HYGROMATIK
We humidify the air.

Operating Instructions

HyLine

Electrode Steam Humidifier

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A Word about Water Quality

The mode of operation of all electrode steam humidifiers is based on the fact that water contains minerals and is therefore conductive.

- "normal" tap water is ideal.
- but what is "normal" tap water exactly?

Users of HYGROMATIK units in the most diverse areas consider their tap water "normal."

HYGROMATIK typically defines "normal" as feed water with a conductivity between 200 and 500 µS/cm (microSiemens per centimeter) at 15° C.

Some areas, however, are supplied with tap water whose quality is outside the parameters specified by HYGROMATIK. If the HYGROMATIK steam humidifier's control is not adjusted correctly in these areas, the unit cannot perform optimally. For example, the electrodes could wear out particularly quickly or the steam production could be too low.

The operational parameters set by HYGROMATIK in the factory are intended for normal tap water. However, they can very easily be reprogrammed to fit the special requirements of a particular area. In addition, it is possible to install a plastic star in the cylinder in order to increase the life span of the electrodes or to provide a flushing mechanism to extend maintenance intervals.

Because of this you should monitor your new unit during initial operation. Make sure that it has been properly installed and is operating to your satisfaction.

Consult your HYGROMATIK specialists. We will test the quality of your water and advise you on installation and initial operation. Your HYGROMATIK steam humidifier will be carefully adapted to your particular application.

Warning, Hazardous Voltage: All work to be performed by trained personnel only. All electrical installation and servicing of the electrical components of this unit to be performed by qualified electricians only. Disconnect power supply before installation and servicing!

Table of Contents:

1. Introduction

Dear Customer,

Thank you for choosing a HyLine type steam humidifier.

HYGROMATIK steam humidifiers represent the latest in humidification technology.

They will impress you with their safety, ease of use and economical operation.

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

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

If you have additional questions, please contact us:

Tel.: +49-(0)4193 / 895-0 (Main Number)

Tel.: +49-(0)4193 / 895-293 (Technical Support Hotline)

Fax: +49-(0)4193/ 895-33

e-mail: hot1@hygromatik.de

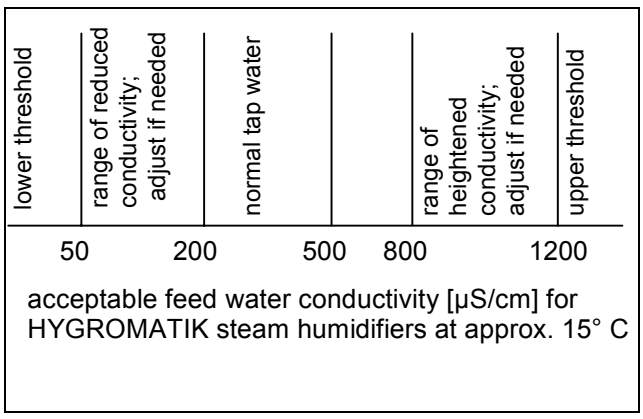
For all technical questions or spare parts orders, please be prepared to provide unit type and serial number (see name plate on the unit).

1.1 Directions for Use

The HYGROMATIK steam humidifier is intended for steam production.

HYGROMATIK units in the HyLine range comprise 10 performance classes with a maximum steam output from 5 kg/h to 116 kg/h.

Use feed water with a conductivity between 50 and 1200 µS/cm only.



acceptable feed water conductivity [µS/cm] for HYGROMATIK steam humidifiers at approx. 15° C

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Warning: HYGROMATIK steam humidifiers emit steam with a temperature of 100° C. The steam may not be inhaled directly.

Proper usage also entails following HYGROMATIK's instructions for installation, dismantling, reassembly, initial operation and operation and maintenance, as well as disposal procedures.

Only qualified, authorized personnel may operate or service the unit. Workers who transport or service the unit must have read and understood the relevant sections of the operating instructions, especially the section "Safety Notes." In addition, staff must receive safety training about potential hazards from the operator. Place a copy of the operating instructions at the location where the unit is operated.

1.2 Typographic Distinctions

- preceded by a bullet: general specifications.

» preceded by an arrow: Procedures for servicing or maintenance which should or must be performed in the indicated order.

☑ Installation step which must be checked off.

1.3 Documentation

Retention

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

Versions in Other Languages

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

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.

Accident Prevention Regulations

Comply with the accident prevention regulation

Accident Prevention Regulation Electrical Systems and Equipment (VBG4/BGVA2)

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.

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

HyLine steam humidifiers are IP21-protected. Make sure that the unit is protected from drips in its installed location.

2.3 Disposal after Dismantling

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

3. Transport

3.1 Overview

Note: Proceed carefully when transporting the steam humidifier in order to prevent damage due to stress or careless loading and unloading.

3.2 Transport Size and Weight

Type	Height (cm)	Width (cm)	Depth (cm)	Weight (kg)
HY1	56	56	33	16
HY2	76	55	32	24
HY3	76	55	32	25
HY4	84	60	36	33
HY5	90	68	43	46
HY6	84	98	36	54
HY7	90	111	43	77

* Dimensions and weights may vary slightly.

3.3 Packing

☞ **Note:** Notice the symbols affixed to the packing box.

3.4 Interim Storage

Store the unit in a dry place and protect from frost.

3.5 Check for Complete and Correct Delivery of Goods

Upon receipt of the unit, confirm that:

- the type and serial number on the name plate match those specified in the order and delivery documents and
- the equipment is complete and all parts are in perfect condition

☞ **Note:** In case of damage during shipment or missing parts, immediately notify the carrier or supplier in writing.

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

Shipping Companies	After Receipt of Goods
Mail	no later than 24 hours
Rail	no later than 7 days
Truck and Rail Carriers	no later than 4 days
Parcel Service	immediately

* Time limits for some services subject to change.

3.6 Included in the Delivery

The delivery includes:

- Unit of the selected HyLine type including selected control.
- Water installation hose 0,6m, 3/4".
- Mounting set with anchors and screws. For HyLine types HY2 to HY7, extra mounting bar.
- Operating Instructions for the unit and the control.
- Ordered accessories (steam manifold, steam hose, condensate hose, etc.).

4. Operation and Installation

4.1 Mode of Operation

The HYGROMATIK steam humidifier utilizes the conductivity normally present in tap water for steam production. Electrodes inside an enclosed steam cylinder are immersed directly into the tap water. They are connected to the alternating current.

The conductivity of the water generates an electric current between the electrodes. In this way, the electric power supplied is converted directly into heat without energy loss.

The amperage is a function of the available voltage, the immersed electrode surface area, the average distance between the electrodes and the water conductivity. The steam output of the humidifier is determined by electric power usage, which is regulated by increasing or decreasing the immersed surface area of the electrodes.

Concurrently, a self-regulating control keeps conductivity within a specified range.

The steam produced has a temperature of about 100°C with minimal excess pressure ("pressureless steam").It is free of minerals and largely germ-free. Mineral deposits typically remain behind in the cylinder.

4.2 Installation and Operation

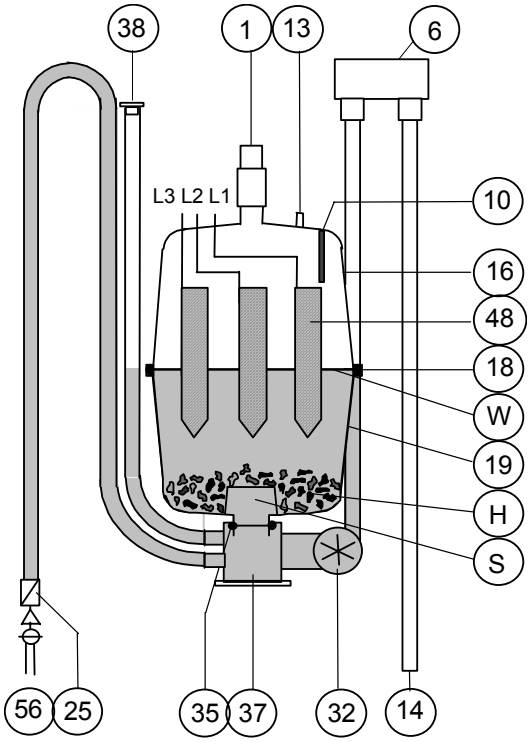
When the controller specifies an increase in humidity, the main contactor is switched on and the electrodes (48) are supplied with power. The water inlet solenoid valve (25) feeds water into the steam cylinder (16+19).

As soon as the electrodes are immersed, the current begins to flow. The water is now heated. When the pre-selected output is reached, the control turns off the solenoid valve and interrupts the water supply.

After a short heating up period, the water between the electrodes begins to boil and vaporize. The vaporization lowers the water level in the steam cylinder, reducing the output provided. The inlet solenoid valve, equipped with a fine mesh filter, intermittently admits fresh water.

Humidifier power usage is continuously monitored. With a cold start-up, the nominal current increases to 125% in order to achieve quick-start output parameters. This activates the electronic overflow limiter which causes a partial draining of the cylinder. This reduces the immersed surface area of the electrodes, lowering power usage.

The concentration of dissolved salts increases over time, which can lead to a rise in the conductivity of the water. If this continues, conductivity may increase until a short circuit occurs. This could damage the unit, but in any case would significantly reduce the life span of the electrodes.



Location	Designation
1	Steam hose adapter
6	vent pipe
10	max. water level sensor electrode
13	condensate return
14	water drain, discharge
16	top part of steam cylinder
18	cylinder flange and o-ring
19	lower part of cylinder
25	solenoid valve water inlet
32	blow-down pump
35	o-ring
37	cylinder base
38	hose for manual draining
48	electrodes
56	water installation
H	mineral deposits
S	coarse strainer
W	water level

For this reason, regular, periodic blow-downs of some of the concentrated water are very important. Following this procedure as recommended provides stable cylinder water conductivity as well as minimal water loss for the expected service life of the cylinder.

Water blow-down is performed by a blow-down pump (32). The functioning of the blow-down pump is continuously monitored during operation. If the pump is damaged, the steam humidifier shuts down.

With normal water quality, the blow-down loss rate is between 7% and 15% of the amount of steam produced. The steam cylinder requires complete drainage every 2-8 days, regardless of the water quality.

Mineral deposits (H) settle in the open area below the electrodes and are removed through periodic maintenance. The blow-down pump itself has wide openings and can flush out smaller pieces of mineral deposit. This extends the service life of the unit and reduces the required maintenance interval.

During blow-downs, water flows from the pump into the drainage system.

A sensor electrode (10) monitors the maximum water capacity of the cylinder. When the water level reaches the sensor electrode, the water supply is interrupted. This can occur when the water has low conductivity or when the electrodes are worn out. In the case of low water conductivity, however, this state usually lasts only a short time. The built-in control and the large area electrodes combine to produce a rapid rise in conductivity by increasing the concentration of the water.

The steam cylinder consists of a top (16) and lower (19) part joined with a cylinder flange. The seal between the cylinder and cylinder base, as well as between the top and lower part of the cylinder, is maintained using an o-ring (35).

5. Installation

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

Obey all safety notes and warnings present on the unit.

During installation the unit must be disconnected from its power supply.

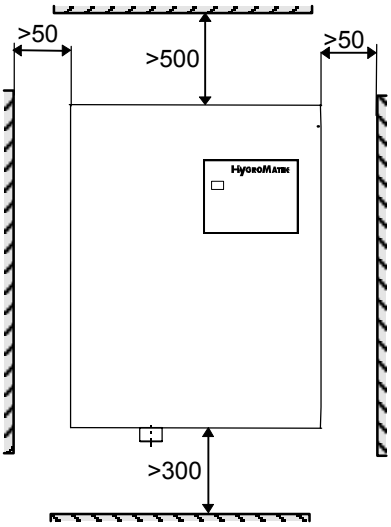
Attaching or installing additional components is permitted only with the written consent of the manufacturer, or else the warranty is void.

5.1 Steam Humidifier Operating Environment

Note: When selecting the installation site for the steam humidifier, note that:

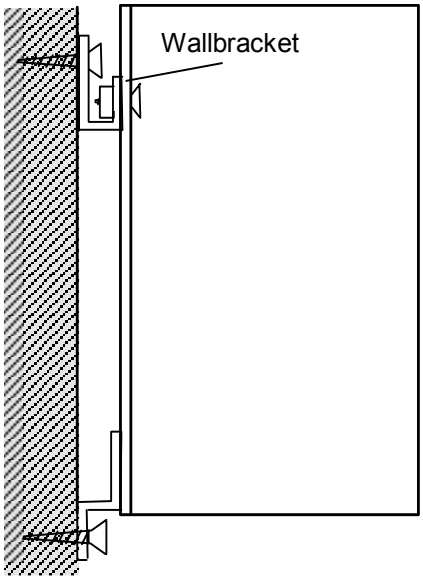
- Ambient temperature must be between 5° and 40° C.
- Relative humidity must not exceed 80% RH.
- the minimum clearances indicated in the diagram below must be observed; these are necessary to ensure adequate ventilation for the housing.
- the steam humidifier should be installed as close as possible to the steam manifold. Optimal performance is guaranteed only with short lengths of steam and condensate hose.
- hoses must be laid at a consistent 5-10% incline to prevent sagging and kinking.
- the rear panel of the steam humidifier heats up during operation (to a maximum of 60°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 steam humidifier is not qualified for exterior applications.

Clearances



Note: When choosing the site for the steam humidifier, consider the location of existing water installations (feed and drain lines).

Mounting Fixtures



The unit should be mounted on a stable wall.

Note: To achieve a uniform immersed surface area for the electrodes, the humidifier must be installed plumb and level.

to Install Units Type HY1:

» Place the steam humidifier in its intended location, use a level to adjust position, and secure. See "Unit Dimensions" Section 5.1.1.

» Attach the unit to the lower mounting fixtures.

to Install Units Types HY2-HY7:

» Fix bracket at the intended location. See "Unit Dimensions" Sections 5.1.1 and 5.1.2.

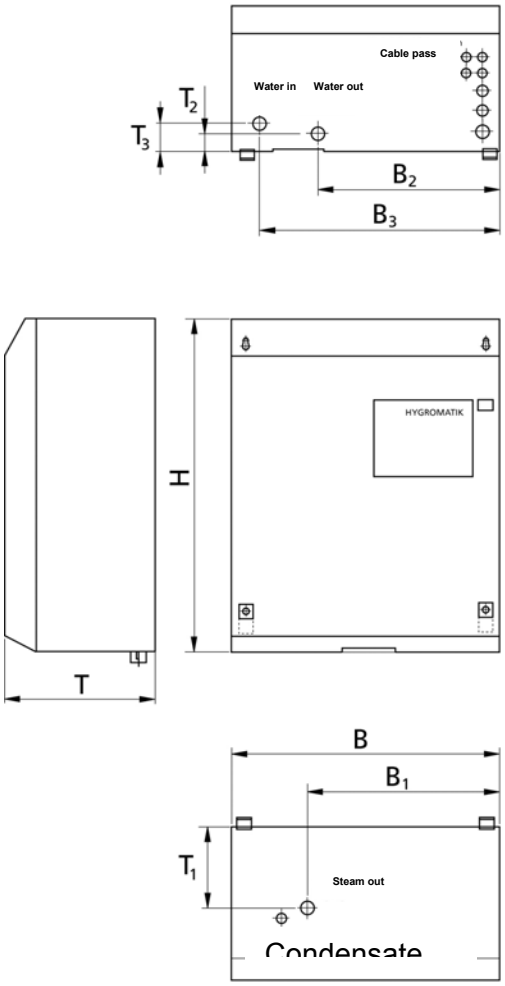
» Mount the unit, adjust position using a level, and screw tightly into the mounting fixtures.

» Attach the unit to the lower mounting fixtures.

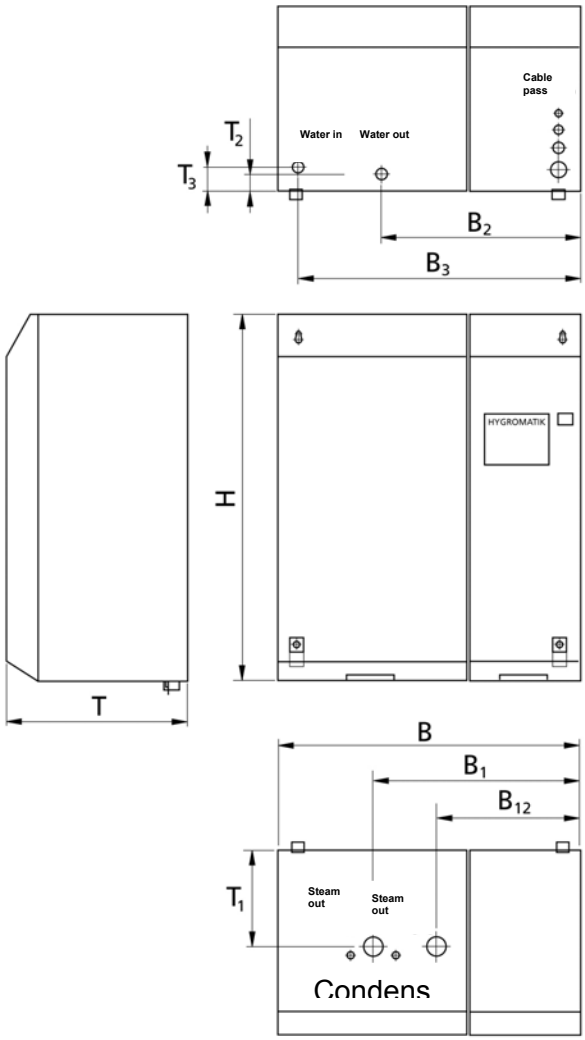
If no suitable wall is present, we recommend construction of a free-standing console anchored to the floor.

5.1.1 Unit Dimensions HY1-5

HY 1-4



HY 5

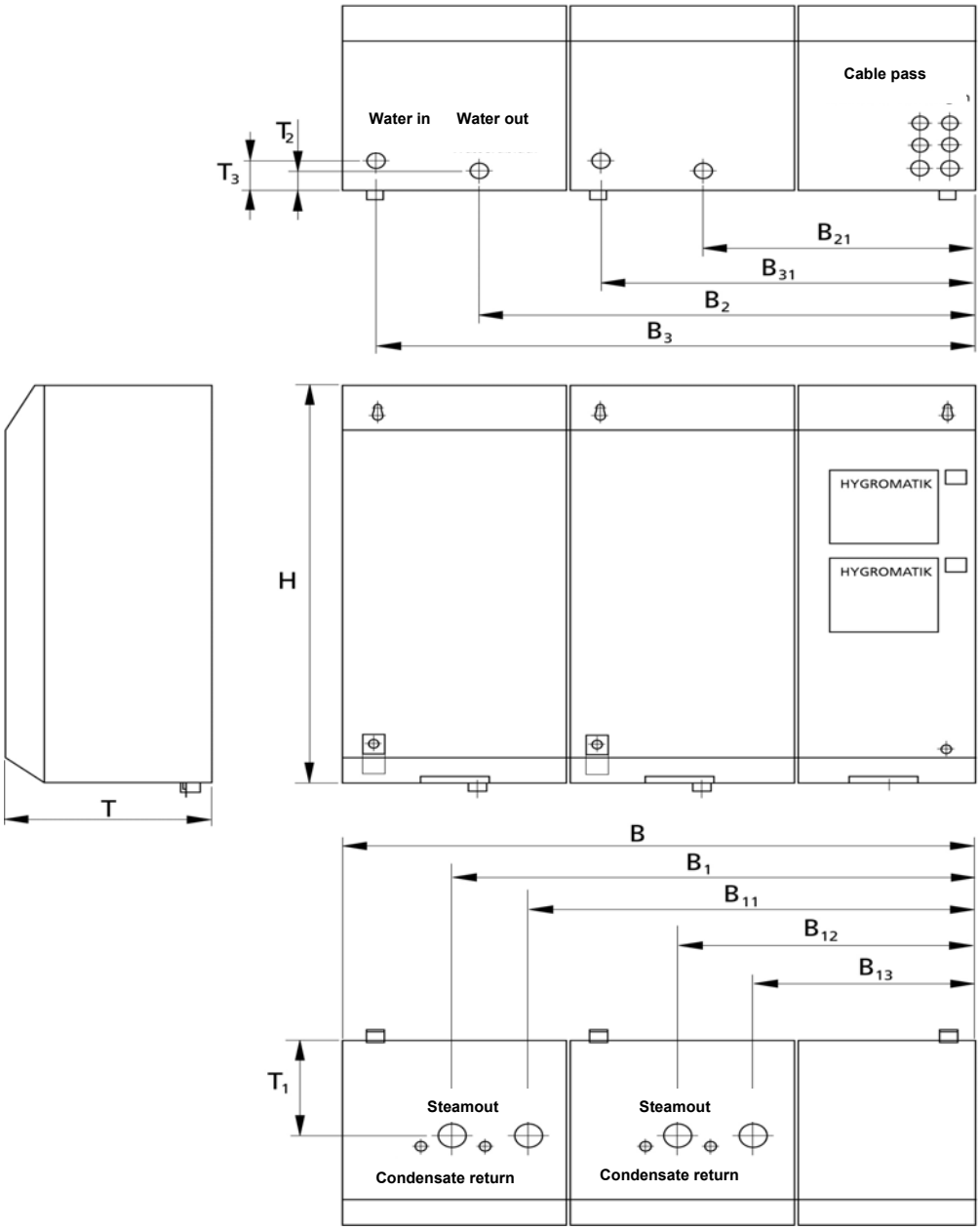


				Steam outlet					Water drain, discharge			Water supply		
Type / Dimensions	**H**	**B**	**T**	**B_1**	**B_{11}**	**B_{12}**	**B_{13}**	**T_1**	**B_2**	**B_{21}**	**T_2**	**B_3**	**B_{31}**	**T_3**
HY 1	461	441	208	336	-	-	-	113	317	-	33	411	-	48
HY 2	632	507	276	370	-	-	-	147	351	-	33	462	-	53
HY 3	632	507	276	370	-	-	-	147	351	-	33	462	-	53
HY 4	689	550	319	341	-	-	-	167	368	-	33	488	-	74
HY 5	767	634	387	433	303	-	-	203	413	-	33	588	-	51

Specifications in (mm)

5.1.2 Unit Dimensions HY6-7

HY 6-7



				Steam outlet					Water drain, discharge			Water supply		
Type / Dimensions	**H**	**B**	**T**	**B_1**	**B_{11}**	**B_{12}**	**B_{13}**	**T_1**	**B_2**	**B_{21}**	**T_2**	**B_3**	**B_{31}**	**T_3**
HY 6	690	923	317	766	*	435,5	*	165	729	399	33	878	556	51
HY 7	767	1060	387	860	730	463	333	202	821	424	33	1025	627	51

Specifications in (mm)

* HY 6 has only one steam outlet

5.2 Fan Unit (optional)

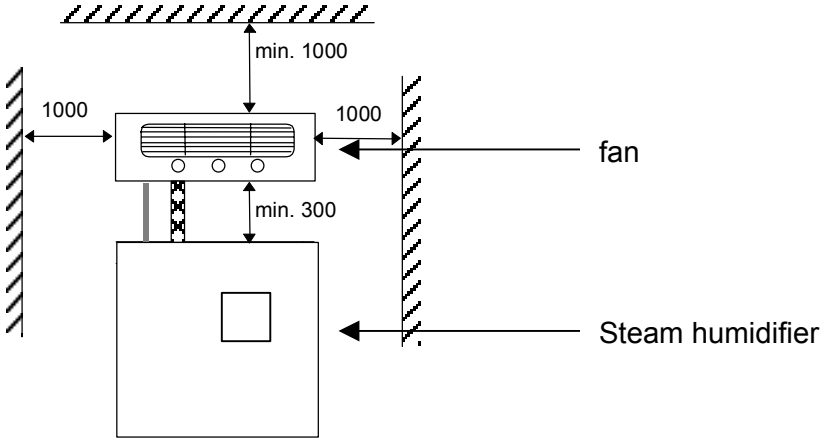
Note: The fan unit should be positioned to avoid drafts. In general, a minimum height of 2 m is sufficient.

- Install the fan unit directly on a wall.

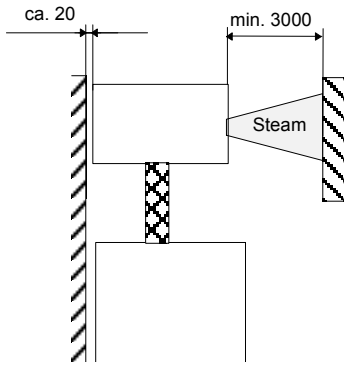
Fan unit	Type
for wall installation	VG 08, 17, 30

5.2.1 Fan Unit Type VG

- Install the fan unit over the steam humidifier.
- When employing multiple fan units, do not exceed a maximum distance of 5 m from the steam humidifier.
- Observe the clearances specified in the diagram below:



Fan Unit Wall Installation

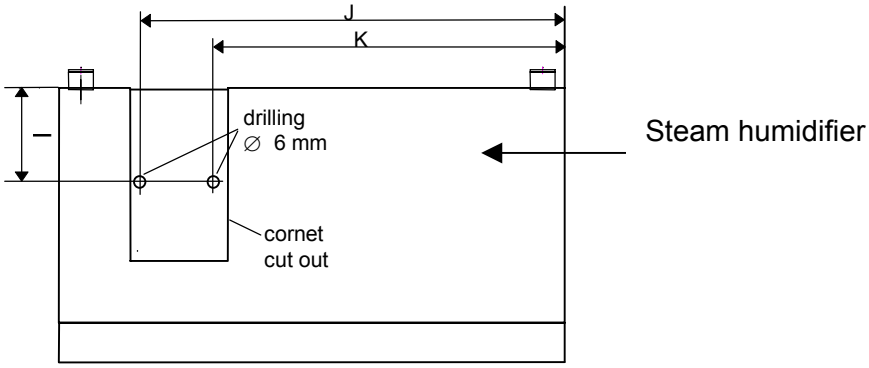


Side View Wall Installation

5.2.2 Fan Unit Cover

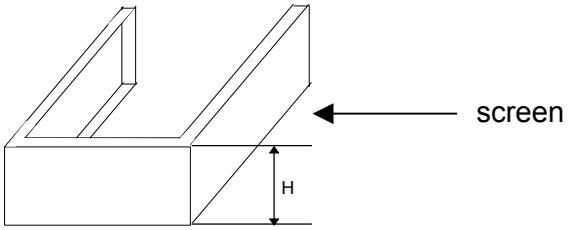
Covers for Types HY1 and HY4 are available to protect the steam and condensate hoses between the steam humidifier and the fan unit. The vertical distance between the humidifier and the fan unit is determined by the height of the cover (see Table of Dimensions H).

» Drill two holes in the housing as specified in the following diagram.



Type	H [mm]	I [mm]	J [mm]	K [mm]
HY1	175	80	373	266,5
HY2-3	280	105	422	310
HY4	280	105	452	340

» Install the steam humidifier and fan unit on the wall (distance H). Diameter ofbore ø 6 mm Panel cutout



» Secure the steam hose between the humidifier and fan unit with hose clamps.

» Also using a hose clamp, attach the condensate hose to the fan unit.

» Run condensate hose along the rear of the unit to the water discharge. (Also see Section 6.3. "Water Discharge".)

» Lay the loop of condensate hose 200 mm directly above the drain. The loop acts as a vapor barrier.

☞ **Note:** Condensate cannot be fed directly back into the steam cylinder.

» Slide cover between humidifier and fan unit.

» Fasten cover with the two screws supplied. Screw from the steam panel outwards.

5.3 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.

5.3.1 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 Δx 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 (Section 5.3.2). 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:

x_1: _____ [g/kg]

t_2: _____ [°C]

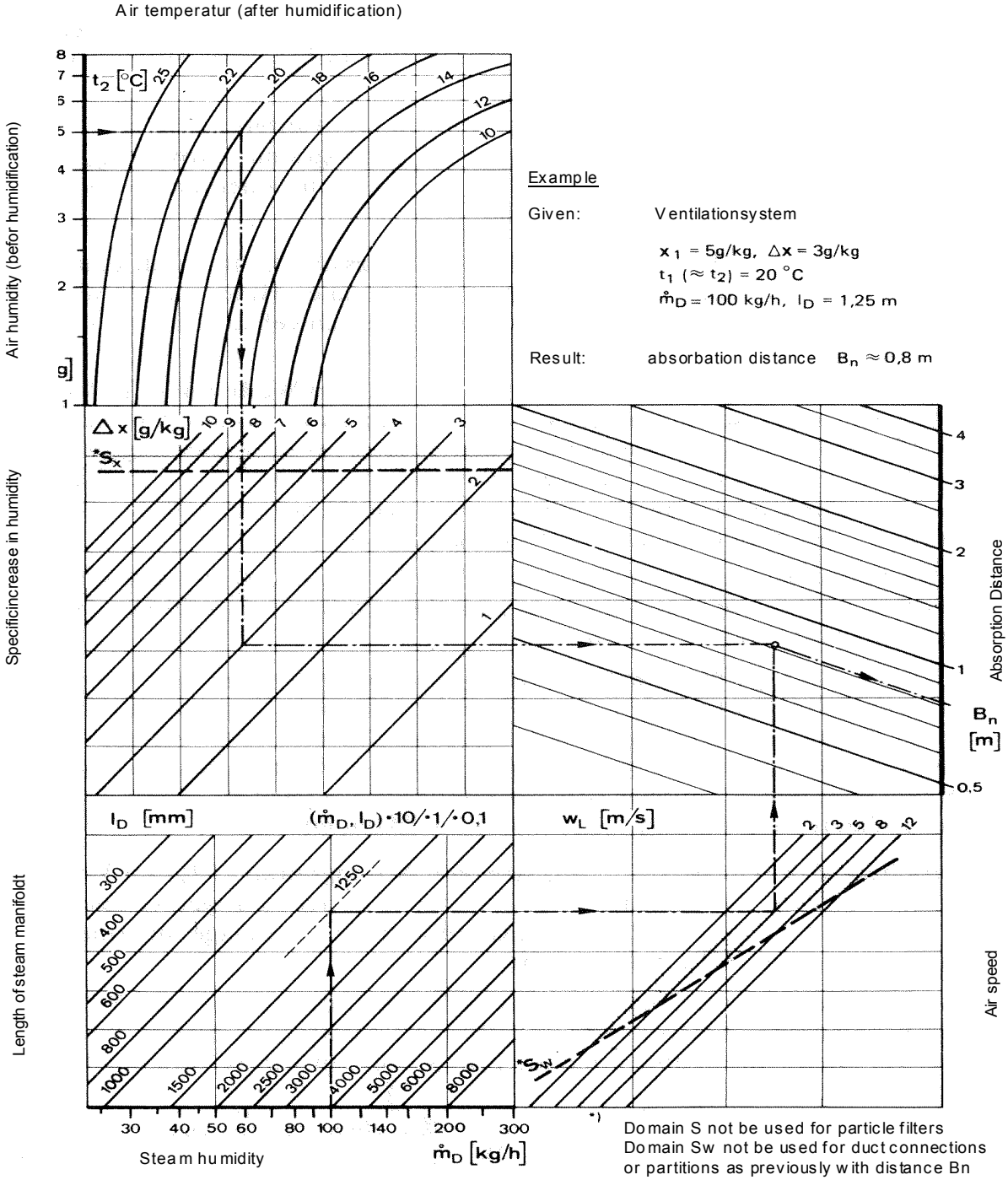
Δx: _____ [g/kg]

$\overset{o}{m}_D$: _____ [kg/h]

w_L: _____ [m/s]

l_D: _____ [mm]

5.3.2 Absorption Distance Nomogram



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

5.4 Steam Manifold

Please note:

- Install the steam manifold as close as possible to the steam humidifier in order to minimize steam loss through condensation.

Note: For the steam generator Type HY-DS:

- 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.

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.

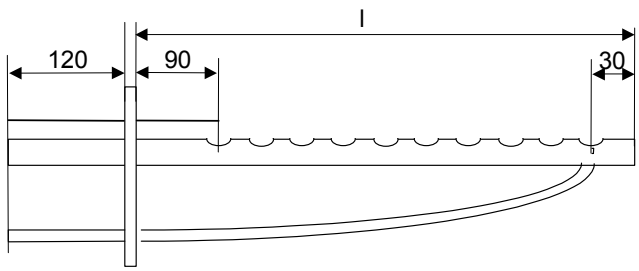
Type	Steam Manifold	Steam Hose	Condensate Hose
HY1-2	1x25	DN25	DN12
HY3-4	1x40	DN40	DN12
HY5-6	2x40	2xDN40	2xDN12
HY7	4x40	4xDN40	4xDN12

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

* Nonstandard lengths available on request

Note: At lengths of 900mm or more, steam manifolds are shipped with an extra alternative mounting fixture (Nut, M8) on the closed end.



5.4.1 Notes on Installation

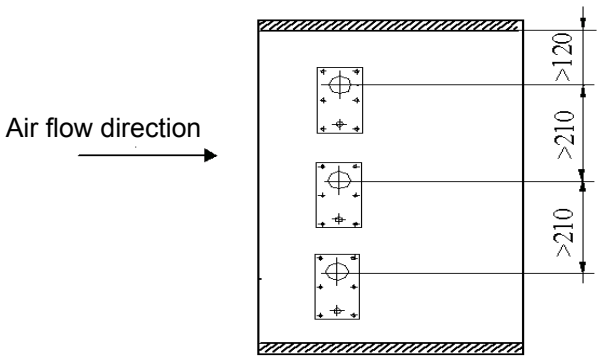
Placement of the steam manifold on the supply side of the air duct is preferred.

- Maximum allowable pressure in the air duct is 1200 Pa
- On the return side, the maximum allowable negative air pressureis 500 Pa

With high-pressure air-conditioning systems, the unit's drain or supply hose must be lengthened depending on the overall pressure. When this is the case please consult HYGRO-MATIK.

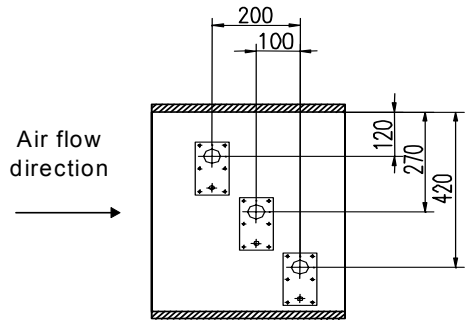
When installing the steam manifold, please note the following:

- The air intake can be positioned on the right or the left.
- Observe a minimum distance of 120 mm from the top of the air duct.
- Depending on the design of the air duct, additional mounting of the steam manifold may be required.

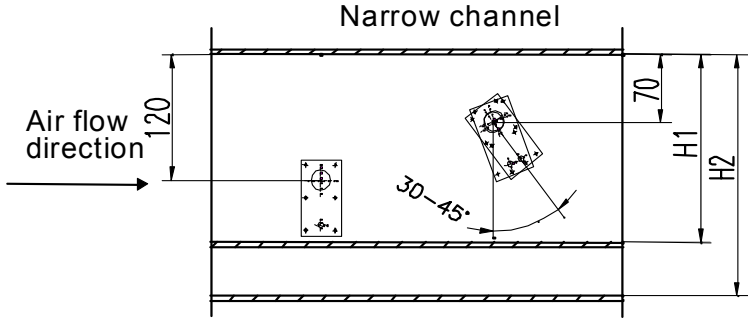


- Position the steam manifold to ensure uniform steam distribution in the air duct.
- install the steam manifold horizontal with it ensure a clean steam out

Air Duct	Note on Installation
low	Different lengths in the air flow direction side by side
narrow, high	Identical lengths one on top of the other. Staggered laterally if possible.
square	Identical lengths, staggered vertically and laterally
low, very wide	Facing each other.

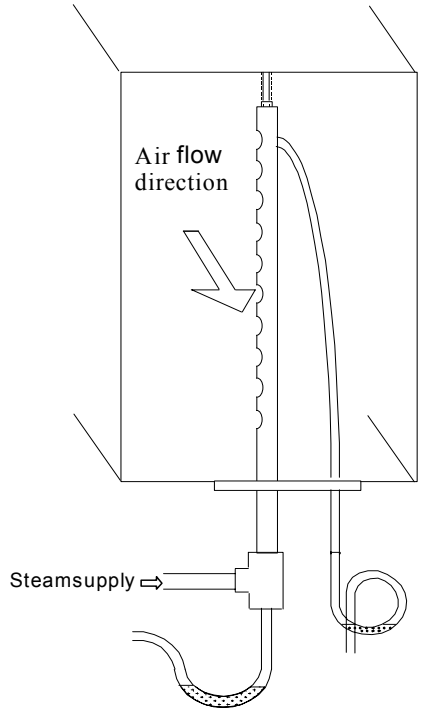


- By tilting the steam manifold 30 - 45° towards the air flow direction, the minimum upper clearance can be reduced to 70 mm.



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

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



- If installation conditions are exceptional, carefully evaluate the state of the air. Above all, assess the danger of condensation in the duct. Airflow Steam supply
- We note that the German Association of Engineers (VDI) Guideline 6022 specifies a water drain within the absorption distance inside the air duct.

5.5 Steam Line

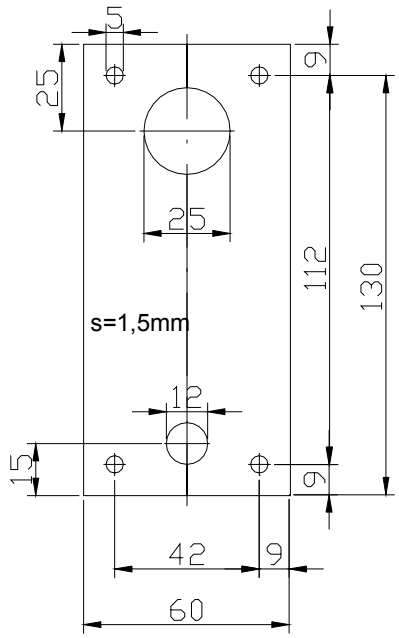
Note: When installing steam line, please note:

- The nominal width of the steam hose or steam line may not be less than that of the HYGROMATIK steam humidifier outlet nozzle (prevents crimping and maintains pressureless steam emission from the steam nozzle).
- Hoses must be laid at a consistent 5-10% incline without sagging and kinking (otherwise water collects inside).
- Use the shortest length steam hose possible. To minimize energy loss and condensation, insulate hoses over 5 m long.
- When using two steam manifolds to distribute steam output, install the T-piece for the steam and condensate hose as close as possible to the steam manifolds. Lay the steam hose (only) along the longer of the two stretches to minimize condensate leakage.
- Secure the steam hose with hose clamps spaced no more than 500 mm apart.
- Lay the steam line so that it is accessible.
- Insert long, straight lengths of steam hose into copper or temperature-resistant plastic pipe.
  (40 mm nominal width for hose DN 25;
  60 mm nominal width for hose DN 40).
- Only original HYGROMATIK hoses perform to operational specifications.
- HYGROMATIK hoses are not qualified for exterior applications.
- Allow for these minimum bending radius:
  steam hose DN 25: Rmin = 200 mm
  steam hose DN 40: Rmin = 400 mm

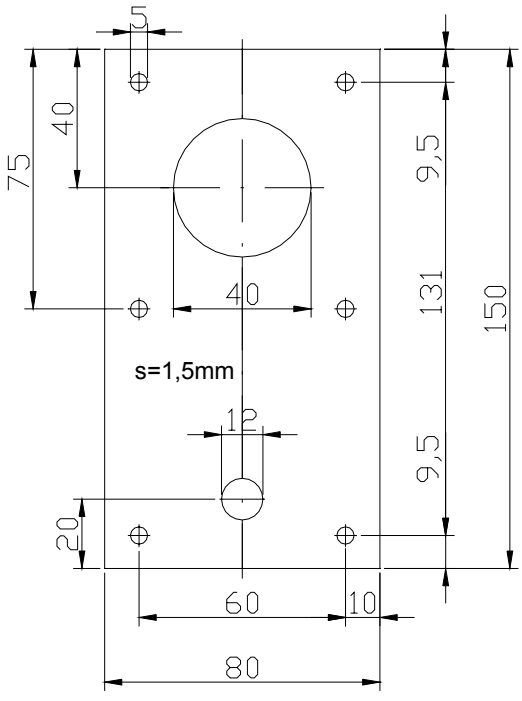
5.6 Cover Plate

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.



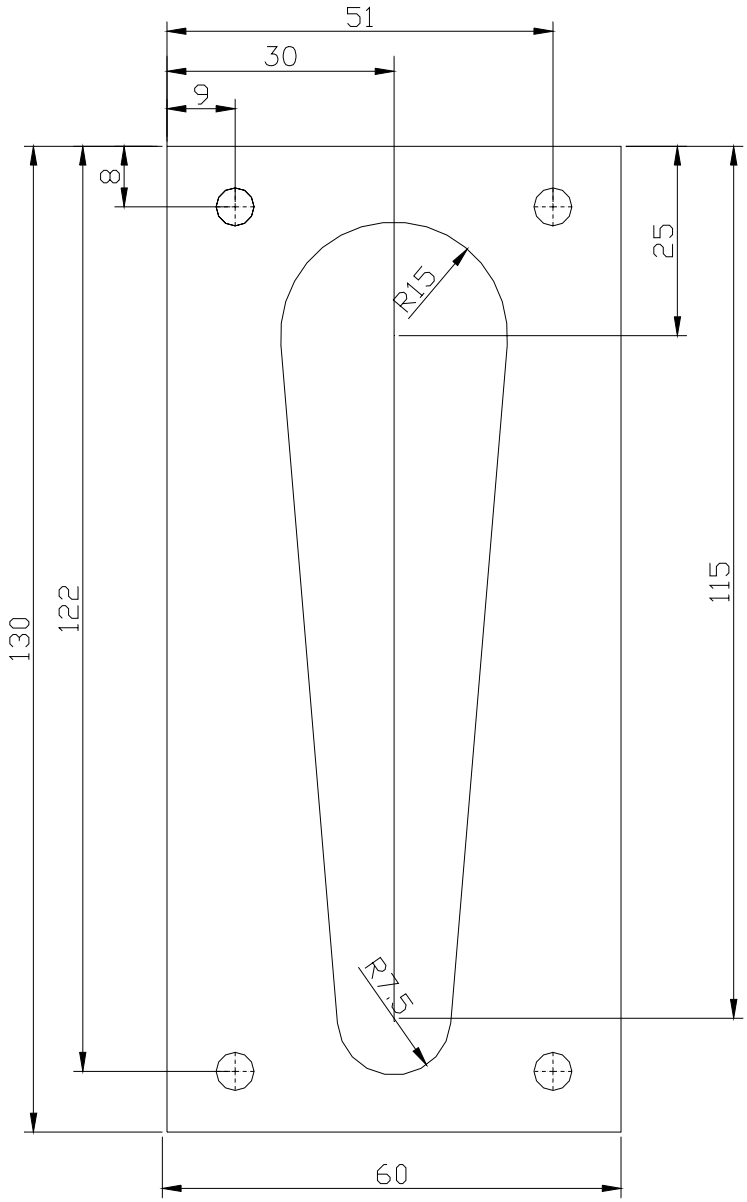
flange plate DN25 E-2604260



flange plate DN40 E-2604410

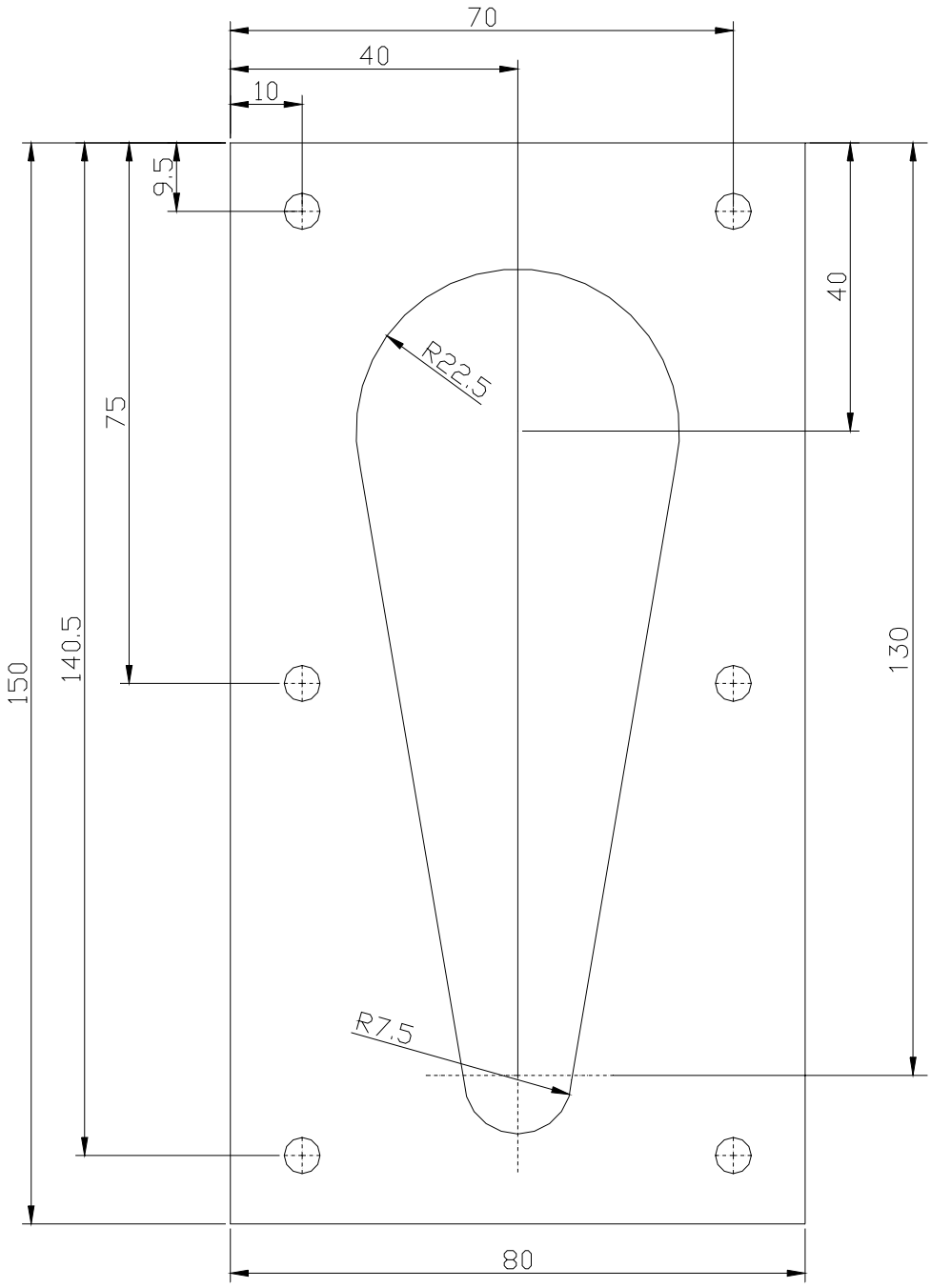
5.7 Drill Pattern

5.7.1 Drill Pattern DN25



Note: Depending on print medium there could be dimension inaccurancies.

5.7.2 Drill Pattern DN40



Note: Depending on print medium there could be dimension inaccurancies

5.8 Condensate Hose

Note: When installing the condensate line, please note:

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

If the steam manifold is placed 500 mm or more above the top of the unit:

» Remove the condensate plug (No. 12) from the connection fitting on the cylinder.

» 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: We recommend laying a 200 mm diameter loop to act as a vapor barrier. (Also see Section 5.8. "Water Discharge".) These steps can reduce the noise from the steam manifold during operation.

If the steam manifold is placed less than 500 mm above the top of the unit:

» 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 (No. 13) must be closed with a sealing cap (No. 12)

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

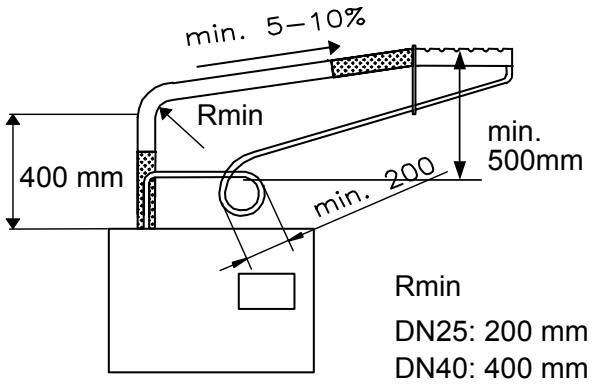
5.9 Types of Installation

If the steam manifold is placed 500 mm or more above the top of the unit:

» Run the steam hose at least 400 mm from the unit and then lay the connection to the steam manifold at a consistent incline.

» Lay the condensate hose at an angle to the steam cylinder.

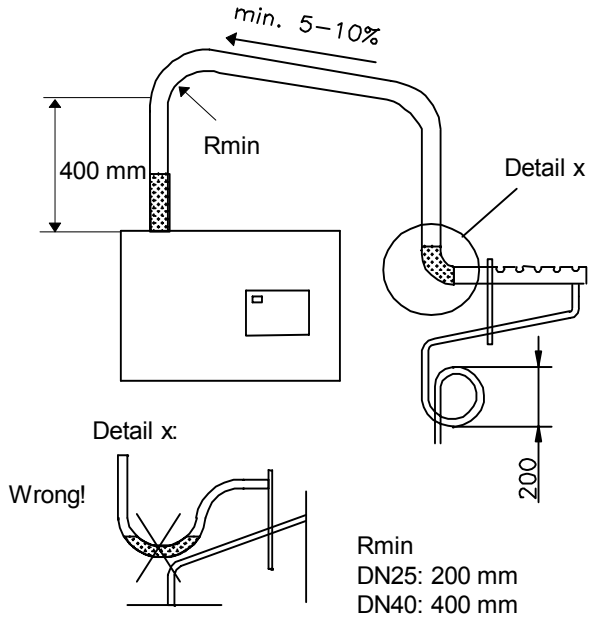
» If enough space is available, lay a loop as a vapor trap. The steam manifold must be at least 500 mm from the loop.



If the steam manifold is placed less than 500 mm above the top of the unit:

» Run the steam hose at least 400 mm from the unit and then lay the connection to the steam manifold at a consistent incline.

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



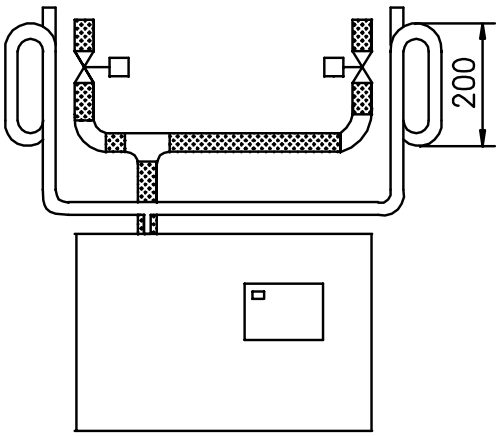
» Lay the loop of condensate hose 200 mm directly above the drain. Detail

5.10 Steam Solenoid Valve

If one steam humidifier serves multiple users with divergent needs, steam solenoid valves may be installed in the steam hoses. Valve controls must be installed by the customer.

- Valves are typically installed in vertical ascending risers.
- Ideal placement is directly above the steam humidifier

The solenoid valve comes with hose grommets to simplify steam hose mounting. Lay condensate hose as directed in Sections 5.5 and 5.7.



Installation of Steam Solenoid Valve

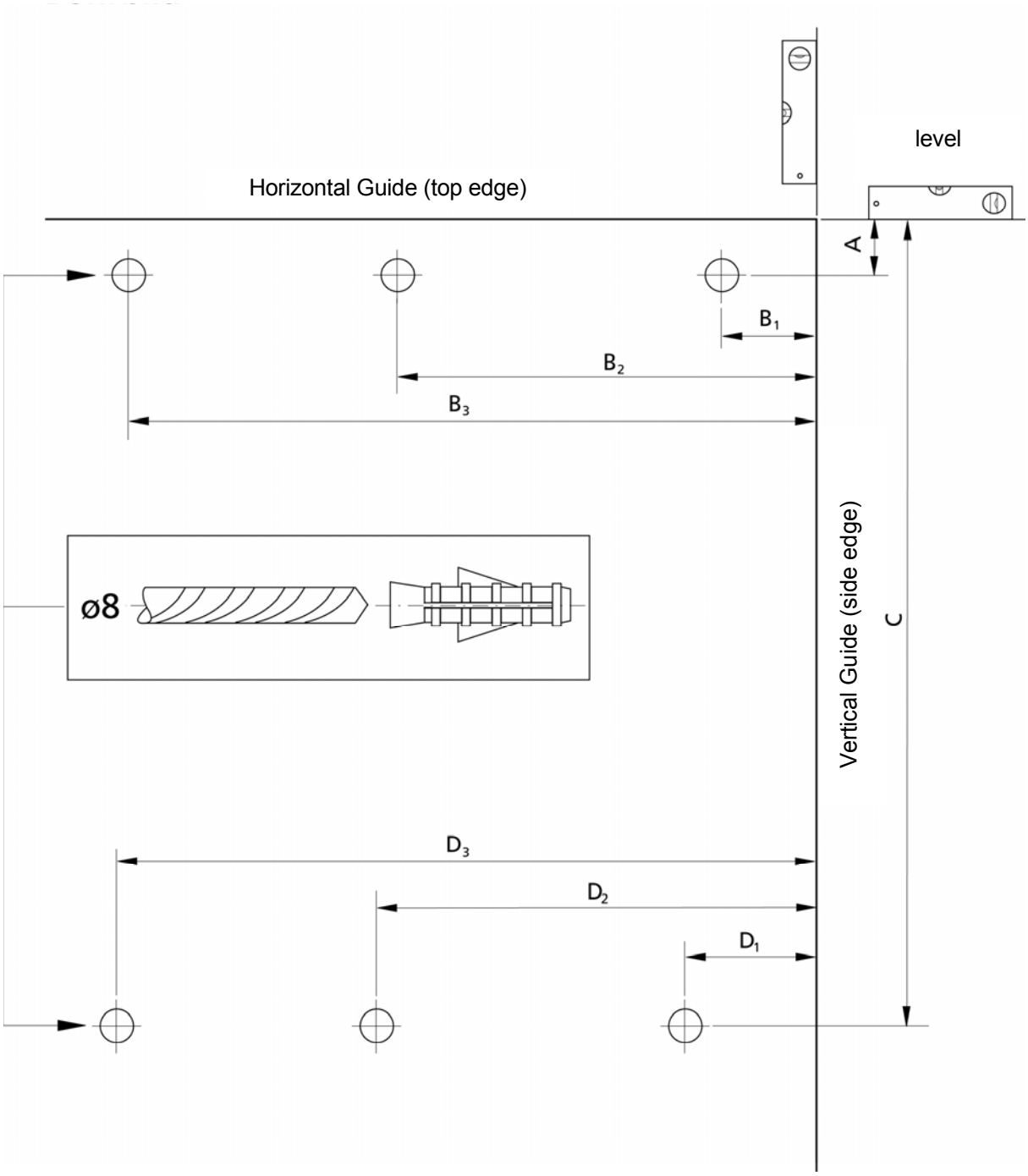
5.11 Unit Installation Check

Warning: Only allow qualified, authorized personnel to start up the unit.

Before switching on the unit, go down the following installation checklist:

- ☑ Is the humidifier mounted plumb and level?
- ☑ Have unit clearances been observed?
- ☑ Is the steam hose laid at an incline of at least 5-10%? (See Section 5.8)
- ☑ Has the condensate hose been installed with a loop as a vapor trap? (See Section 5.7)
- ☑ Have the steam manifold(s) been positioned correctly?
- ☑ Are all screws and clamps properly tightened?

5.11.1 Drill Pattern



Type / Dimensions	A	B_1	B_2	B_3	C	D_1	D_2	D_3
HY 1	40	30	-	421	473	40	-	401
HY 2/3	20	20	-	487	647	20	-	487
HY 4	20	20	-	510	704	40	-	510
HY 5	20	20	-	594	782	40	-	594
HY 6	20	20	440	830	705	90	508	833
HY 7	20	20	530	929	782	130	537	930

Specifications in (mm)

6. Water Installation

Warning: When installing the water installation, note the following:

- Have all work performed by a professional.
- Disconnect power supply before installation.
- Obey local public utility regulations.
- Verify that necessary safety measures have been taken – in compliance with either German Technical and Scientific Association for Gas and Water (DVGW) guidelines (German Institute for Standardization [DIN] 1988) or local regulations – to eliminate backflow of polluted water into drinking water treatment facilities. This can mean laying the water supply line 300 mm above the unit (with automatic ventilator and extra check valve). Install a backflow preventer if necessary.
- Use feed water without chemical additives and with a conductivity between 200 and 800 µS/cm only. Above conductivity levels of 800µS/cm to a maximum of 1200µS/cm and below conductivity levels of 200µS/cm to a minimum of 50µS/cm, special adjustments are required. In this case please contact HYGROMATIK.
- The water supply temperature may not exceed 60° C.
- Water installation pressure: 1-10 bar
- Blow-down water must be able to drain.

6.1 Operation with Softened Water

Warning: Unless special measures are taken, feeding softened water into the HYGROMATIK steam humidifier is dangerous. It can cause

- unacceptably high conductivity
- the formation of salt bridges between the electrodes and the electrode leads on the inner surface of the top part of the steam cylinder
- foaming in the steam cylinder

Salt bridges cause electrical arcs. These are indicated by the presence of black grooves in the top part of the cylinder. The top part must be replaced to prevent further damage to the cylinder material, as well as short circuits which trip main circuit breakers.

Foam comes into contact with the maximum water level sensor electrode and triggers a signal indicating the cylinder is filled to capacity, even though this is false and the nominal current has not yet been reached.

Note: Please contact HYGROMATIK if you wish to operate the unit with softened water.

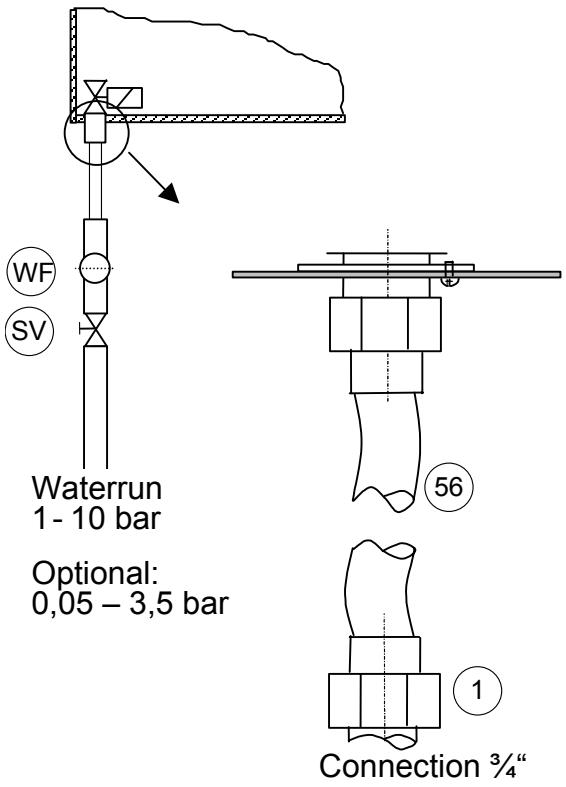
- If using a water softening system, we recommend diluting the softened water with normal tap water to produce an overall hardness between 4-8°dH.
- When feed water contains softened water, the level of conductivity is typically higher at operating temperature. Install a HYGROMATIK "cylinder star" to extend the service life of the electrodes.

6.2 Water Supply

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

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

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.

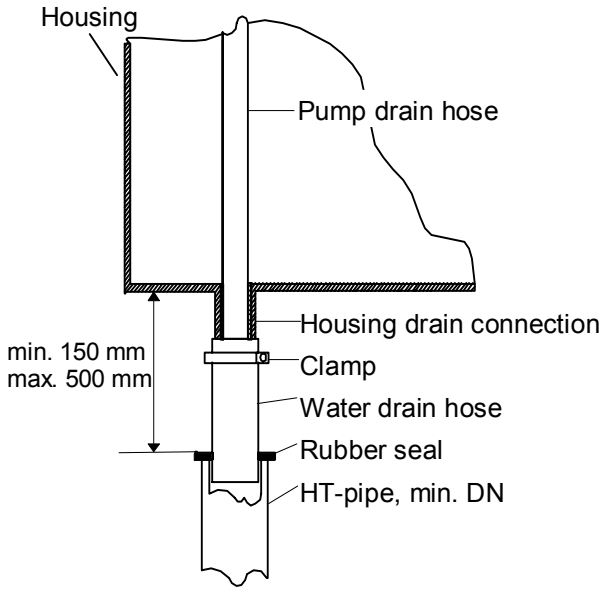
Install as follows:

» 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.

6.3 Water discharge



Warning: Water must drain freely! For water discharge, we recommend installation of a flexible water drain hose.

Please note:

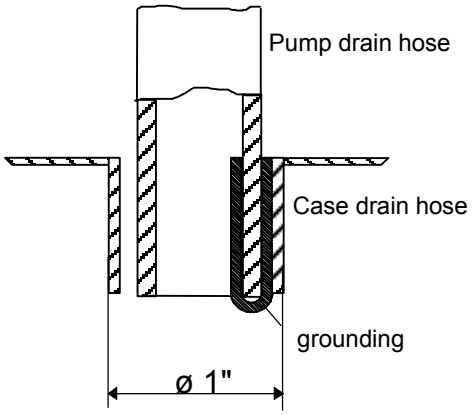
- Do not bend, shorten or lengthen the drain hose.
- Install discharge line and drain pipe made from temperature resistant material (to 95° C).

Install water discharge as follows:

- Loosely insert a length of 1" drain hose, approx. 150 - 300 mm, into a drain pipe with a minimum inner diameter of 40 mm and seal with a rubber gasket.
- Fit water drain hose over the pump drain hose and fasten to the housing drain connection.

A grounding clip is fixed on the inner surface of the housing drain connection. The end of the pump drain hose is pushed into this clip. During blow-down, the grounding clip is in direct contact with the water and shunts potential residual electric currents away from the housing.

There is a 3mm-wide crack between the pump drain hose jacket and the inner surface of the housing drain connection. If water collects in the base plate, it will flow through this crack into the drainage system.



6.4 Water Installation Check

Go down the following water installation checklist:

- ☑ Are all screws and clamps properly tightened?
- ☑ Is the water supply pipe flushed?
- ☑ Was the water installation correctly installed? (See Section 6.2)
- ☑ Can the blow-down water drain freely?
- ☑ Was the water discharge correctly installed? (See Section 6.3)
- ☑ Is there no leakage from the water supply pipe and water discharge?

Warning: Flush the water supply pipe before connecting to the solenoid valve, especially a newly installed pipe. This prevents premature damage.

7. Electrical Connection

Danger, Hazardous Voltage: All work related to electrical installation to be performed by authorized personnel only (electricians or professionals with equivalent training).< The customer is responsible for checking qualifications.

Danger, Hazardous Voltage: Do not plug the steam humidifier into 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 con trol are very sensitive to electrostatic discharges. In order to protect these components during any type of installation, steps must be taken to guard against damage from electrostatic discharge (ESD protection).

Warning: For electrical installation, note the following:

- Disconnect power supply before installation and protect against restart.
- Verify the absence of electric current.
- Make sure the unit is switched off before installing or removing the mounting plate with electrical. (Also see Section 8.2. "Access Electrical Enclosure".)
- Professionally lay electrical connector cable.
- Install the electrical connections according to the wiring diagram.
- For units with rated power over 33 kW, only a permanent connection to a permanent wire is allowable (German Association for Electrical, Electronic & Information Technologies [VDE] Standard 0700 Section 98).
- Verify that all terminals have been tightened.

7.1 Electrical Installation

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

» Install a separate main connection for each steam cylinder, complete with main contactor, main switch, etc.

» Connect potential equalization to the outer ground bolt.

» Observe the German Association for Electrical, Electronic & Information Technologies [VDE] Standard 0100 when selecting a connection cross section.

» Install main power supplies as follows:

Type	Main Power Supply
HY1 - HY5	1 x 400V/3Phase/N
HY6 - HY7	2 x 400V/3Phase/N

Other voltages are available on request.

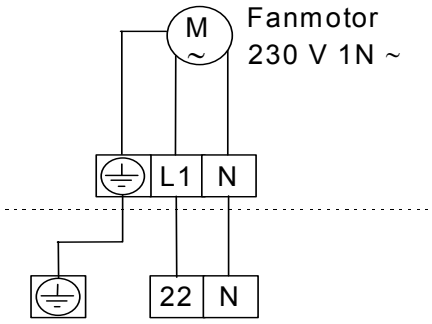
We recommend employing quick or medium blow main fuses (applicable only to the grid voltages above).

See table below indicating maximum power usage for each circuit protection:

Type	Power Usage	Circuit Protection
HY1.05	5,4 A	3 x 6A
HY1.08	8,7 A	3 x 10A
HY2.13	14,1 A	3 x 16 A
HY2.17	18,4 A	3 x 20 A
HY3.23	24,9 A	3 x 35 A
HY4.30	32,5 A	3 x 35 A
HY5.45	48,8 A	3 x 63 A
HY6.60	2 x 32,5 A	6 x 35 A
HY7.90	2 x 48,8 A	6 x 63 A
HY7.116	2 x 62,8 A	6 x 63 A

7.2 Fan Unit

» Connect fan unit according to the wiring diagram.



Terminals Humidifier

The fan unit operates in parallel with the humidifier.

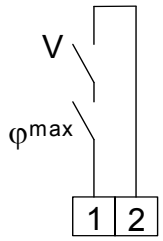
Note: Terminal 22 is supplied with the unit for simultaneous fan unit and humidifier orders only. In other cases (i.e. retrofitting) the fan unit phase can be connected to Terminal 2.

7.3 Safety Interlock

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

Warning: A max-hygrostat should be installed in the safety interlock. The max-hygrostat acts as a safety device in case the humidity sensor malfunctions.

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



terminals humidifier

7.4 Wiring Diagram

Please remove the wiring diagram from the technical manual supplied with the control used with your humidifier. Every steam humidifier comes with one technical manual for the unit and one for the control.

7.5 Cable Connections

The table below shows the cable connections provided in HyLine units If the HyLine unit is ordered with a DS control (steam bath) and in one of the appropriate available configurations, extra cable connections will be installed.

unit	L/EMP/ST /DS Standard	DS Opt. 5 or 6	DS Opt. 7	DS Opt. 8	DS Opt. 1 to 4
HY1	25+25+25	+16	+16	+16	+16
HY2/3	32+25+25	+16	+16	+16	+16
HY4	32+25+25	+16	+16	+16	+16
HY5	32+25+25	+16			
HY6	32+32+25				
HY7	32+32+25				

The cable connections have a terminal capacity of:

Connection M	Terminal capacity Ø mm
16	4,5 – 10
25	9,0 – 17
32	18 - 25

7.6 Electrical Installation Checklist

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

- ☑ Is the power grid voltage compatible with the voltage on the name plate?
- ☑ Have all electrical connections been made according to the terminal connection diagram?
- ☑ Have all electrical cable and plug connections been properly tightened?
- ☑ Are all electrical socket connections secure?
- ☑ Is the unit grounded?

After this check the unit can be switched on.

Warning: The unit must be closed and locked. This guarantees that the cover is grounded.

Note: For initial operation, control, service, malfunctions, and circuit diagrams, consult the operation instructions for the L-, EMP-, LD- or DS-controls.

8. Maintenance

The HYGROMATIK steam humidifier is easy to maintain. However, 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 note:

- The unit is only to be serviced by qualified, authorized personnel.
- Observe safety notes.
- Switch off the unit before maintenance and protect against restart.
- After maintenance work, have qualified personnel check that the unit is operating safely.

The steam humidifier's performance and maintenance intervals primarily depend on the water quality (carbonate hardness, conductivity) and the quantity of steam produced since the last maintenance. Abnormal water quality can shorten or lengthen maintenance intervals. Ongoing maintenance intervals can be estimated based on the amount and type of residue found in the steam cylinder.

Indications that cylinder maintenance is required immediately include:

Control	Indicator
L/LD	maintenance message: **red LED** is blinking: - maximum water level, delay *, - blow-down malfunction *, - filling failure *, Unit has switched itself off automatically.
EMP / DS	**Maintenance** message on the display (red LED is blinking). Unit has switched itself off automatically*. The maintenance message can also be sent by one of the open programmable potentialfree contacts. See EMP-Control Operation, Section "Parameter Settings with Codes"

* Also see corresponding control operation instruction, Section "Malfunctions."

8.1 Maintenance Work

Mineral deposits precipitate and crystallize very differently in different types of water, even when two types have the same conductivity and hardness levels (the various constituents in the water interact differently).

Instructions on maintenance and cleaning intervals, or on electrode service life, are based entirely on empirical data.

Cycle	Maintenance Work
4 Weeks after initial operation (with normal water quality)	Visual inspection of electrical and mechanical connections Remove mineral deposits from steam cylinder, water drain hose and blow-down pump Check electrodes for erosion
Semiannually (with normal water quality and "normal" operation = 8h/Day)	Visual inspection of electrical and mechanical connections Remove mineral deposits from steam cylinder, water drain hose and blow-down pump Check electrodes for erosion

In most cases, the conductivity levels given in Section 1.1 "Directions for Use" of these instructions can be considered normal. Individual parameter setting of the control may be necessary.

In extreme cases, water pretreatment may be necessary (softening by dilution to approx. 4 - 8 °dH; decarbonization/partial desalination to achieve target reductions in carbonate hardness).

HYGROMATIK would be pleased to refer you to companies specializing in water treatment systems.

8.2 Access Electrical Enclosure

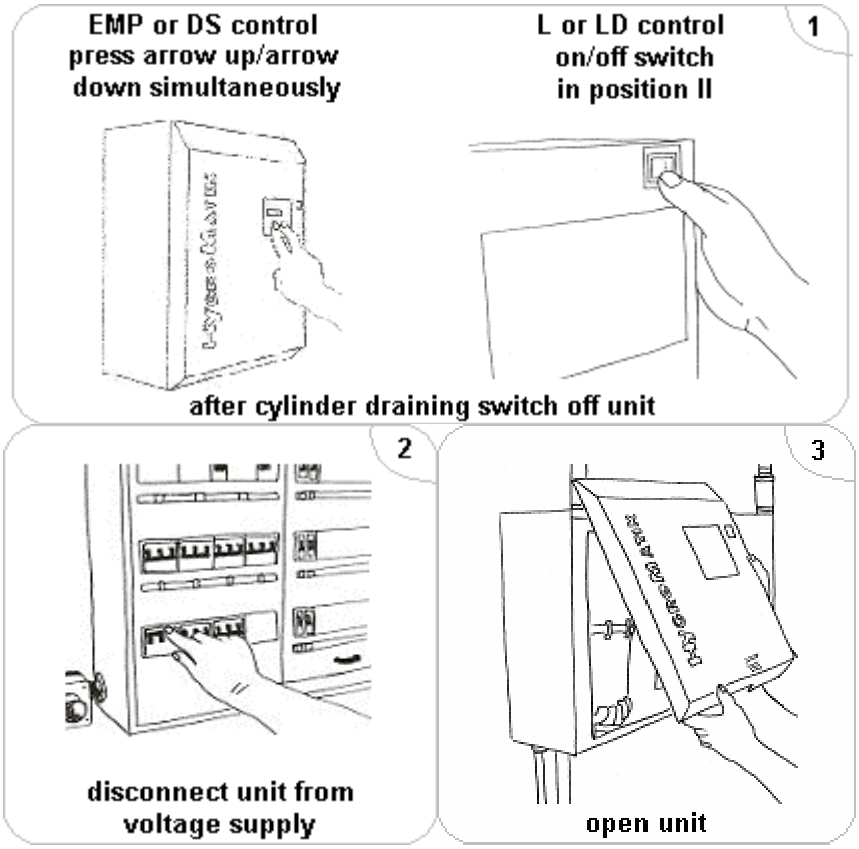
The control together with its display and operating panel are installed on a mounting plate in the electrical enclosure. The mounting plate is fastened with two screws to the electrical enclosure/steam panel.

Note: If the upper screw is loosened from the mounting plate, the plate can be tipped forwards.

Danger, Hazardous Voltage: Make sure the unit is switched off before installing or removing the mounting plate. When dismounted, the mounting plate is not in contact with the ground wire. When installed, it is connected to the ground wire by the screw and toothed lock washer mounting.

8.3 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!



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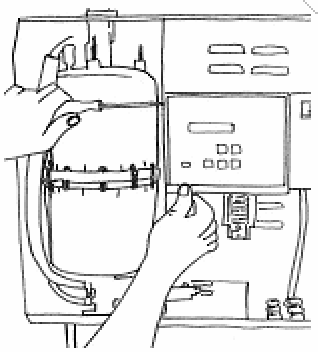
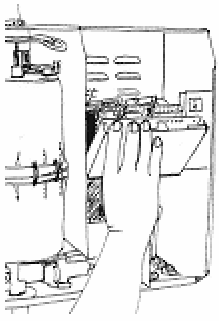


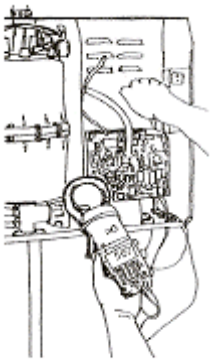
remove upper screw

5



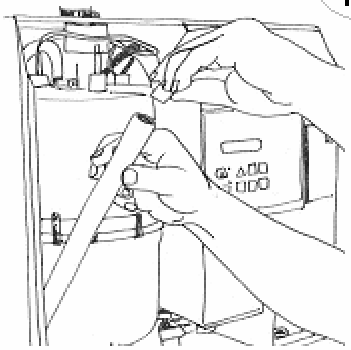
bring mounting plate
in vertical position

6



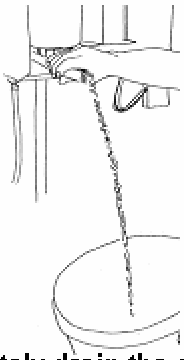
check for voltage disconnection

7



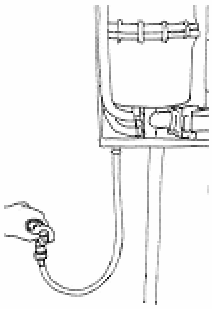
remove stopper

8



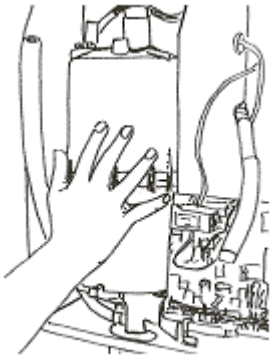
completely drain the cylinder

9



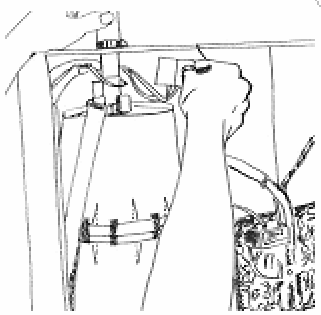
disconnect unit from
water supply

10



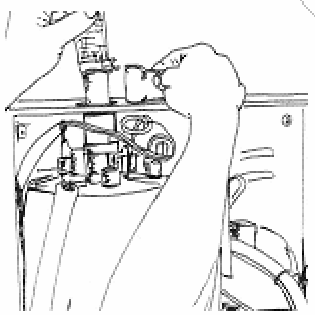
check cylinder temperature

11



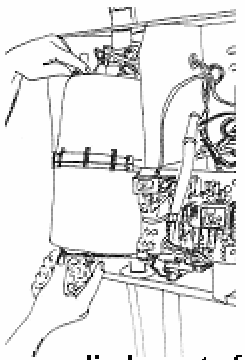
remove steam
hose from adapter

12



push clip on adapter outside cabinet

13

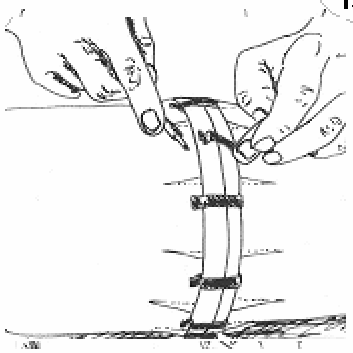


lift steam cylinder out of base

14

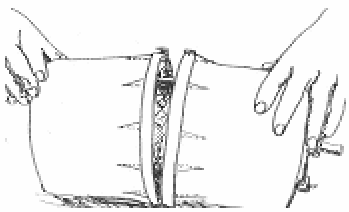
unplug electrodes / sensor electrode

15



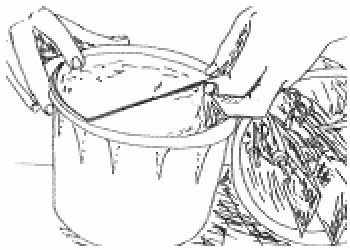
remove flange clamps

16



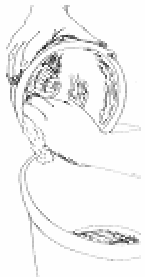
open cylinder

17



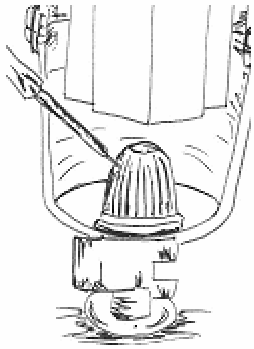
remove used O-ring

18



clean cylinder inside. Do not use acids or other chemicals

19



clean strainer

Warning: Check the inside of the top part of steam cylinder for crust build-up and possible salt bridges (black grooves between the electrode leads). If present, wash away completely .

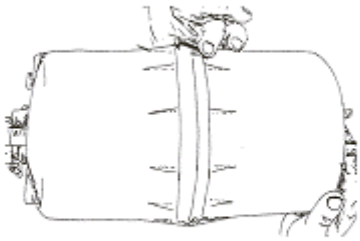
Note: If electrical arcs have burned deep grooves in the material, the top part of the cylinder must be replaced.

Warning: Clean the sensor electrode until it is bright.

20

insert new O-ring

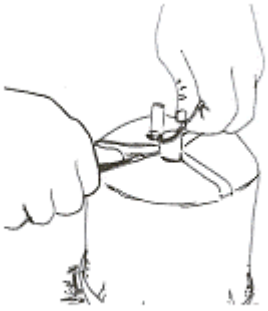
21



connect upper and lower part with clamps

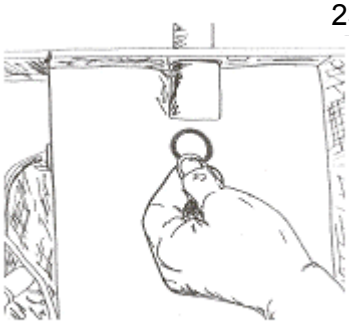
Note: When putting the cylinder back together, the joints and reinforcements of both sections must fit together snugly.

22



remove used O-ring

23



insert new O-ring

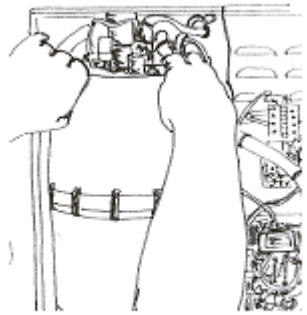
24

remove old O-ring
insert new O-ring

25

connect plug to level sensor/electrodes

26



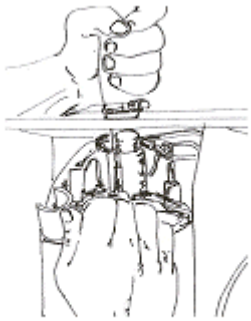
place cylinder vertically into cylinder base

Warning: The plug must be pressed down onto the electrode as far as it will go.

Note: Connect plugs to the correct electrodes. Note the color of the knurled nut.

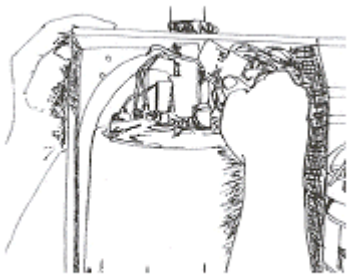
Note: Condensate connection must be showing in the front on the left.

27



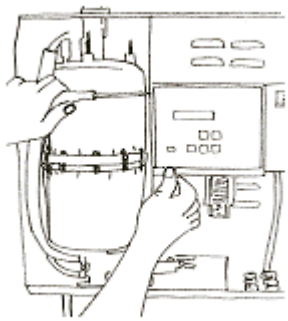
push adapter onto steam outlet

28



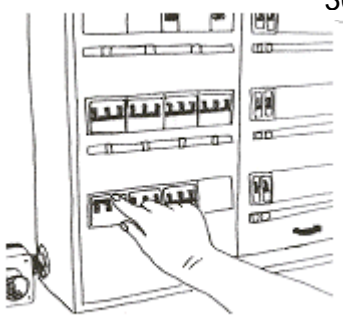
fix adapter with clip

29

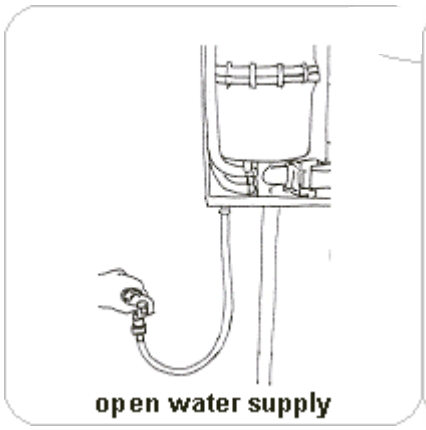


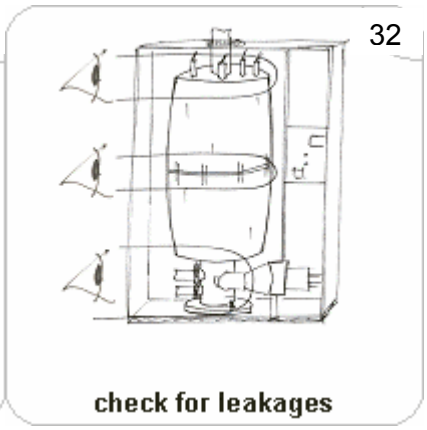
re-fasten control mounting plate

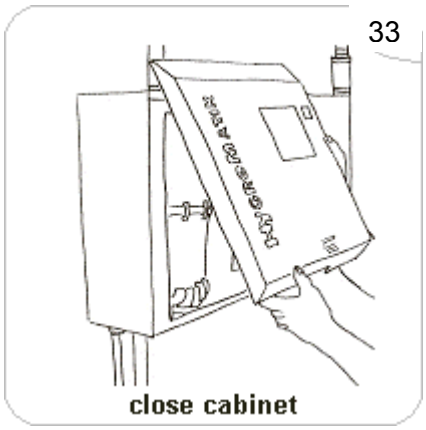
30



reconnect to power supply


open water supply


32
check for leakages


33
close cabinet

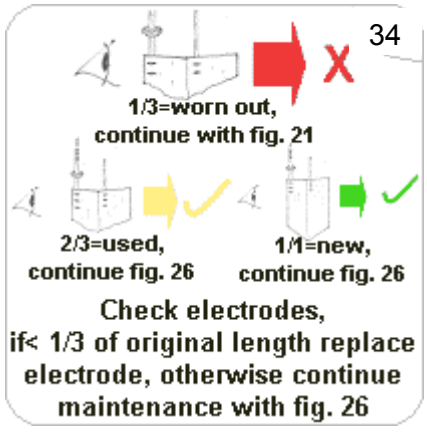
Warning: The unit must be closed and locked. This guarantees that the cover is grounded.

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

8.4 Eletrode wear

Electrode wear depends on:

- feed water composition and conductivity.
- the quantity of steam produced.


34
1/3=worn out,
continue with fig. 21
2/3=used,
continue fig. 26
1/1=new,
continue fig. 26
Check electrodes,
if< 1/3 of original length replace electrode, otherwise continue maintenance with fig. 26

Warning: At the latest, electrodes must be replaced if a maintenance message is displayed. The maintenance message appears after one hour of operation at maximum water level. The humidifier switches itself off. Also see Section "Maintenance." When the electrodes are less than 1/3 to 1/2 of their original length, replace them.

8.4.1 Original Electrode Lengths

Original lengths of HYGROMATIK large area stainless-steel electrodes are:

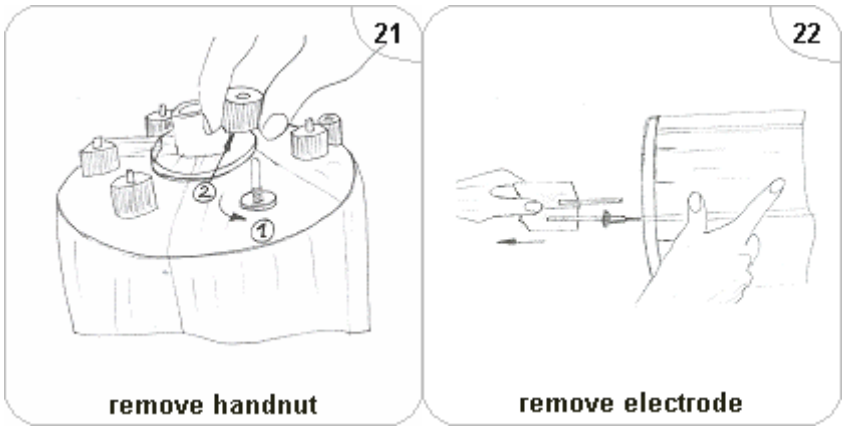
Type	HY1	HY2-4, 6	HY5, 7
Length (mm)	155	235	300

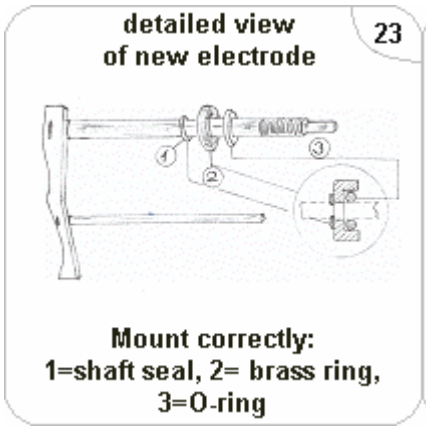
8.4.2 Uneven Electrode Wear

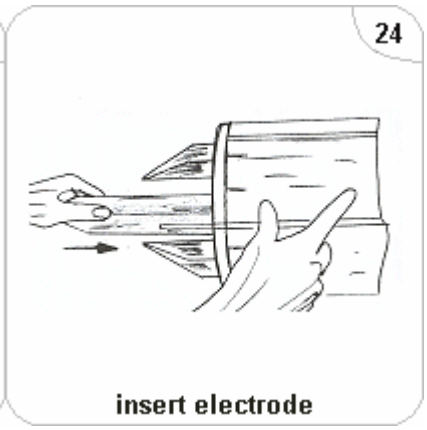
In most case, the longer electrode(s) will not be supplied with electricity for a time. Therefore they will not wear. The cause of the problem, such as a tripped circuit breaker, can be repaired. However, since the shorter electrode(s) have a greater specific load, the electrodes continue to wear unevenly.

Note: Replace electrodes with significantly uneven wear. Check the power supply (breaker, voltage drop). Also see electronic operation, Section "Malfunctions."

8.5 Replacing Electrodes







» Remove and open cylinder, as described in Section 8.3 "Removing and Cleaning Steam Cylinder."

» Loosen knurled nuts (5) and remove electrodes (48).

» Install new electrodes and hand tighten the nuts.

» Use solvent-free, HYGROMATIK-quality o-rings (for flange, cylinder base and steam hose adapter).

» Remove and open cylinder, as described in Section 8.3 "Removing and Cleaning Steam Cylinder."

» Connect plugs (4) directly to the electrodes (48) (with gray, red and black knurled nuts). It is not necessary to detach the knurled nuts!

Warning: The plug must be pressed down onto the electrode as far as it will go.

Note: Connect plugs to the correct electrodes. Pay attention to the color of the knurled nut.

» Attach plug (8) to the sensor electrode.< (Knurled nut (9) - gray)

» Switch breaker back on.

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

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

Note: In the following cases:

- the electrodes must be frequently replaced,
- black slime collects inside the cylinder, or
- there is "lightning" in the cylinder,

the conductivity of the water is too high or it isn't decanted often enough. In this case please contact HYGROMATIK.

8.6 Cleaning the Blow-Down Pump

» Remove and open cylinder, as described in Section 8.3 "Removing and Cleaning Steam Cylinder."

» Detach e-cable from the pump.

» Detach adapter (30) from the pump.

» Loosen screws (44) and remove the pump from the base.

» Open the pump (bayonet lock).

» Remove residues from the drain hoses and pump (potentially replace o-ring (33) or housing (34) if these components are no longer in excellent condition).

» Reassemble the pump.

» Moisten o-ring (31) and insert in the side connection of the base.

» Push pump into the base and mount tightly with screws (44).

» Moisten o-ring (31) and insert in adapter (30).

» Fit adapter (30) over the side connection of the pump.

» Connect e-cable to the pump.

» Install cylinder, as described in Section 8.3 "Removing and Cleaning Steam Cylinder."

» Switch on the unit and check for leaks during operation.

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

8.7 Cleaning the Water Inlet Solenoid Valve

Removal

» Shut off water supply and loosen water installation hose connection.

» Remove cylinder, as described in Section 8.3 "Removing and Cleaning Steam Cylinder."

» Loosen connecting hose (21) from the base.

» Detach e-cable from the solenoid valve.

» Loosen solenoid valve mounting screws (28).

» Remove solenoid valve from the borehole.

» Remove fine mesh filter (29) from the solenoid valve, clean and replace if needed.

Installation

» Insert fine mesh filter (29).

» Place solenoid valve with seal in the borehole of the unit housing.

» Attach solenoid valve tightly with screws (28).

» Screw on water installation hose.

» Connect e-cable to the solenoid valve.

» Attach connecting hose (21) to the base.

» Install cylinder, as described in Section 8.3 "Removing and Cleaning Steam Cylinder."

» Turn on the tap.

» Switch on the unit and check for leaks during operation.

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

8.8 Checking Cable Connections and Electrode Cables

» Make sure that no cable and plug connections are loose.

Warning: Plugs must be pressed down onto electrodes as far as they will go.

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

» Check electrode plug isolation, replace plugs as needed.

Warning: Replace electrode plugs after removing and reinstalling them several times.

8.9 Checking Operation

Start up the unit and operate for a few minutes at maximum output if possible.

» Check safety devices.

» Check hose connections for possible leaks.

8.10 Dismantling

After you stop using the steam humidifier, dismantle (demolish or scrap) it by following the installation procedures in reverse order.

Warning: Dismantling of the unit is only to be attempted by qualified personnel. Electrical dismantling is only to be attempted by trained professionals.

Note the information provided in Section 2 "Safety Notes," especially the guidelines for disposal.

9. Spare Parts

*	HY1	HY2	HY3	HY4	HY5	HY6	HY7	Article No.	Name
55								E-2124010	Key for safety lock
54								E-2124012	Safety lock, includes 2 keys
									Steam Production
	1							B-3204031	Steam cylinder compl.
		1						B-2204101	Steam cylindeb compl. including 3 electrodes, hand nut and packing
			1					B-2204111	Steam cylinder compl. Including 6 electrodes, hand nut and packing*
				1		2		B-2204105	Steam cylinder compl. Including 6 electrodes, hand nut incl. packing*
					1		2	B-2204109	Steam cylinder compl. Incl.6 electrodes, hand nut and 1 sensor electrode*
16	1							E-3226005	Top part of steam cylinder, empty
16		1						E-2206068	Top part of steam cylinder, empty
16			1					E-2206082	Top part of steam cylinder, empty
16				1		2		E-2206069	Top part of steam cylinder, empty
16					1		2	E-2207001	Top part of steam cylinder, empty
19	1							B-3216007	Lower part of steam cylinder, compl. with coarse strainer*
19		1	1					B-2206046	Lower part of steam cylinder, compl. with coarse strainer*
19				1		2		B-2206071	Lower part of steam cylinder, compl. with coarse strainer*
19					1		2	B-2207002	Lower part of steam cylinder, compl. with coarse strainer*
17	1							E-3216010	O-ring for cylinder flange
17		1	1					E-2206050	O-ring for cylinder flange
17				1		2		E-2206051	O-ring for cylinder flange
17					1		2	E-2207011	O-ring for cylinder flange
35	1							E-3216011	O-ring for cylinder base
35		1	1	1	1	2	2	E-2204022	O-ring for cylinder base & steam hose adapter
49	1							B-3204019	Electrodes, 3 pcs., standard, incl. hand nut
49		1						B-2204081	Electrodes, 3 pcs., standard, incl. hand nut
48			1	1		2		B-2204083	Electrodes, 6 pcs., standard, incl. hand nut
48					1		2	B-2204085	Electrodes, 6 pcs., standard, incl. hand nut
10	1							B-3204027	Sensor electrode complete incl. hand nut
10		1	1	1	1	2	2	B-2204075	Sensor electrode complete incl hand nut
10	1	1	1	1	1	2	2	E-3216025	Plug-in contact with insulating hose
4	3							E-3216024	Plug-in contact for electrodes, 16A (small)

	HY1	HY2	HY3	HY4	HY5	HY6	HY7	Article No.	Name
4		3	6	6		12		E-2206059	Plug for electrode 35A (med.)
4					6		12	E-2207016	Plug for electrode 63A (large)
18	12	18	18	24	24	48	48	E-3216022	Clip for closing all transparent cylinder
37	1							E-3220000	Cylinder base
37		1	1	1	1	2	2	E-2206086	Cylinder base
	1	1	1	1	1	1	1	B-3216023	Mounting set for cylinder base
12	1	1	1	1	1	2	2	E-2204035	Condensate plug
1	1							E-3221002	Adapter for steam hose
1		1						E-2209000	Adapter for steam hose
1			1					E-2209004	Adapter for steam hose
1				1		2		E-2209006	Adapter for steam hose
1					1		2	E-2209008	Adapter for steam hose
2	1	1						E-3221004	Clip for adapter steam hose
2			1	1	1	2	2	E-2209002	Clip for adapter steam hose
3	1	1						E-3216011	O-ring for cylinder base
3			1	1	1	2	2	E-2204022	O-ring for cylinder base & steam hose
	1							B-3216071	O-ringset (Pos. 3, 17, 35)
		1						B-2207021	O-ringset (Pos. 3, 17, 35)
			1					B-2207023	O-ringset (Pos. 3, 17, 35)
				1		2		B-2207025	O-ringset (Pos. 3, 17, 35)
					1		2	B-2207027	O-ringset (Pos. 3, 17, 35)
	1							B-3216079	Maintenance kit***
		1						B-2207029	Maintenance kit***
			1					B-2207031	Maintenance kit***
				1		2		B-2207033	Maintenance kit***
					1		2	B-2207035	Maintenance kit***
									Water Supply
21	0,9	1,6	1,6	1,6	1,9	1,6	1,9	E-2604014	Connecting hose
25	1							B-2304021	Solenoid valve
25		1	1	1	1	2	2	B-2304023	Solenoid valve
	1	1	1	1	1	2	2	B-2304031	Hose for water supply ¾”
	1							E-3320400	Flow rate controller 2.5 l/min.
		1	1	1	1	2	2	E-2321100	Flow rate controller 3.5l l/min.
29	1	1	1	1	1	2	2	E-2304029	Fine filter for inlet
38	0,4	0,7	0,7	0,7	0,8	0,7	0,8	E-2604010	Hose
	1	1	1	1	1	2	2	E-2305002	Gasket ¾”
20	1	1	1	1	1	1	1	E-2604062	Stopper, conical, 13.5 – 15.6

*	HY1	HY2	HY3	HY4	HY5	HY6	HY7	Article No.	Name
									Water Drain, Water Discharge
	1							B-3401017	Drain hose system (pos. 30, 15, 14, 6)
		1	1					B-3401019	Drain hose system (Pos. 30, 15, 14, 6)
				1		2		B-3401013	Drain hose system (Pos. 30, 15, 14, 6)
					1		2	B-3401021	Drain hose system (Pos. 30, 15, 14, 6)
31	1	1	1	1	1	2	2	E-3220005	O-ring for cylinder base pump adapter
31	1	1	1	1	1	2	2	E-3220005	O-ring for cylinder base pump
33	1	1	1	1	1	1	1	E-2404024	O-ring for drain pump between housing and motor
32	1	1	1	1	1	2	2	B-2404027	Blow-down pump without mounting set
	1	1	1	1	1	2	2	B-2424014	Mounting set for blow-down pump (pos. 42 – 44)
6	1	1	1	1	1	2	2	E-2425004	Elbow with vent pipe
									Control
									Universal
	1							E-2501005	Main contactor 16 A, 230 V/ 50-60Hz
		1						E-2501006	Main contactor 24 A, 230 V/ 50-60Hz
			1	1		2		E-2505007	Main contactor 40 A, 230 V/ 50-60Hz
					1		2	E-0505009	Main contactor 63 A, 230 V/ 50-60Hz
	1	1	1	1	1	2	2	E-2505206	Safety fuse 1,6 A, 5x20 mm
4	1							B-3526017	Connecting cable with plug-in contact 3pcs.
4		1						B-2524019	Connecting cable with plug-in contact 3pcs.
4			1	1				B-2524017	Connecting cable with plug-in contact 6pcs.
4					1			B-2524139	Connecting cable with plug-in contact 6pcs.
4						1		B-2524141	Connecting cable with plug-in contact 6pcs.
4						1		B-2524143	Connecting cable with plug-in contact 6pcs.
4							1	B-2524145	Connecting cable with plug-in contact 6pcs.
4							1	B-2524147	Connecting cable with plug-in contact 6pcs.
									Steam Production at Special Voltages 500V or higher
		1	1					E-2206054	O-ring for cylinder flange
				1		2		E-2206056	O-ring for cylinder flange
					1		2	E-2207014	O-ring for cylinder flange
		1						B-2208007	Cylinder star complete
			1					B-2208013	Cylinder star complete
				1		2		B-2208009	Cylinder star complete
					1		2	B-2208011	Cylinder star complete
		2,5	5	8		16		E-9000110	Cable H07V-K2.5 (m)
		3	6	6		12		E-2206059	Plug for electrode 35A (med.)
					8		16	E-9000132	Cable H07V-K6,0 (m)
					6		12	E-2207016	Plug for electrode 63A (large)

*	HY1	HY2	HY3	HY4	HY5	HY6	HY7	Article No.	Name
									Controls, Special Voltage, 500V and higher
		1	1	1	1	2	2	E-2504158	Transformer 690V/230V, 25VA
		1	1	1	1	2		E-2504168	Transformer 480V-500V/230V
		1	1	1	1	2	2	E-2504160	Transformer 600V/230V
		1	1	1	1	1	1	E-2504166	Transformer 690V/230V, 130VA
		1	1	1	1	2	2	E-2504166	Transformer 690V/230V, 130VA
					1			E-2507024	Main contactor 60A, 230 V/690V
			1	1		2	2	E-2507022	Main contactor 40A, 230 V/690V
		1						E-2507018	Main contactor 25A, 230 V/690V
		1	1	1	1	2	2	E-2590102	Line safety switch 1 Amp., 3-pin
									Controls, Special Voltages, over 416V up to 480V
					1		1	E-2507024	Main contactor 60 A, V/690V
		1	1	1		2		E-2507022	Main contactor 40 A, 230 V/690V
	1	1						E-2507018	Main contactor 25 A, 230 V/690V
	1	1	1	1	1	2	2	E-2504157	Transformer 208V-600V/230V
	1	1	1	1	1	2	2	E-2504168	Transformer 480V/230V
									Controls, Special Voltages under 230V
					1			E-2504092	Main contactor 100 A, 230 V
			1	1		2		E-0505009	Main contactor 63 A, 230 V
		1						E-2505007	Main contactor 40 A, 230 V
	1							E-2501006	Main contactor 24 A, 230 V
				1				B-2524015	Connection cable for electrodes 35A/6mm²
									L Control
	1	1	1	1	1	2	2	B-3504071	Electronic pcb type L3
51	1	1	1	1	1	2	2	E-2502412	Control switch for L3
52	1	1	1	1	1	2	2	B-2120851	Mounting plate with foil
									EMP Control
	1	1	1	1	1	2	2	B-2525177	EMP Control with display and operating unit
51	1	1	1	1	1	2	2	E-2502414	Control switch, double pole, black
52	1	1	1	1	1	2	2	B-2120853	Mounting plate for controls with foil

*	HY1	HY2	HY3	HY4	HY5	HY6	HY7	Article No.	Name
									DS control
	1	1	1	1	1			B-2525187	Electronic DS 230V blind plug at pole 45 & 5
	1	1	1	1	1			B-2525175	Electronic DS 230V blind plug at pole 45 & 5
51	1	1	1	1	1			E-2502414	Control switch for EMO, DBV 2 pole
52	x	x	x	x	x			B-2120855	Mounting plate with foil for DS
52	x	x	x	x	x			B-2120853	Mounting plate with foil for EMP & DBV-P2
	x	x	x	x	x			E-0605228	Temperature sensor TF 104 for DS
	x	x	x	x	x			B-2505207	Holder for temperature sensor, incl. Hollow set screw
	x	x	x	x	x			E-2505206	Replacement fuse for light, fan, essence injector 1.6A, 5x20 mm
	x	x	x	x	x			E-3516026	Safety fuse 1,6 A 5x20 mm for E-2504154
	x	x	x	x	x			E-2504154	Transformer 230/24V/130VA
									Essence Injector
	x	x	x	x	x			B-2604091	Pump, peristaltic for etheric oil
	x	x	x	x	x			B-2604083	Pump, peristaltic for etheric oil
	x	x	x	x	x			E-2604070	Hose, silicon 6 x 1,5
									Accessories
	x	x						E-2604012	Steam hose DN 25
			x	x	x	x	x	E-2604013	Steam hose DN 40
	x	x	x	x	x	x	x	E-2604014	Condensate hose DN 12
	x	x						E-2404004	Hose clamp d:20-32mm
			x	x	x	x	x	E-2604016	Hose clamp DN 40
	x	x	x	x	x	x	x	E-2304015	Hose clamp d:10-16mm
	x	x						B-2604026	Steam solenoid valve 0-0.4 bar, ¾", 130°
			x	x	x	x	x	B-2604040	Steam solenoid valve 0-0.4 bar, cpl.,130°
	x	x						E-2604042	T-piece DN 25
			x	x	x	x	x	E-2604023	T-piece DN 40
	x	x	x	x	x	x	x	E-2604021	T-piece DN 12
	x							B-2208005	Cylinder star, complete
		x						B-2208007	Cylinder star, complete
			x					B-2208013	Cylinder star, complete
				x		x		B-2208009	Cylinder star, complete
					x		x	B-2208011	Cylinder star, complete
	x							B-2304063	Super Flush – upgrade kit-**
		x	x	x	x	x	x	B-2304065	Super Flush – upgrade kit-**
	x	x	x	x	x	x	x	B-2304031	Hose for water supply ¾"

* See exploded view Chapter 10

When ordering spare parts, please provide the unit type and serial number.

** When using the Super Flush flushing mechanism, please order a back-up nozzle (B-2304079) for the lower part of the steam cylinder. This nozzle will come already installed in the lower part of the cylinder.

*** Maintenance set for steam cylinder includes:electrodes without knurled nuts, o-ring steam hose adapter, o-ring cylinder flange, o-ring cylinder base.

10. Fax Form - Order for spare parts

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

Fax Form

Please copy, fill in and fax to

Fax.No. **+49(0)4193/895-33**

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)

_____
_____
_____
_____
_____
_____

company stamp (invoice address)

_____
date/signature

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

11. Technical Specifications

Technical Specifications Steam Humidifier HyLine HY1 - HY7						
Type		HY1.05	HY1.08	HY2.13	HY2.17	HY3.23
Steam output [kg/h]		5	8	13	17	23
Power supply *		400V/3/N/50-60 Hz				
Power Usage [kW]		3,8	6,0	9,8	12,8	17,3
Input [A]		5,4	8,7	14,1	18,4	24,9
Circuit Protection [A]***		3x6	3x10	3x16	3x20	3x35
Control		L/EMP/ST/DS				
Control voltage		230 V				
Steam hose connection [mm]		1x25	1x25	1x25	1x25	1x40
Condensate hose connection [mm]		1x12	1x12	1x12	1x12	1x12
empty weight [kg]		13	13	20	20	22
operating weight [kg]		19	19	38	38	40
dimensions	height [mm]	480	480	650	650	650
	width [mm]	441	441	507	507	507
	depth mm]	225	225	293	293	293
Water Installation		1 to 10 bar with 3/4" connection				
fan unit**		VG08	VG08	VG17	VG17	VG30
airflow capacity [m³/h]		185	185	185	185	350

* Other voltages on request.
** Not included with delivery.
*** Multiply power input by 1.3 after full blow-down. Note overload capacity of automatic breakers. If necessary, select the next higher rating.

Technical Specifications Steam Humidifier HyLine HY1 - HY7						
Type		HY4.30	HY5.45	HY6.60	HY7.90	HY7.116
Steam output [kg/h]		30	45	60	90	116
Power supply *		400V/3/N/50-60 Hz				
Power Usage [kW]		22,5	33,8	2x22,5	2x33,8	2x43,5
Input [A]		32,5	48,8	2x32,5	2x48,8	2x62,8
Circuit Protection [A]***		3x35	3x63	6x35	6x63	6x63
Control		L/EMP/LD/DS		L/EMP		
Control voltage		230 V				
Steam hose connection [mm]		1x40	2x40	2x40	4x40	4x40
Condensate hose connection [mm]		1x12	2x12	2x12	4x12	4x12
empty weight [kg]		28	39	47	70	70
operating weight [kg]		55	85	101	162	162
dimensions	height [mm]	707	785	707	785	785
	width [mm]	550	634	927	1060	1060
	depth [mm]	336	404	336	404	404
Water Installation		1 to 10 bar with 3/4" connection				
fan unit**		VG30	2xVG30	2xVG30	3xVG30	4xVG30
airflow capacity [m³/h]		350	2x350	2x350	3x350	4x350

* Other voltages on request.
** Not included with delivery.
*** Multiply power input by 1.3 after full blow-down. Note overload capacity of automatic breakers. If necessary, select the next higher rating.

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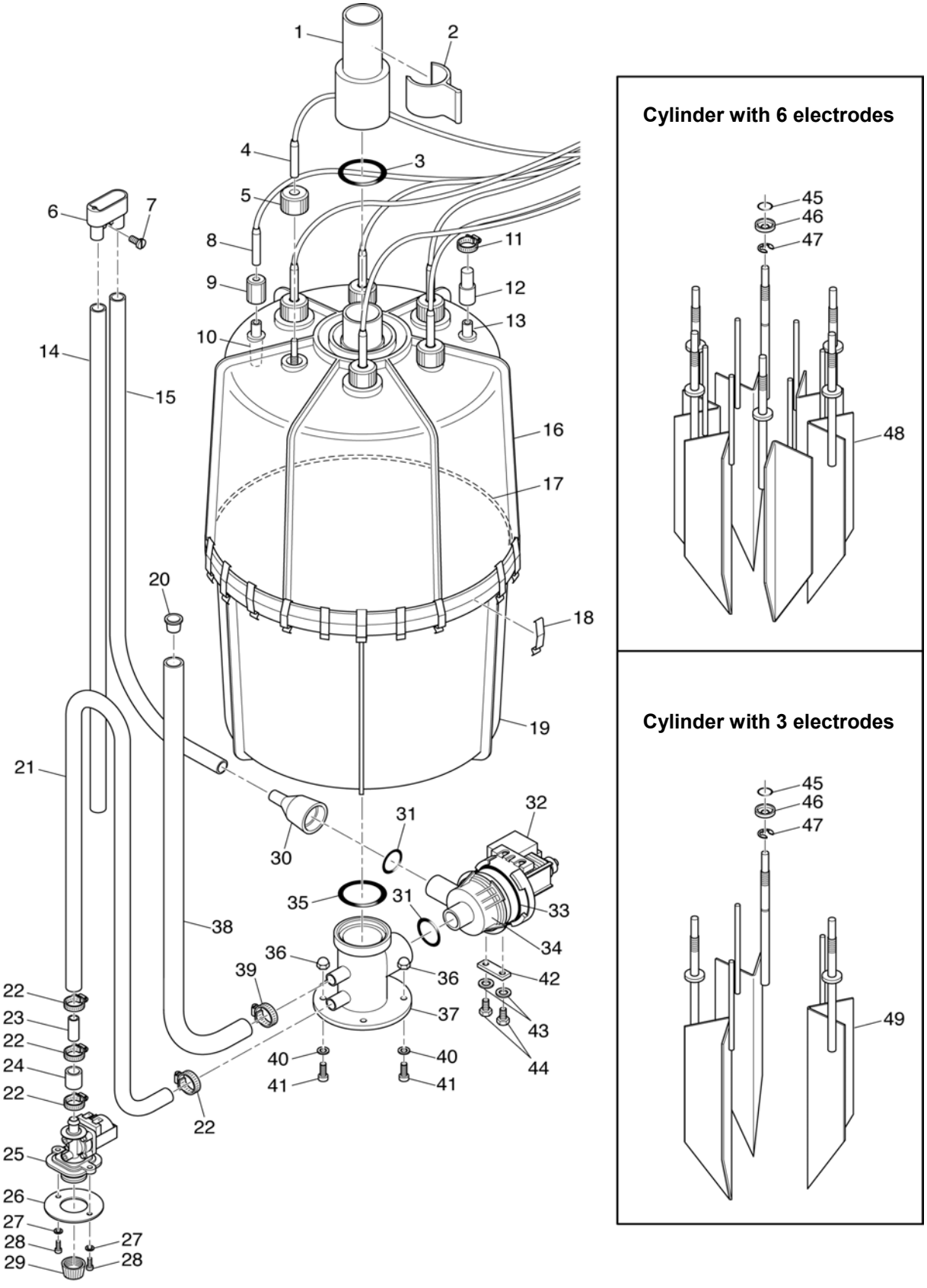
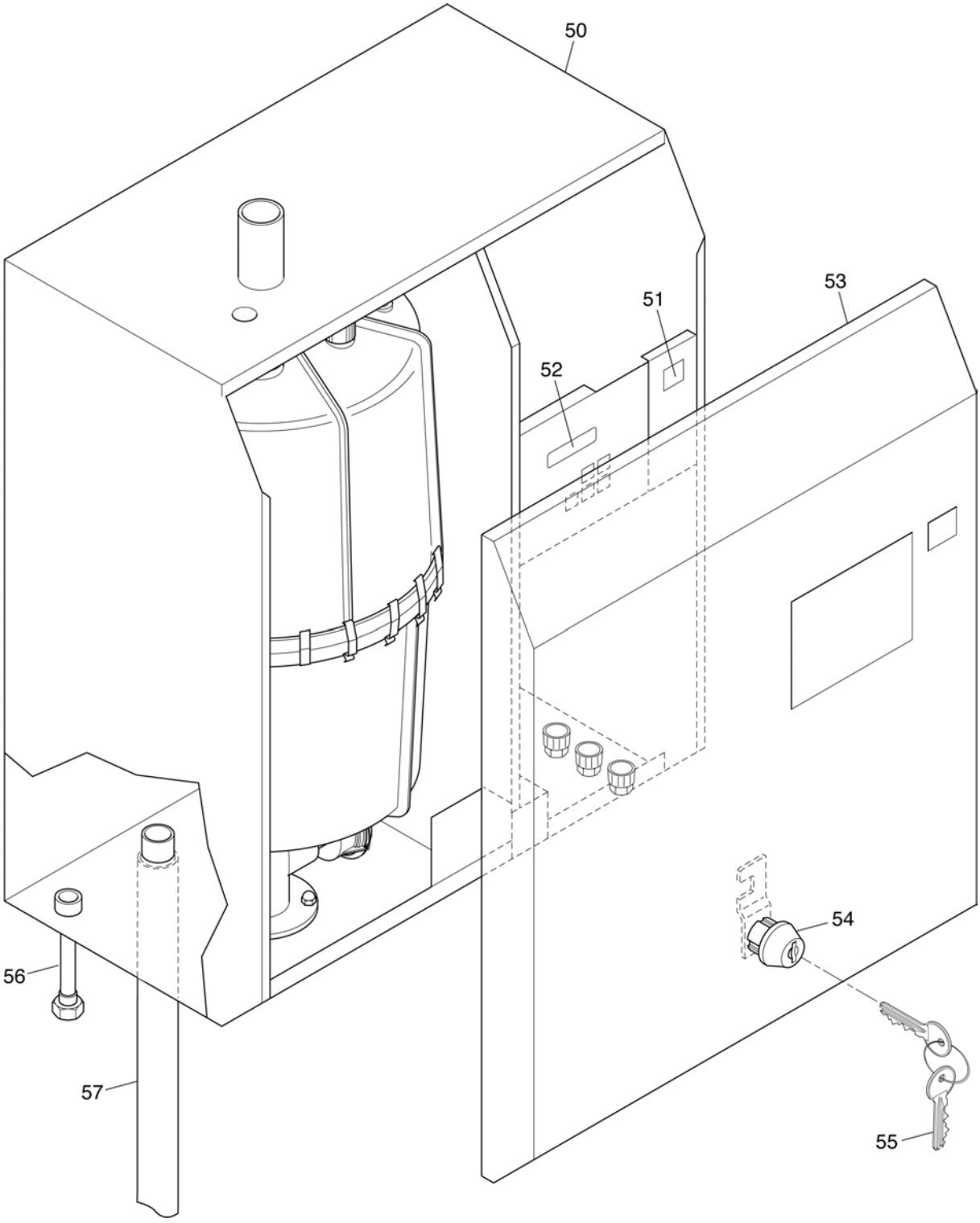
12. Exploded View



13. View of housing



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