort-Plus** control: For 1-step controls, Parameter U6 must be set to “1-step,” also see Section „Parameter Setting with Codes (P0=10) / Advanced Customer Level“ in the technical manual for the Control.

7.5.2 Proportional Control with an external control signal

The control can be adjusted to the following external control signals:

0(2) - 5 V DC

0(2) - 10 V DC

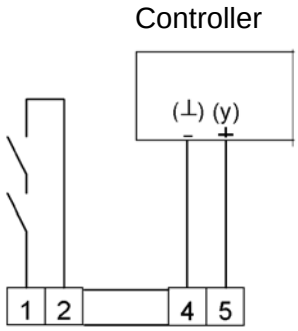
0(4) - 20 V DC

0(4) - 10 mA DC

0(4) - 20 mA DC

0 - 140 Ohm

The factory setting is a control signal of 0-10V.



Humidifier Terminals

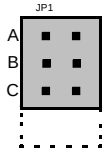
Basic Control

By the use of a **Basic** control:

For a Proportional Control with an external control signal the jumpers must be set as indicated below:

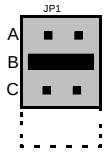
Setting for External Control Signal:

0(2) - 10 V DC



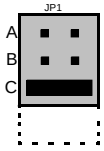
Setting for External Control Signal:

0(4)-20 mA



Setting for External Control Signal:

0-140 Ohm



Comfort Control

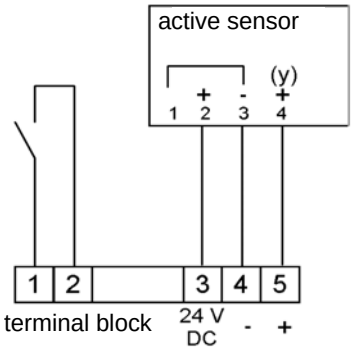
By the use of a **Comfort/Comfort-Plus** control: For a proportional control connected to an external control signal, Software-Parameters U6 and E3 must be set as indicated below.

Setting for External Control Signall	Parameter	
	U6	E3
0(2) - 10V DC	external controller	0 - 10 V
0(4) -20 mA	external controller	0 - 20 mA
0 - 140 Ohm	external controller	0 - 140 Ohm

7.5.3 Proportional Control with Built-In PI-Controller

Upon request, HygroMatik will provide an active sensor with a control signal of 0-10 V DC. Sensors with other control signals can also be used; the control (only available at Comfort or Comfort-Plus Control) need only be set to them.

Connection: Active Sensor, one-cylinder and double- cylinder humidifier; voltage output

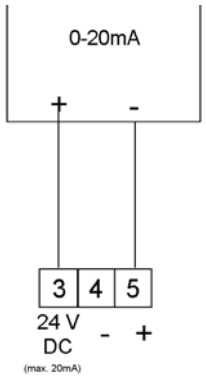


Humidifier Terminals

If other types of active sensors are used Paramter E3 has to be adjusted:

Setting for Sensor Signall	Parameter	
	U6	E3
0(2) - 10V DC	PI-Control	0 - 10 V
0(4) -20 mA	PI-Control	0 - 20 mA
0 - 140 Ohm	PI-Control	0 - 140 Ohm

Connection: active sensor; current output, single-cylinder and double cylinder units, two-wire system



Humidifier Terminals

Note: The desired relative humidity value is set at Parameter **P8** (factory setting: P8=50%).

7.6 Cable Connections

The table below shows the cable connections provided in HeaterLine steam humidifiers:

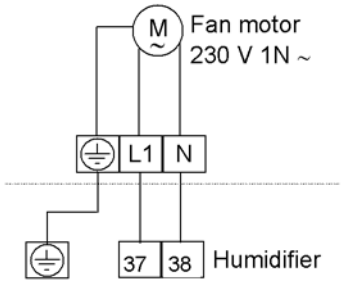
Unit	Connection M16	Connection M25	Connection M32
HC03 - 09	4	2	0
HC06P-HC09P HC12 - HC27	4	2	1

Characteristics of metric cable connections:

Thread	across-flats dimensions [mm]	for cable diameter [mm]
M16x1,5	19	4,5 - 10
M25x1,5	30	9 - 17
M32x1,5	36	11 - 21

7.7 Fan Unit

» Connect fan unit as specified in the wiring diagram.



The fan unit is activated/deactivated in parallel with humidification.

Note: Terminals 37 und 38 are supplied with the unit only when the fan unit and humidifier are purchased simultaneously. In other cases (i.e. retrofitting) the fan unit motor phase can be connected to Terminal 2 guided via the auxiliary contact of the main contactor.

Only cables with same diameter are alllowed to be connected to one common clamp.

7.8 Wiring Diagram

Please refer to the wiring diagram in the technical manual supplied with the control used with your humidifier. Every steam humidifier comes with a unit-specific technical manual and a manual for the control. In addition, you will find downloadable wiring diagrams and technical manuals at www.hygromatik.de.

7.9 Electrical Installation Checklist

Perform electrical installation checks in compliance with customer site requirements and public power utility regulations:

- ☑ Does the mains voltage match the voltage on the name plate?
- ☑ Have all electrical connections been made according to the terminal diagram?
- ☑ Have all electrical cable and plug connections been properly tightened?
- ☑ Are all electrical plug connections secure?
- ☑ Is the unit grounded?

After this check the unit can be switched on.

Warning: The unit must be closed and locked (only for humidifer type HeaterLine). This guarantees that the cover is grounded.

Note: For initial operation, control, service, malfunctions, and circuit diagrams, consult the operation instructions for the Hygro-Matik-controls or at www.hygromatik.de**.**

8. Maintenance

The HygroMatik steam humidifier is easy to maintain. Nevertheless, inadequate or improper maintenance can lead to operational malfunctions. Perform regular maintenance to give your unit a long life span.

Warning: When performing maintenance work, please follow these instructions:

- During operation and also for a while after switching off the unit the steam cylinder is hot. Before touching the cylinder, check its temperature.
- Drained cylinder water could have a temperature up to 95°C.
- Before removing the steam cylinder make sure that it is completely drained and that it does not contain any hot water.
- During disassembling a steam hose hot steam could leave the steam hose if several humidifiers are working on the same air duct, although the currently maintained unit is switched off.
- Have the unit serviced only by qualified, authorized personnel.
- Obey safety regulations.
- Switch off the unit prior to maintenance and secure against restart.
- After maintenance work, have qualified personnel check that the unit is operating safely.
- If a defective cable is detected through a visual check switch off the unit, secure it against restart and replace the cable.
- The clamps that fix the steam cylinder halves have partially sharp edges and could spring out uncontrolled during removement. Prevent springing out clamps by covering the clamps with one hand during removement.

The steam humidifier's performance and maintenance intervals depend primarily on the existing water quality and the quantity of steam generated. Variable water quality can lengthen or shorten the maintenance interval. Ongoing maintenance intervals can be estimated based on the amount and type of residue found in the steam cylinder. Immediate cylinder maintenance is indicated by:

a **green, blinking LED** on the display and operating panel. the display reads **Service** (only with controls of Type Comfort and Comfort Plus).

8.1 Maintenance for Operation with Demineralized Water / Condensate

Instructions for maintenance and cleaning intervals are based exclusively on typical, empirically determined values.

Cycle	Maintenance Task
4 Weeks after Initial Operation	Visual check of electrical and mechanical connections. Visual check of water level control. Visual check of steam cylinder interior.
Annually	Visual check of electrical and mechanical connections. Visual check of water level control. Visual check of heater elements / thermo sensor. Visual inspection of interior of steam cylinder. If needed, cleaning of steam cylinder, heater elements and thermo sensor.

8.2 Maintenance for Operation with Tap Water or Partially Softened Water

No precise maintenance intervals can be specified because these always depend on water quality and quantity of steam generated. It is advisable to adjust the frequency of maintenance to the specific operational application.

HYGROMATIK recommends to open and check the steam cylinder two weeks after commissioning. Ongoing maintenance intervals can be estimated based on the amount and type of residue found in the steam cylinder.

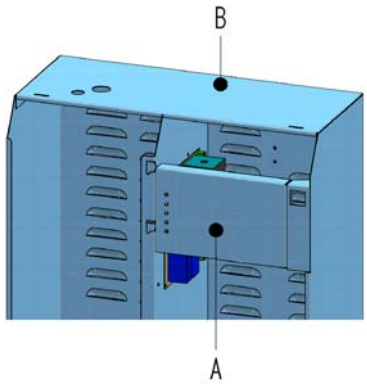
Blow-Down Cycles

The vaporization process causes mineral (calcium) deposits of different compositions to settle in the steam cylinder. Part of this solid build-up is removed through periodic blow-downs and fresh tap water refills.

Water quality

When using tap water, note that cleaning intervals shorten as the carbonate hardness level in the water increases. As a general rule, it is preferable to operate the unit with fully demineralized water. Operation will not be affected by mineral deposits and flushing losses will be minimized.

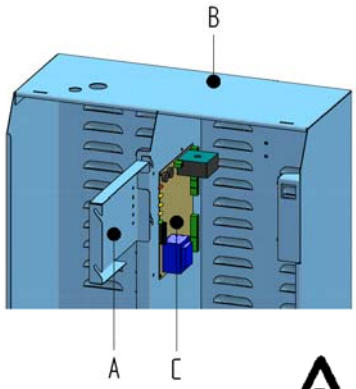
Note: If desired, maintenance intervals can be lengthened by moderately increasing blow-down rates. Please consult Hygro-Matik.



8.3 Access to Control Unit

» Remove cover (or electric compartment cover) and lift display panel (A) out of its guide.

» Turn display panel (see drawing) and hang display panel on the humidifier cabinet (B) by placing the two guide pins in the two front guides.



» The PCB (C) is now accessible.

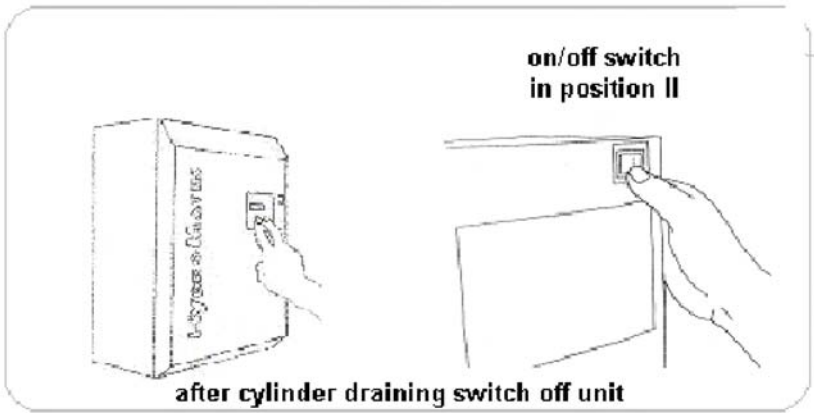
Danger, Hazardous Voltage: Switch off unit before installing or removing the display plate.

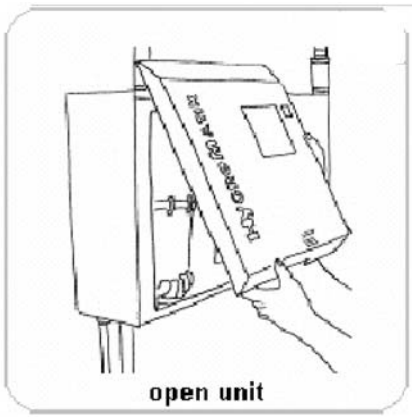
8.4 Removing and Cleaning the Steam Cylinder

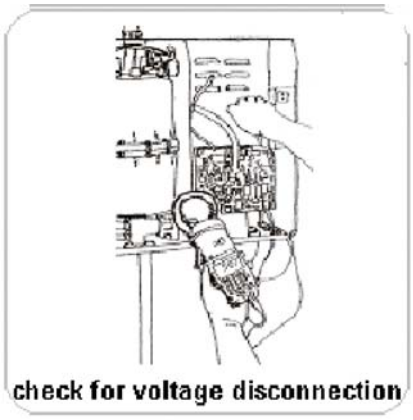
Warning: Please follow the detailed instructions in these operating instructions! The unit is only to be serviced by qualified, authorized personnel. Note the warnings and safety notes in the operating instructions. Failure to observe warnings and safety notes may result in injury, serious injury or death, and/or damage to the unit. The steam cylinder may still be hot when you begin maintenance work. Handle carefully!

Note: After a longer period of operation the steam cylinder could shrink a little. This doesn‘t matter but could lead to tightness discrepancies when only one half of the cylinder is being exchanged. Therefore we recommend not to change only one half of the cylinder but a complete cylinder.

Removal:







check for voltage disconnection

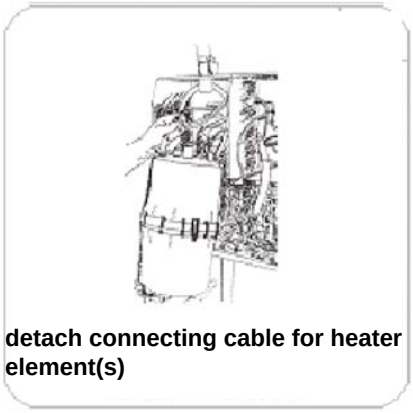
disconnect unit from water supply

check cylinder temperature

remove steam hose from adapter

push clip on adapter outside cabinet

lift steam cylinder out of base



detach connecting cable for heater element(s)

remove flange clamps

open cylinder

remove used O-ring

clean cylinder inside.

clean the two strainers

Cleaning of Steam Cylinder and Cylinder base

When using mineral deposit removers or cleaners to clean the cylinder and heater elements, make sure you thoroughly rinse the unit before returning reassembling it. Use mineral deposit removers **only** for cylinder and heater elements.

Note: Overly strong mechanical cleaning can damage the cylinder / heater elements.

» Remove all deposits. However, small amounts of scale deposits on the heater elements (8) are harmless.

» Cylinder base (11) and the connections have also to be checked for deposits and cleaned if necessary.

Cleaning of the Control Cylinder

The control cylinder (27, 28, 29) monitors the water level. When cleaning the steam cylinder the control cylinder should also be cleaned. Therefore:

» Loosen the four top screws that interconnect floating switch (27) and control cylinder housing (29).

» Pull out floating switch and clean it carefully.

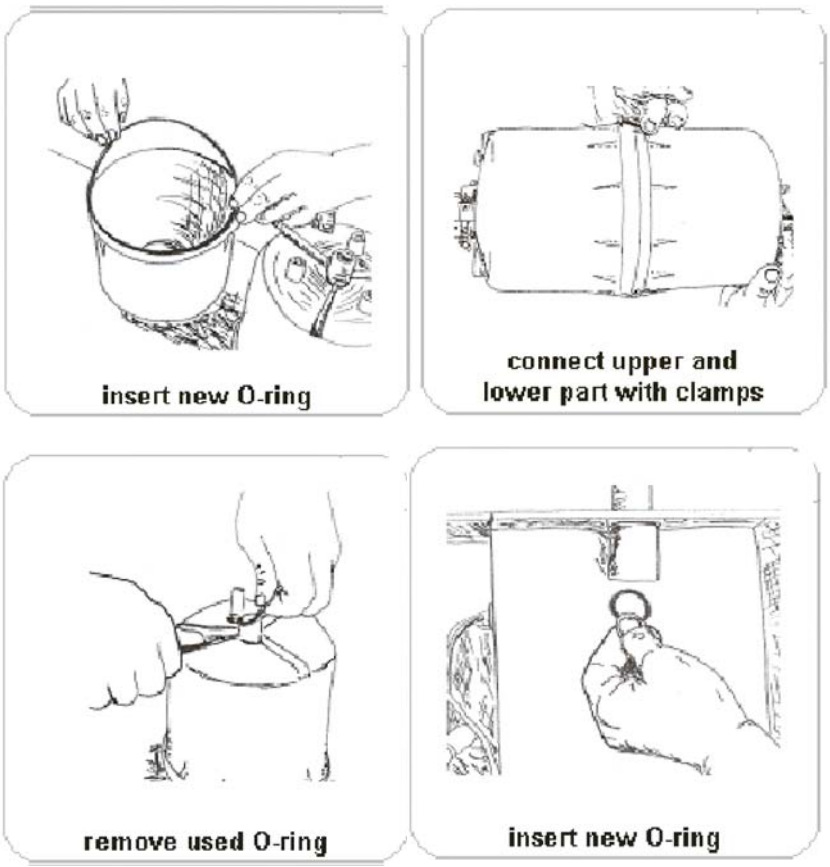
» Take off sealing (28) and clean it.

Note: The rod assembly may not be lubricated.

» Clean the sealing surface it the control cylinder housing (28).

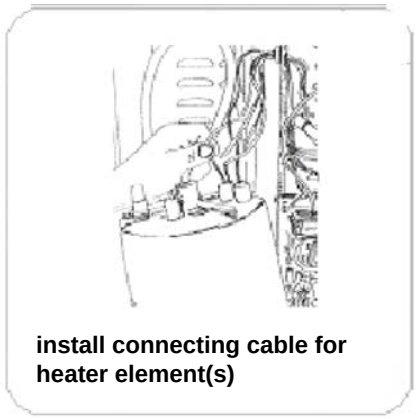
» For installation mount the a.m. components in reverse order.

Assembly



Note: When putting the cylinder back together, the joints and reinforcements of both sections must fit together snugly.

remove old O-ring
insert new O-ring



install connecting cable for heater element(s)

place cylinder vertically into cylinder base

push adapter onto steam outlet

fix adapter with clip

reconnect to power supply

Switch on the unit and check for leaks after 15-30 minutes of operation.

8.5 Maintenance of the Control Cylinder

When cleaning the steam cylinder the control cylinder should also be cleaned.

As the access to the control cylinder is only possible if the steam cylinder is removed one can find the sub chapter „Cleaning of the Control Cylinder" in chapter „Cleaning the Steam Cylinder".

8.5.1 Cleaning the nozzle in the steam hose adapter

From the top of the control cylinder a hose is laid to the connector at the steam hose adapter. Within this connector there is an integrated nozzle that has to be cleaned regularly as it could be blocked by lime.

8.6 Replacing Heater Elements

Removal

» Remove and open the steam cylinder as described above in section "Removing and Cleaning the Steam Cylinder."

» Detach connecting cable for the heater element in question. Mark these two terminals.

» If necessary, remove the capillary tube from the thermo sensor by detaching the retainer clips.

» Detach the heater element from the cover by removing the nut and adjusting washer.

» If present detach cable lug for grounding.

» Pull heater element downward out of the steam cylinder.

» Clean the sealing surface on the underside of the cover around the area where the new heater element will be installed.

Installation

» Install new heater element (with sealing), replacing the parts in the correct sequence, and screw nut.

» Insert the heater element's connecting cable into the two marked terminals and tighten. Polarity of (heater element) connecting cable is not important.

» If necessary: Install capillary tube on the thermo sensor using retainer clips.

» To proceed further, follow the steps described above in section "Removing and Cleaning the Steam Cylinder".

8.7 Replacing Thermo Sensor (for Heater Element)

Removal

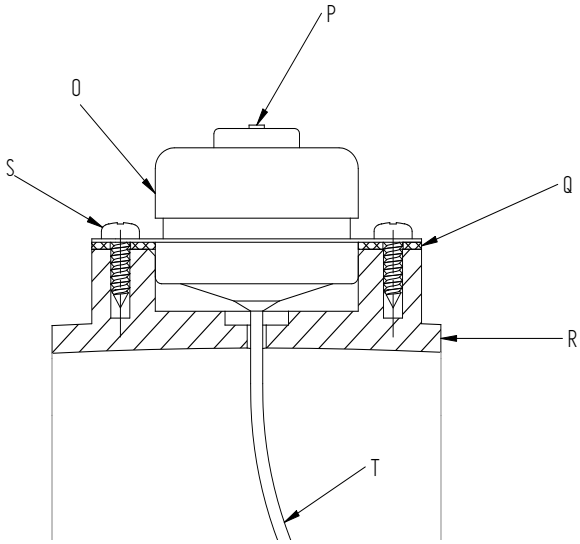
» Remove and open the steam cylinder as described above in section “Removing and Cleaning the Steam Cylinder.”

» Loosen clips of capillary tube (T).

» Disconnect capillary (T) tube from the heater elements (8).

» Remove the etwo screws (S) of thermo sensor (O).

» Remove thermo sensor.



O: Thermo Sensor
P: Unlocking Button for Thermo Sensor
Q: Seal
R: Steam Cylinder
S: Screw
T: Capillary tube

Warning: Do not bend the capillary tube of the thermo sensor!
Installation

» Install thermo sensor with new sealing. Do not fix the screws too tightly!

» Neatly connect the capillary tube to the heater element. Having humidifiers with two or more heating elements the capillary tube is connected to two heating elements.

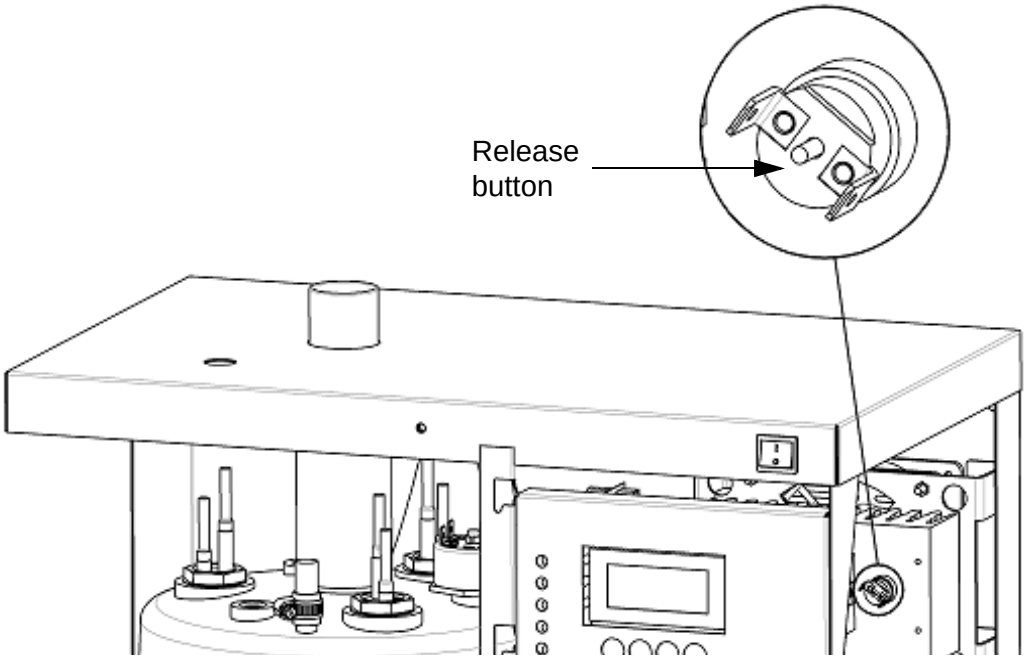
» To proceed further, follow the steps described above in section “Cleaning Coarse Strainer in Cylinder Base - Assembly” .

8.8 Unlocking of a Released Thermo Sensor (for heater element)

If a thermo sensor (for heater element) has released due to a too high temperature the red release button (P) is some millimetres above the level of the top of its holder. Additional the control reports a failure „thermo sensor activated“. After the system has cooled down the release button (P) can be unlocked by pressing it down a few millimetres.

8.9 Unlocking of a Released Thermo Sensor (for Solid State Relay)

If a thermo sensor (for solid state relay) has released due to a too high temperature (>100°C +/- 5°K) the control reports a failure „thermo sensor activated“. After the system has cooled down the release pin (that lays between the both plain connectors) can be released by pressing it carefully down until there is a klick sound.



8.10 Removing Inlet Solenoid Valve and Cleaning Fine Mesh Filter

Removal

» Remove and open the steam cylinder as described above in section “Removing and Cleaning the Steam Cylinder - Removal.”

» Seal off water supply and remove screw joint from fresh water connection.

» Detach connector hose from base.

» Remove electrical connectors from solenoid.

» Remove solenoid valve mounting screws.

» Take the solenoid valve out of hole.

Cleaning

» Remove fine mesh filter from the solenoid valve and clean.

Installation

» Place solenoid valve with seal in the hole in the unit cabinet.

» Secure solenoid valve tightly with screws .

» Attach fresh water connection.

» Connect elecrical cable to the solenoid valve.

» Attach connector hose to the base by using clamps .

» Install cylinder as described above in section “Cleaning Steam Cylinder - Assembly”.

» Open water supply.

» Switch on unit and check for leakage after 15-30 minutes of operation.

If leakage occurs, switch off power supply and repair the leaks, following safety instructions for work on live components!

8.11 Cleaning Blow-Down Pump

Removal

» Remove and open the steam cylinder as described above in section “Removing and Cleaning the Steam Cylinder - Removal.”

» Detach electrical connector from the pump (10).

» Detach union adapter (E) from the pump.

» Remove screws (G) and take the pump out of the base (11).

» Open pump (bayonet lock).

» Remove all residue from the drain hoses and pump (possibly replace o-ring (A)).

» Assemble pump.

» Moisten o-ring (C) and place in the side connection of the base.

» Push pump into the base and secure tightly with screws (G).

» Moisten o-ring (D) and place on the side connection of the pump.

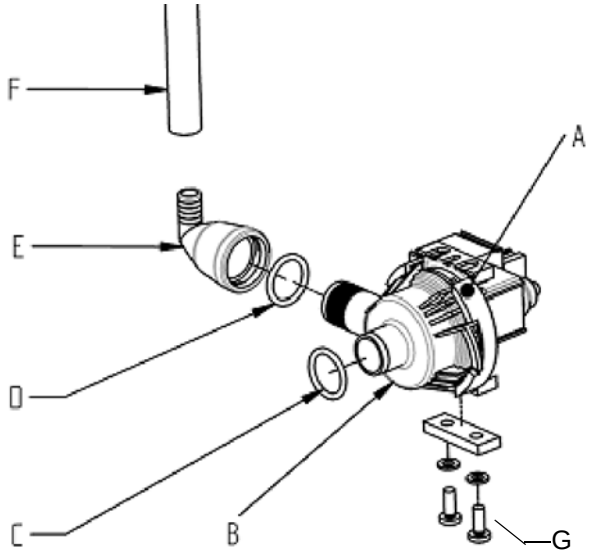
» Slide union adapter (E) over the side connection of the pump.

» Connect electrical connector to the pump (polarity not specified).

» Open water supply.

» Switch on unit and check for leaks after 15-30 minutes of operation.

If leakage occurs, switch off power supply and repair the leaks, following safety instructions for work on live components!



8.12 Cleaning connection hoses and cylinder base

All connection hoses should be free of deposits and under good conditions.

As well check all connections of the cylinder base (11) and the steam hose adapter (2) for deposits and remove if neccessary.

8.13 Checking Cable Screw Connections, Heater Element Wires

» Check that all cable screw connections are securely tightened

» Ensure that heating element cable is not dammaged.

Warning: Loose cable connections cause excessive contact resistance and overheating of contact surfaces.

8.14 Operational Check

» Start up the unit and operate for a few minutes, ideally at maximum output..

» Check safety devices.

» Check hose connections for possible leaks.

8.15 Dismantling

Once the steam humidifier will no longer be used, dismantle (demolish or scrap) it by following the installation procedures in reverse order.

Warning: Dismantling of the unit may only be performed by qualified personnel. Electrical dismantling may only be performed by trained electricians.

Obey the safety guidelines in section “Safety Instructions,” especially the guidelines for disposal.

9. Commissioning

Warning: This unit is only to be started by qualified personnel.

Switching off steam humidifier

Warning: Before starting up the unit, make sure you know how to switch it off.

» Switch off unit by setting control switch to “0”

» Close water supply stopcock valve.

Check of electrical wire connections

»

» Check that all electrical wire connections, including heater element wire connections, are tight and secure.

» Check cylinder seating, and if necessary steam and condensate hose clamps.

Switching on Steam Humidifier

» Switch on main breaker.

» Open water supply stopcock valve. Operating pressure 100 x 10^3 to 100 x 10^4 Pa (1 to 10 bar overpressure).

» Switch on unit by setting control switch to “I”.

» Set control of initial operation check to humidity demand.

The following functions are operating:

- The unit performs a self-test. If the control includes a display, the message “self-test“ is displayed.
- If the safety interlock (see also chapter „Safety interlock”) is closed, the water inlet solenoid valve opens and feeds water into the steam cylinder.
- If there is a demand for humidity, the main contactor is switched and a few minutes later steam production starts.Initiation of steam production can take up to 20 minutes.

Further checks:

☑ Let all electrically-driven operations run to completion.

As soon as the solenoid valve begins replenishing the water periodically, the steam humidifier operates at steady nominal output and the cold start sequence is complete.

» Monitor the unit and let it operate for 15 to 30 minutes. If leaks appear, switch off the unit.

» Repair leaks, and in doing so:

Attention, Hazardous Voltage! Follow safety instructions for work on live components.

10. EC-Declaration of Conformity

EG-Konformitätserklärung
EC Declaration of Conformity

Hersteller: **HygroMatik GmbH**
Manufacturer: HygroMatik GmbH

Anschrift: Lise-Meitner-Straße 3
Address: D-24558 Henstedt-Ulzburg / Germany

Produktbezeichnung / *Product description:*
Heater Compact (HC): HC03, HC06, HC06P, HC09, HC09P, HC12, HC18, HC27

In den Ausführungen / *Type*: Basic, Comfort, Comfort Plus, Dampfbad / *Steam bath* (DS)

Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:
The products described above in the form as delivered are in conformity with the provisions of the following European Directives:

2004/108/EG Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische.
Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility.

2006/95/EG Richtlinie des Rates zur Anleitung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.
Council Directive on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits.

Die Konformität mit den Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen:
Conformity to the Directives is assured through the application of the following standards:

Referenznummer: *Reference number:*	**Ausgabedatum:** *Edition:*	**Referenznummer:** *Reference number:*	**Ausgabedatum:** *Edition:*
DIN EN 55022	2008-05	DIN EN 60335-1	2007-02
DIN EN 61000-4-2	2001-12	DIN EN 60335-1/A13	2009-05
DIN EN 61000-4-3	2008-06	DIN EN 60335-2-98	2009-04
DIN EN 61000-4-4	2005-07	DIN EN 62233	2008-11
DIN EN 61000-4-5	2007-06	DIN EN 62233 Ber.1	2009-04
DIN EN 61000-4-6	2008-04		

Die Anforderungen des Geräte- und Produktsicherheitsgesetzes GPSG) §4 Abs. 1 bis 3 werden eingehalten. Eine vom Lieferzustand abweichende Veränderung des Gerätes führt zum Verlust der Konformität. *The requirements of the German Appliance and Product Safety Law (GPSG) paragraph 4 clause 1 to 3 are met. Product modifications after delivery may result in a loss of conformity.*

Henstedt-Ulzburg, den / *the* 16.11.2009

HygroMatik GmbH

Maike Nielsen
General Manager

i.V. D.

Dirc Menssing
Technical Manager / Quality Manager

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

11. Spare Parts

*	HC03	HC06	HC09	HC06P	HC09P	HC12	HC18	HC27	Article No.	Description
										Cabinet HC
	1	1	1						B-2129007	Cabinet HC03-09
				1	1	1	1	1	B-2129009	Cabinet HC06P-27
										Steam Generation
	1								B-2205483	Cylinder compl., with 1 heater element 2,25kW, 1 thermal sensor and terminal, 230V
		1							B-2205455	Cylinder compl. Incl 1 heater element 4.5kW, 1 thermal sensor and terminal
			1						B-2205459	Cylinder compl. Incl 1 heater element 6.75kW, 1 thermal sensor and terminal
				1					B-2205463	Cylinder compl. Incl 1 heater element 4.5kW, 1 thermal sensor and terminal
					1				B-2205467	Cylinder compl. Incl 1 heater element 6.75kW, 1 thermal sensor and terminal
						1			B-2205471	Cylinder compl. Incl 2 heater elements 4.5kW, 1 thermal sensor and terminal
							1		B-2205475	Cylinder compl. Incl 2 heater elements 6.75kW, 1 thermal sensor and terminal
								1	B-2205479	Cylinder compl. Incl 3 heater elements 6.75kW, 1 thermal sensor and terminal
16	1	1	1						B-3216050	top part of cylinder, empty for 1 heater element and 1 th. Sensor, including strainer
16				1	1				B-2206051	top part of cylinder, empty for 1 heater elements and 1 th. Sensor, including strainer
16						1	1		B-2206059	top part of cylinder, empty for 2 heater elements and 1 th. Sensor, including strainer
16								1	B-2206061	top part of cylinder, empty for 3 heater elements and 1 th. Sensor, including strainer
9	1	1	1						B-3216052	lower part of cylinder Cy08, including strainer
9				1	1	1	1	1	B-2206053	lower part of cylinder Cy17, including strainer
8	1								B-2209029	heater element 230V/ 2,25kW with sealing and mounting set, big diameter
8		1							B-2209025	heater element **230V** / 4.5kW with sealing and mounting set, big diameter
8		1							B-2209021	heater element **400V** / 4,5kW with sealing and mounting set, big diameter
8			1						B-2209023	heater element 400V/ 6.75kW with sealing and mounting set, big diameter
8				1		2			B-2209001	heater element 400V/ 4.5kW with sealing and mounting set
8			1		1		2	3	B-2209003	heater element 400V/ 6.75kW with sealing and mounting set
26				2	2	4	4	6	E-2204006	Gasket for heater element
25				1	1	2	2	3	E-2204007	Mounting nut for heater
15	1	1	1						E-3216010	O-ring seal for cylinder flange
15				1	1	1	1	1	E-2206050	O-ring seal for cylinder flange
	1	1	1						B-3216095	O-ring set for HC06-09
				1	1	1	1	1	B-3216097	O-ring set for HC06P-27
5	1	1	1	1	1	1	1	1	B-2205031	Thermal sensor 1pole
	6	6	6	6	6	8	8	10	E-2205012	Clamp for thermal sensor 1pole
6	1	1	1	1	1	1	1	1	E-2205010	gasket for thermal sensor 1pole
2	1	1	1	1	1	1	1	1	B-2205025	adapter for steam hose DN40
24	1	1	1	1	1	1	1	1	E-2209002	Clip for steam hose adapter DN40
4	1	1	1	1	1	1	1	1	E-2204022	O-ring for steam hose adapter DN40
1	2	2	2	2	2	2	2	2	E-2205088	star knob screw, fixation for steam hose adapter
12	1	1	1	1	1	1	1	1	E-2204035	condensate plug

*	HC03	HC06	HC09	HC06P	HC09P	HC12	HC18	HC27	Article No.	Description
										Water feed
14	1	1	1						B-2304061	double solenoid valve, 0.2-10 bar, 200-240VAC, 2.5 l/min
14				1	1	1	1	1	B-2304069	double solenoid valve, 0.2-10 bar, 200-240VAC, 3.5 l/min
	1	1	1	1	1	1	1	1	E-2304024	fine filter in solenoid valve inlet
	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	E-2304107	gasket for inlet screwed fitting, solenoid
	1	1	1	1	1	1	1	1	E-8501034	hose collar for inlet screwed fitting, 3/4" solenoid
56	1	1	1	1	1	1	1	1	B-2304031	hose for water connection, 0,6m 3/4" cap nuts on both sides, seal included
32	1	1	1	1	1	1	1	1	E-2304036	rubber seal solenoid valve - cabinet
	1	1	1	1	1	1	1	1	B-2304040	mounting set for solenoid valve
	1,15	1,15	1,15	1,35	1,35	1,35	1,35	1,35	E-2604002	hose solenoid valve - cylinder
	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	E-2604002	hose solenoid valve - super flush
	1	1	1	1	1	1	1	1	E-2604044	buckling protection for hose
33	1	1	1	1	1	1	1	1	B-2504129	water level control, compl with flow switch
29	1	1	1	1	1	1	1	1	E-2504174	water level control, without flow switch
27	1	1	1	1	1	1	1	1	B-2504145	flow switch incl. sealings
28	1	1	1	1	1	1	1	1	E-2304038	rubber seal for water level control
	0,27	0,27	0,27	0,4	0,4	0,4	0,4	0,4	E-2604002	hose, cylinder base - control cylinder
30	0,45	0,45	0,45	0,6	0,6	0,6	0,6	0,6	E-2604002	hose, water level control- steam hose adapter
3		1	1	1	1	1	1	1	E-2604021	T-piece condensate manifold, type TS12, DN12
									E-2604029	hose nozzle DN 25 - R 3/4"
58	2	2	2	2	2	2	2	2	E-2604094	Double check valves
34	6	6	6	6	6	6	6	6	E-2304015	hose clamp DN12
39	2	2	2	2	2	2	2	2	E-8501064	hose clamp DN14,2
										Water Drain
11		1	1	1	1	1	1	1	E-2206086	cylinder base for C, Hy, HC, DN40
13		1	1	1	1	1	1	1	E-2204022	O-Ring for cylinder base DN40
10		1	1	1	1	1	1	1	B-2404027	Drain pump 230V/ 50-60Hz without mounting set
		1	1	1	1	1	1	1	B-2424014	Mounting set for drain pump
		1	1	1	1	1	1	1	E-2404008	Drain pump housing
18		1	1	1	1	1	1	1	E-3220005	O-ring cylinder base - drain pump
21		1	1						E-3425002	adapter, pump - drain house, angled DN25/13
				1	1	1	1	1	E-2425002	adapter, pump - drain house, straight, DN25/13
17		1	1	1	1	1	1	1	E-3220005	O-ring for drain pump
7		1	1	1	1	1	1	1	E-2425004	Elbow with vent pipe
22	0,45	0,45	0,45	0,63	0,63	0,63	0,63	0,63	E-2604002	hose, drain pump-elbow
23	0,55	0,55	0,55	0,6	0,6	0,6	0,6	0,6	E-2604004	drain hose, elbow -outlet
57		1	1	1	1	1	1	1	B-2304031	hose water connection 3/4"
	1	1	1						B-3401035	drain hose system for HC03-09, consisting of pos. 7, 17, 21, 22, 23
				1	1	1	1	1	B-3401037	drain hose system for HC06(P)-27, consisting of pos. 7,17,22,23, adaper straight

*	HC03	HC06	HC09	HC06P	HC09P	HC12	HC18	HC27	Article No.	Description
										Control
	1	1	1	1	1	1			B-2507041	main contactor 20A, DILM7, coil voltage.230VAC
							1	1	B-2507061	main contactor 35A, DILM17, coil voltage 230VAC
51	1	1	1	1	1	1	1	1	B-2502412	control button 2 pole Basic, L3/DS, middle 0
	1	1	1	1	1				B-2602001	solid state relais 25 A, 1ph., cooling device 150 x 50 mm, thermal circuit breaker
						1	1		B-2602103	solid state relais 50 A, 2ph., cooling device 150 x 50 mm, thermal circuit breaker (not at Slave-units
								1	B-2602009	solid state relais 75 A, 1ph., cooling device 150 x 80 mm, thermal circuit breaker (not at Slave-units)
	1	1	1	1	1			1	E-2205100	protection cap against contact without cutout
						1	1		E-2205102	Protection cap against contact with cutout
	1	1	1	1	1	1	1		E-2205116	cooling device 150 x 50 mm
								1	E-2205118	cooling device 150 x 80 mm
	1	1	1	1	1	1	1	1	E-2205108	Thermal circuit breaker with manual reset, 100°C ± 5K
				1	1	1	1	1	E-3720010	Fan, 230VAC
										Basic
	1	1	1	1	1	1	1	1	B-2526203	Elektronic pcb type Basic
									B-2526203	Elektronic pcb type Basic for Slave-units
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526213	Elektronic pcb type Basic for HC steam bath
	1	1	1	1	1	1	1	1	B-2120901	Mounting plate with foil for Basic (without display)
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2120909	Mounting plate with foil for Basic DS (without display)
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526301	Relais pcb for Basis pcb
										Comfort
	1	1	1	1	1	1	1	1	B-2526203	Elektronic pcb type Basic
									B-2526203	Elektronic pcb type Basic for Slave-units
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526213	Elektronic pcb type Basic for HC steam bath
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526401	Comfort display incl. mounting plate with foil
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526445	Comfort display incl. mounting plate with foil steam bath
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2120903	mounting plate with foil for Comfort unit (without display)
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2120911	mounting plate with foil for Comfort unit for steam bath DS (without display)
										Comfort Plus
	1	1	1	1	1	1	1	1	B-2526203	Elektronic pcb type Basic
									B-2526203	Elektronic pcb type Basic for Slave-units
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526213	Elektronic pcb type Basic for HC steam bath
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526403	Comfort Plus Display incl. Mounting plate
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2120905	mounting plate with foil for Comfort Plus unit (without display)
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	B-2526447	Comfort plus display incl. mounting plate with foil steam bath

*	HC03	HC06	HC09	HC06P	HC09P	HC12	HC18	HC27	Article No.	Description
										Accessories
									E-2604034	Reducing piece DN40/DN25 for steam hose
									E-2604012	Steam hose DN25, per m
									E-2604013	Steam hose DN40, per m
									E-2604002	Condensate hose DN12, per m
									E-2404004	Steam hose clamp DN25
									E-2604016	Steam hose clamp DN40
									E-2304015	Condensate hose clamp DN12
									E-2604042	Steam manifold piece DN25, stainless steel
									E-2604023	Steam manifold piece DN40, stainless steel
									E-2604021	Condensate connector T-piece DN12
									E-2604094	Double check valves
									B-2604025	steam solenoid valve 0-0,4 bar, compl. for steam hose DN 25
									B-2604040	steam solenoid valve 0-0,4 bar, compl. for steam hose DN 40

If you order any spare parts, specify type and serial number of the unit, please.
* see exploded view

12. Fax Form - Order for spare parts

Fax Form

Please copy, fill in and fax to

Fax.No. **+49(0)4193/895-31**

HygroMatik
Lise-Meitner-Str. 3
24558 Henstedt-Ulzburg
Tel. +4904193/895-0

Order of 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)

_____
_____
_____
_____

company stamp (delivery adress)

date/signature

* Order can only be processed if unit type and unit serial no. are filled in.

13. Index

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14. Technical Specifications

HeaterCompact HC									
Type	**HC03**	**HC06**	**HC06**	**HC09**	**HC06P**	**HC09P**	**HC12**	**HC18**	**HC27**
Steam Output [kg/h]	3	6	6	9	6	9	12	18	27
Electrical Supply*	230V/1/N		400V/3/N 50-60Hz						
Power Rating [kW]	2,25	4,5	4,5	6,8	4,5	6,8	9,0	13,5	20,3
Power Consumption [A]**	9,8	19,6	11,3	16,9	11,3	16,9	19,5	29,3	29,3
Circuit Protection [A]	1x10	1x20	3x16	3x20	3x16	3x20	3x25	3x35	3x35
Control Type	Basic, Comfort and Comfort Plus								
Number of Steam Cylinder	1								
Number of Heater Elements	1	1	1	1	1	1	2	2	3
Steam Hose Connection	1x25mm***							1x40mm	
Condensate Hose Connection	1x12mm								
Net Weight [kg]	16	16	16	16	25	25	26	26	27
Operating Weight [kg]	18	18	18	18	43	43	44	44	45
Height [mm]	562				707				
Width [mm]	427				490				
Depth [mm]	257				306				
Water Supply	Fully Demineralized Water / Cleaned Condensate: 1 to 10 bar, 13mm Hose Partially Softened Water / Tap Water (different qualities): 1 to 10 bar, for 3/4" external thread								
Fan Unit, Wall-Mounted	VG08	VG08	VG08	VG17	VG08	VG17	VG17	VG30	VG30
Airflow Capacity of Fan Unit [m^3/h]	160	160	160	185	160	185	185	350	350

* Other voltages upon request.
** Current load of phases is not uniform. See table below.
*** incl. reducing piece DN40/DN25

Max. current load [A] according to phase:

Phase	HC06(P)	HC09(P)	HC12	HC18	HC27
Electrical Supply*	400V/3/N 50-60Hz				
L1	11,3	16,9	11,3	16,9	29,3
L2	11,3	16,9	19,5	29,1	29,3
L3	0,2	0,2	11,3	16,9	29,3

HeaterCompact HC for SPA

HC03..-DS - HC27..-DS

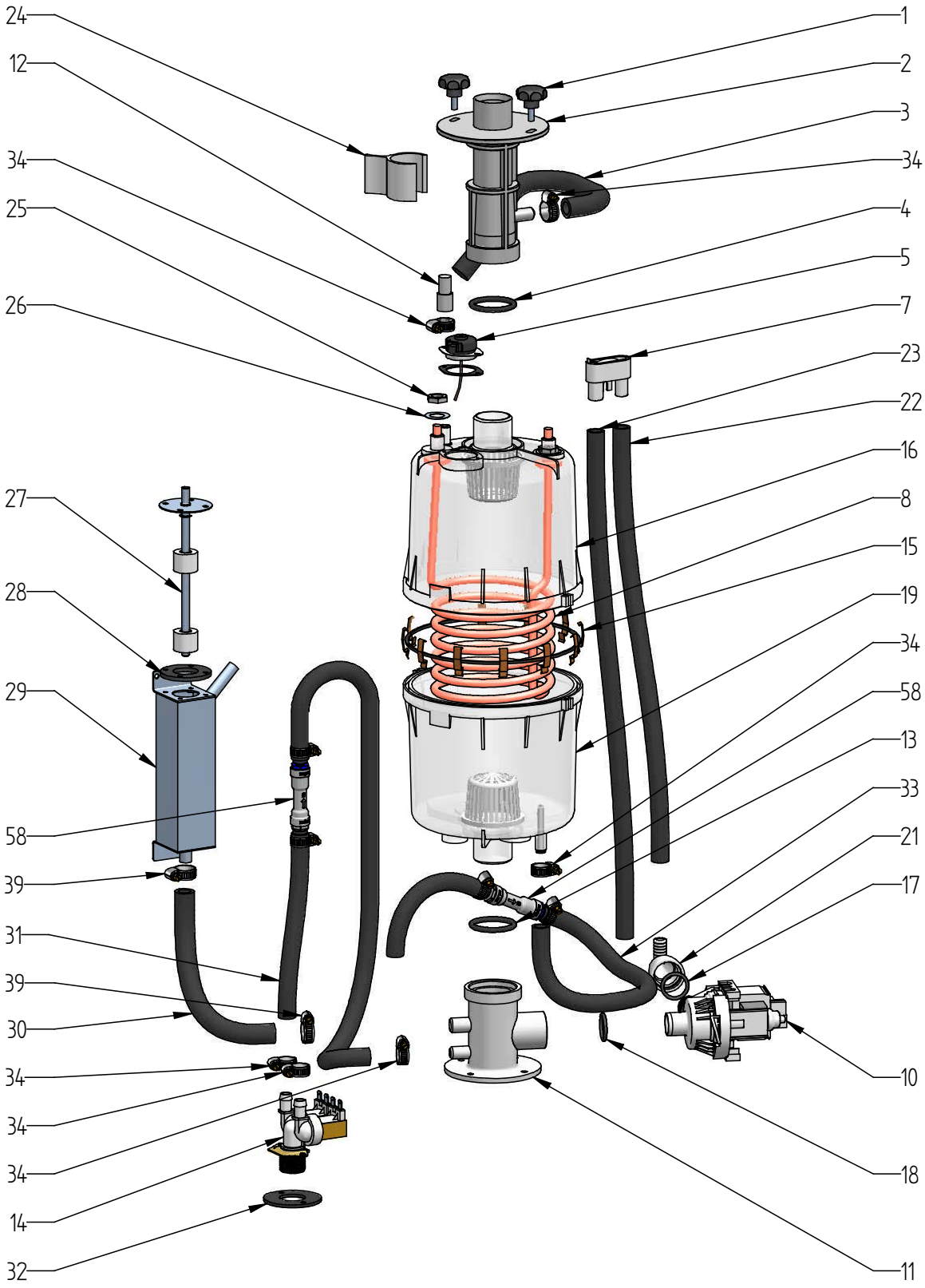
Type	**HC03**	**HC06**	**HC06**	**HC09**	**HC06P**	**HC09P**	**HC12**	**HC18**	**HC27**
Steam Output [kg/h]	3	6	6	9	6	9	12	18	27
Electrical Supply*	230V/1/N		400V/3/N 50-60Hz						
Power Rating [kW]	2,25	4,5	4,5	6,8	4,5	6,8	9,0	13,5	20,3
Power Consumption [A]**	9,8	19,6	11,3	16,9	11,3	16,9	19,5	29,3	29,3
Circuit Protection [A]	1x10	1x20	3x16	3x20	3x16	3x20	3x25	3x35	3x35
Control Type	Basic, Comfort and Comfort Plus								
Number of Steam Cylinder	1								
Number of Heater Elements	1	1	1	1	1	1	2	2	3
Steam Hose Connection	1x40mm								
Condensate Hose Connection	1x12mm								
Net Weight [kg]	16	16	16	16	25	25	26	26	27
Operating Weight [kg]	18	18	18	18	43	43	44	44	45
Height [mm]	562				707				
Width [mm]	427				490				
Depth [mm]	257				306				
Water Supply	Fully Demineralized Water / Cleaned Condensate: 1 to 10 bar, 13mm Hose Partially Softened Water / Tap Water (different qualities): 1 to 10 bar, for 3/4" external thread								

* Other voltages upon request.
** Current load of phases is not uniform. See table below.

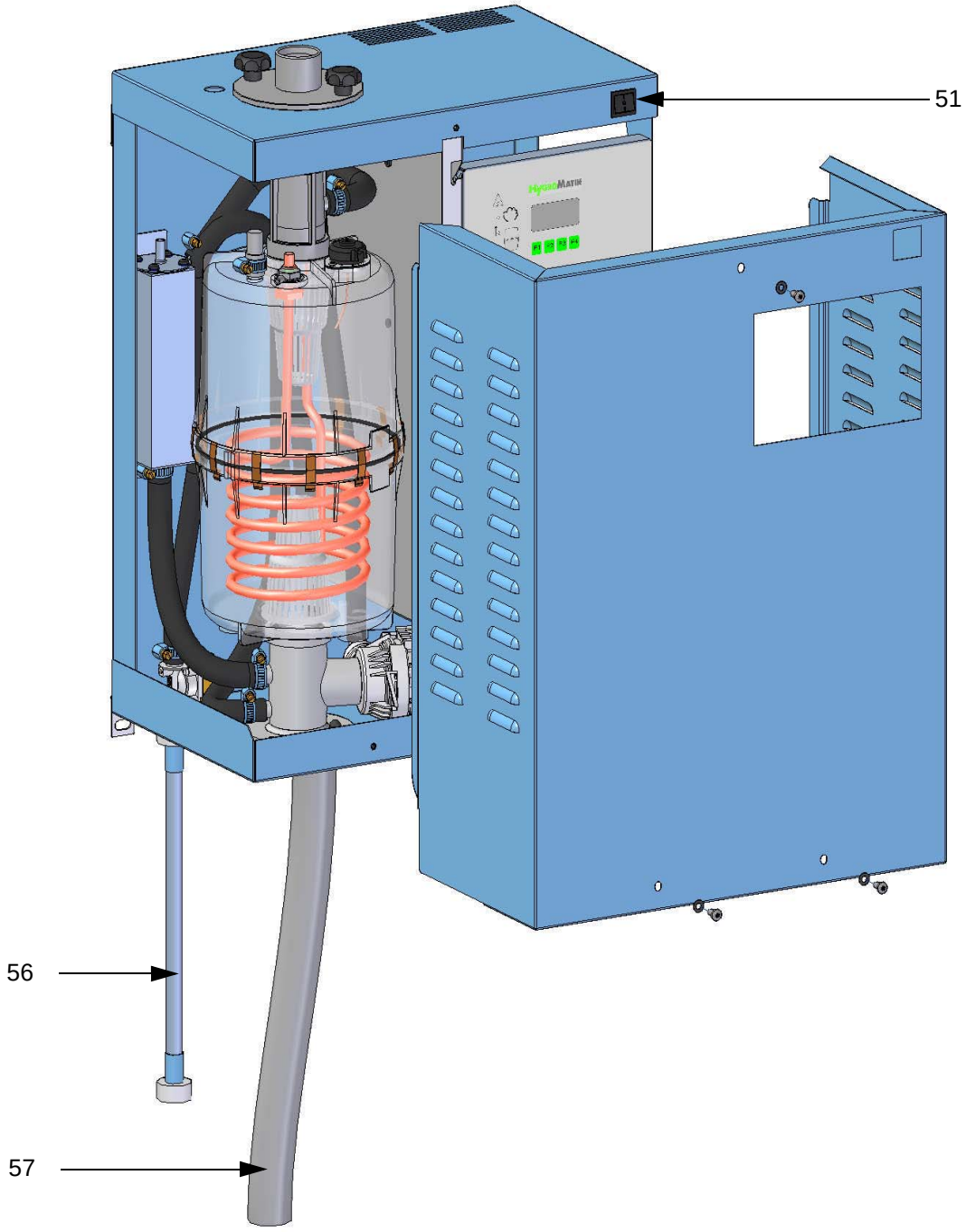
Max. current load [A] according to phase:

Phase	HC06(P)	HC09(P)	HC12	HC18	HC27
Electrical Supply*	400V/3/N 50-60Hz				
L1	11,3	16,9	11,3	16,9	29,3
L2	11,3	16,9	19,5	29,1	29,3
L3	0,2	0,2	11,3	16,9	29,3

15. Exploded View



16. View of Cabinet



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