



STULZ the natural choice

Electrode steam humidifier STULZ SupraSteam®



WARNING



The product must be installed with the earth connected, using the special yellow-green terminal on the terminal block. Do not use the neutral for the earth connection.

Save time and money!

A diligent reading of this manual guarantees a proper installation and a secure use of the described products.

IMPORTANT



The STULZ humidifiers are advanced products, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.stulz.com. Each STULZ product, in relation to its advanced level of technology, requires setup/configuration/programming/commissioning to be able to operate in the best possible way for the specific application. The failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; STULZ accepts no liability in such cases.

The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. STULZ may, based on specific agreements, act as a consultant for the installation/commissioning/use of the unit, however in no case does it accept liability for the correct operation of the humidifier and the final installation if the warnings or suggestions provided in this manual or in other product technical documents are not heeded. In addition to observing the above warnings and suggestions, the following warnings must be heeded for the correct use of the product:

- **DANGER OF ELECTRIC SHOCK**

The humidifier contains live electrical components. Disconnect the mains power supply before accessing inside parts or during maintenance and installation.

- **DANGER OF WATER LEAKS**

The humidifier automatically and constantly fills/drains certain quantities of water. Malfunctions in the connections or in the humidifier may cause leaks.

- **DANGER OF BURNS**

The humidifier contains high temperature components and delivers steam at 100°C/ 212°F

- The environmental and power supply conditions must conform to the values specified on the product rating labels.
- The product is designed exclusively to humidify rooms either directly or through distribution systems (ducts).
- Only qualified personnel who are aware of the necessary precautions and able to perform the required operations correctly may install, operate or carry out technical service on the product.
- Only water with the characteristics indicated in this manual must be used for steam production.
- All operations on the product must be carried out according to the instructions provided in this manual and on the labels applied to the product. Any uses or modifications that are not authorised by the manufacturer are considered improper. STULZ declines all liability for any such unauthorised use.
- Do not attempt to open the humidifier in ways other than those specified in the manual.
- Observe the standards in force in the place where the humidifier is installed.
- Keep the humidifier out of the reach of children and animals.
- Do not install and use the product near objects that may be damaged when in contact with water (or condensate). STULZ declines all liability for direct or indirect damage following water leaks from the humidifier.

- Do not use corrosive chemicals, solvents or aggressive detergents to clean the inside and outside parts of the humidifier, unless specifically indicated in the user manual.
- Do not drop, hit or shake the humidifier, as the inside parts and the linings may be irreparably damaged.

STULZ adopts a policy of continual development. Consequently, STULZ reserves the right to make changes and improvements to any product described in this document without prior warning.

The technical specifications shown in the manual may be changed without prior warning.

The liability of STULZ in relation to its products is specified in the STULZ general contract conditions, available on the website www.stulz.com and/or by specific agreements with customers; specifically, to the extent where allowed by applicable legislation, in no case will STULZ, its employees or subsidiaries be liable for any lost earnings or sales, losses of data and information, costs of replacement goods or services, damage to things or people, downtime or any direct, indirect, incidental, actual, punitive, exemplary, special or consequential damage of any kind whatsoever, whether contractual, extra-contractual or due to negligence, or any other liabilities deriving from the installation, use or impossibility to use the product, even if STULZ or its subsidiaries are warned of the possibility of such damage.

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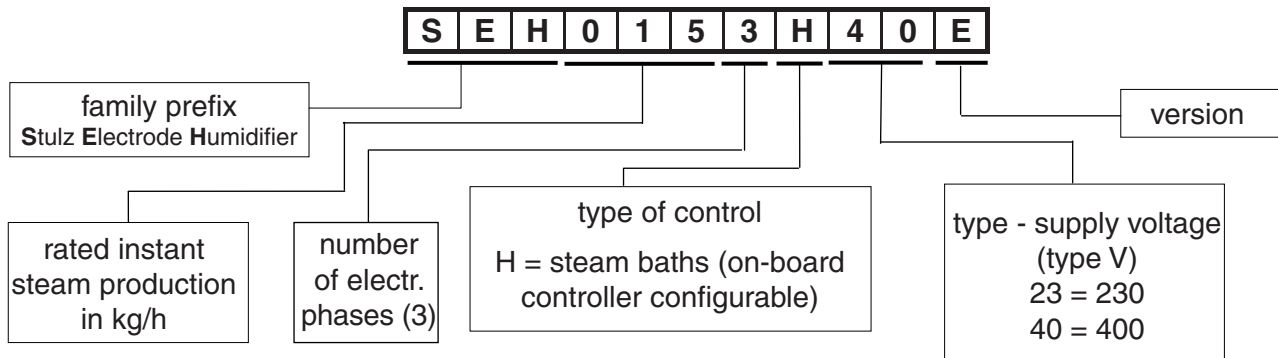
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1 MODELS AND DESCRIPTION OF THE COMPONENTS

1.1 Models

The code denoting the model of humidifier is made up of 11 characters, with the following meaning:



Example: The code SEH0153H40E identifies an immersed Stulz electrode humidifier (SEH) with:

- rated steam capacity 15 kg/h (015);
- 3 electric phases (3);
- internal controller (H);
- supply voltage 400 VAC (40);
- Europe-Version (E)

1.2 Description of the components

1.2.1 Description of the components up to 15 kg/h steam production

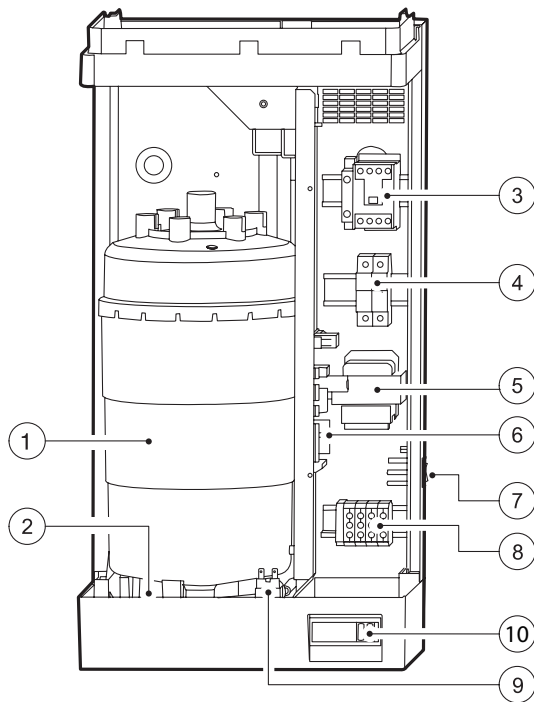


Fig. 1.2.1.1

Key:

no. description

1.	cylinder
2.	drain electrovalve
3.	remote control switch
4.	fuse carrier
5.	transformer
6.	main board
7.	ON- OFF switch / manual drain switch
8.	power cable terminal block
9.	supply electrovalve
10.	controller

1.2.2 Description of the components from 25 kg/h up to 65 kg/h steam production

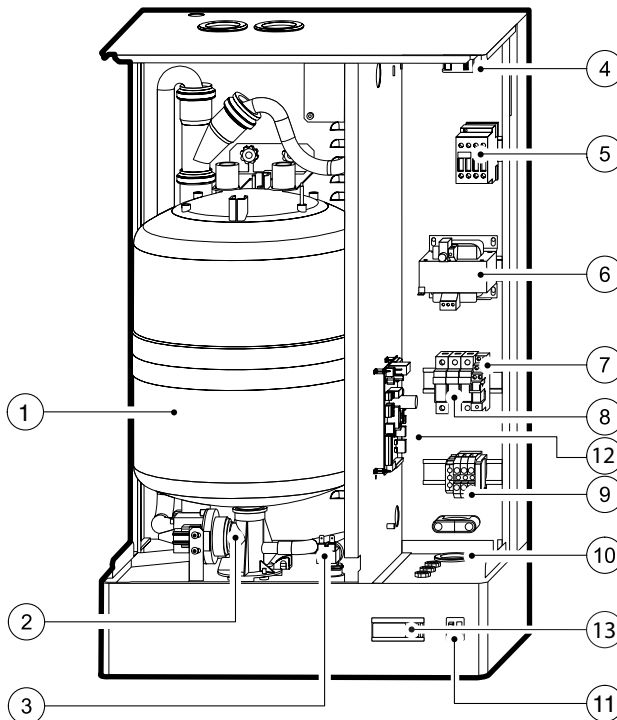


Fig. 1.2.2.1

Key:

no. description

1.	cylinder
2.	drain pump
3.	drain electrovalve
4.	TAM
5.	remote control switch
6.	transformer
7.	relay
8.	fuse carrier
9.	power cable terminal block
10.	cable gland
11.	ON- OFF switch / manual drain switch
12.	main board
13.	controller

1.3 Description of the water bearing components

1.3.1 Units up to 15 kg/h steam production

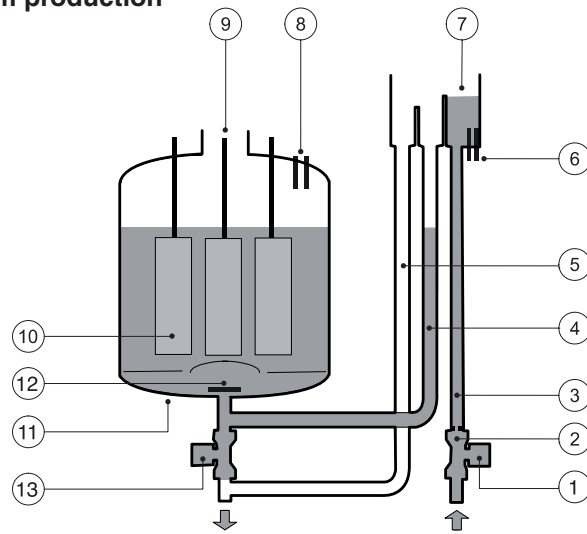


Fig. 1.3.1.1

1.3.2 Units from 25 kg/h up to 65 kg/h steam production

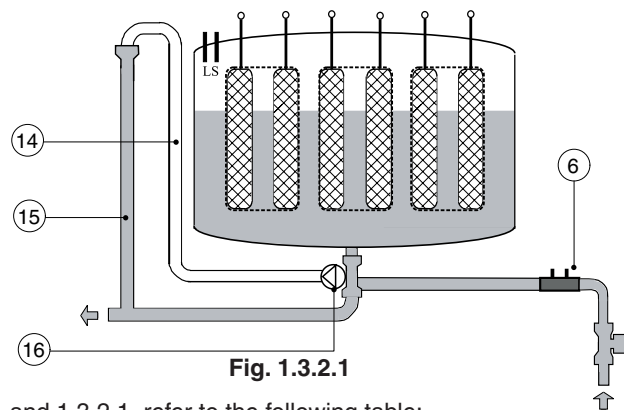


Fig. 1.3.2.1

For the description of Fig. 1.3.1.1 and 1.3.2.1, refer to the following table:

no.	description
1	fill electrovalve
2	flow-rate limiter
3	supply pipe
4	fill pipe
5	overflow pipe
6	conductivity measuring electrodes
7	supply tank - overflow*
8	anti foam electrode
9	steam outlet
10	electrodes (2/6 in the single-phase model, 3/6 in the three-phase model)
11	cylinder casing
12	bottom filter
13	drain electrovalve
14	drain pump pipe
15	drain column
16	drain pump

Tab. 1.3.2.1

* Device used to prevent water overflowing from the supply tank, above the safety level (for example, due to a controller malfunction or leaking from the fill electrovalve or back pressure). The supply tank is fitted with an overflow diaphragm that discharges the excess water through a special pipe. The overflow diaphragm is lower than the filling inlet, to prevent back-flow into the supply pipe.

2 CONTROL AND OPERATING PRINCIPLE

2.1 Operating principle

In an electrode humidifier the production of humidity is obtained inside a cylinder (boiler) containing water that is heated to and then held at boiling temperature. The water that evaporates over time is automatically replaced with water from the mains supply. **In an electrode humidifier the production of humidity is obtained inside a cylinder (boiler) containing water that is heated to and then held at boiling temperature. The water that evaporates over time is automatically replaced with water from the mains supply.**

The quantity of current that initially flows depends greatly on the type of water supplied from the mains. Normally, a recently-started cylinder has low current; nonetheless, over time the quantity of salts inside the water increases (evaporation in fact does not carry the salts with it). This allows the level of current required by the machine to provide the quantity of steam requested to be reached.

In stable operating conditions, the level of production required is automatically achieved using the water level control on the boiler. This is in fact reflected in higher or lower levels of current.

The salts introduced by the automatic refilling of the water are partly deposited as lime scale inside the boiler, contributing to the progressive depletion of the cylinder, and partly remain dissolved in the water. To avoid excessive accumulation of salts, a quantity of water is periodically and automatically drained and then replaced with fresh water.

2.2 Control principles

The range of humidifiers includes the following control options.

2.2.1 ON/OFF control – P controllers; H controllers with parameter A0=0

The action is all or nothing, activated by an external contact that thus determines the set point and the control differential. The external contact can be a humidostat:

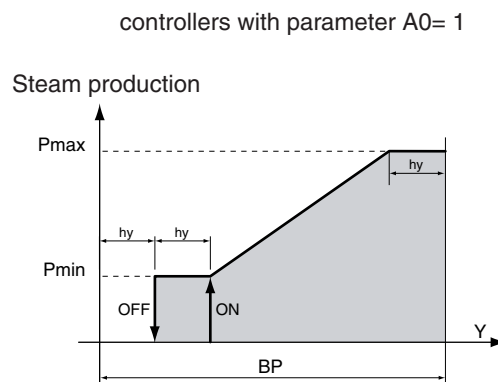
- closed: humidifier produces steam if also the remote ON/OFF contact is closed too.
- open: steam production is stopped when the current evaporation cycle ends (it may take maximum 10-15min since contact opens). Note that when the remote on/off contact opens, steam production is immediately stopped, regardless the current evaporation cycle has finished.

2.2.2 Proportional control – P controllers; H controllers with parameter A0=1

The steam production (hourly quantity) is proportional to the value of a signal Y coming from an external device; the type of signal (H controllers only) can be selected from the following standards: 0 to 1 Vdc, 0 to 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA; for type P controllers, the signal is 0 to 10 Vdc and cannot be modified. The entire range is called the BP (proportional band).

The maximum production, Pmax, corresponding to 5% less than the maximum value of the external signal Y, can be programmed (type H controllers only) between 20% and 100% of the rated value of the humidifier (parameter P0).

The minimum production, Pmin is set at 20% of the rated value, with the activation hysteresis, value hy, equal to 2% for P controllers and equal 5% for H controllers of the entire BP of the external signal Y.



2.2.3 Autonomous control with relative humidity transducer - H controllers with param. A0=2

Steam production is linked to the measurement of % rH, performed by the relative humidity transducer connected to the controller, and increases as the distance from the set point St increases.

The maximum production $P0$, which occurs when the relative humidity is less than the set point by a value at least $P1$, can be programmed between 20% and 100% of the rated value of the humidifier. The minimum production $Pmin$ is set at 20% of the rated value, with an activation hysteresis provided by the value hy , equal to 10% of $P1$.

The dehumidification function, if enabled (parameter $b = 1 = \text{odd number}$, see Table 8.3.2), overlaps the control diagram and is activated when the relative humidity % rH, transmitted by the transducer, is higher than St by a programmable quantity $P5+P6$; the hysteresis of the step, also programmable, is equal to $P6$.

To check that the relative humidity measured by the transducer is within the pre-set values, the controller with autonomous control allows two alarm thresholds to be programmed (also see paragraph 12.1):

- high relative humidity alarm threshold $P2$;
- low relative humidity alarm threshold $P3$.

In case of exceeding / falling below this threshold after an adjustable delay $P4$, an alarm state is activated and the contact of the corresponding relay on the main controller board is closed.

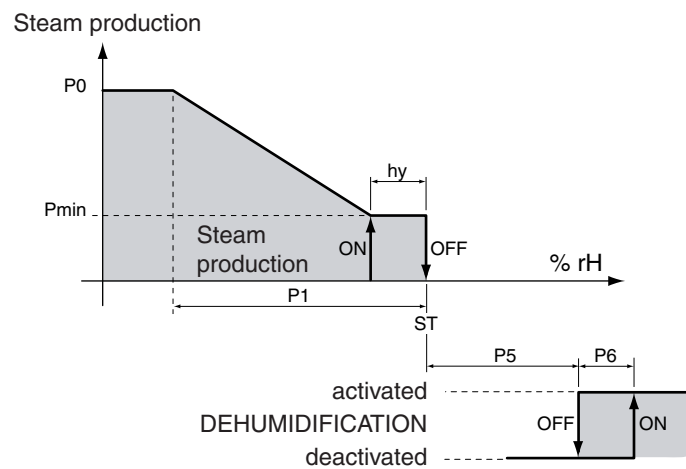


Fig. 2.2.3.1

2.2.4 Autonomous control with ambient relative humidity transducer and compensation transducer for limiting the outlet humidity – (parameter A0=3)

In this case too the controller modulates steam production as a function of the measurement % rH performed by the main relative humidity transducer (see par. 11.3), however, in addition, its entity is limited if the relative humidity % rH2 measured by a second compensation transducer placed in the air duct downstream from the humidifier exceeds the maximum desired value.

The compensation probe has its own set point P7 and differential P8, based on which the limit of production is calculated (see Fig. 2.2.4.1).

The production associated to the compensation transducer is limited to a value that increases with the difference.

To prevent the relative humidity measured by the transducer in the air duct downstream from the humidifier exceeding a value considered as excessive, the control module in this mode allows a high outlet relative humidity alarm threshold P9, to be programmed (also see par. 12.1).

If this threshold is exceeded, after a programmable delay P4, an alarm state is activated, with closing of the contact of the corresponding relay on the main control board.

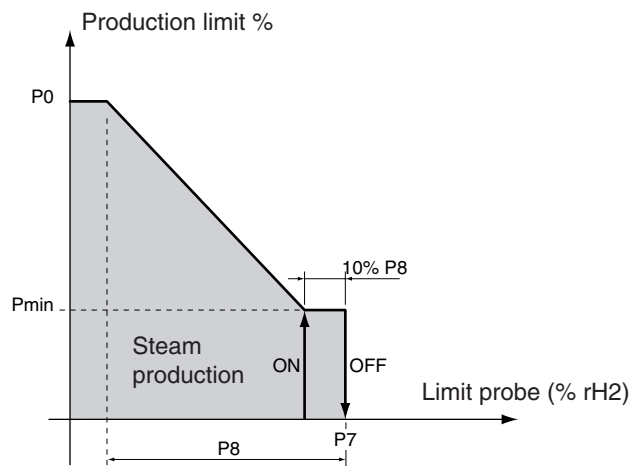


Fig. 2.2.4.1

2.2.5 Application for steam baths: control with temperature transducer – (parameter A0=4)

In applications for steam baths, where the control probe measures temperature rather than humidity, the same considerations are valid as described in paragraph 2.2.3, replacing relative humidity with temperature.

The dehumidification function is not available in this operating mode.

High temperature limit 60°C, see Table 8.2.1 (P2).

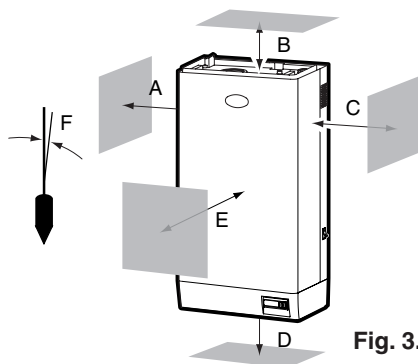
3 MOUNTING

3.1 Receipt and storage

Check that the humidifier is intact upon receipt and immediately notify the shipping agent, in writing, of any damage that may be due to improper or careless transport. Move the humidifier to the place of installation before removing it from the packaging, grasping the neck only from below the base. Open the box, remove the layer of protective material and take out the humidifier, keeping it vertical at all times; only remove the protective bag when installing the unit.

3.2 Positioning

For installation choose the most suitable position for the steam distribution, that is the position that minimises the length of the steam outlet pipe, or alternatively, in the case of direct humidification into the room using a ventilated distributor, in a central position in the room being humidified (see Chap. 5). The unit has been designed for wall-mounting, and the wall must be able to support the weight of the unit in normal operating conditions (see par. 13.1). The metal casing of the humidifier heats up during operation, and the rear part in contact with the wall may reach temperatures of over 60 °C; check that this does not cause any problems. Make sure the humidifier is level, and that the minimum spaces are respected as per the drawing, to allow room for maintenance operations.



Dimension in mm

A	B	C	D	E	F
≥300	≥200	≥200	≥400	≥700	<0.5°

Fig. 3.2.1

3.3 Fastening

The appliance must be wall-mounted using three screws: two upper screws, for fastening the support bracket, and one lower, central screw, to fasten the unit into place. For the distances (in mm), see Fig. 3.3.1. Fasten (see Figs. 3.3.1 and .2) the bracket supplied with the humidifier to the wall, checking that it is horizontal using a spirit level, if the unit is mounted on a brick wall, plastic screw anchors (diam. 8 mm) and the screws (diam. 5mm x L= 50 mm) supplied may be used.

Hang the appliance on the bracket using the band located on the top edge of the rear of the unit. Finally, fasten the appliance to the wall using the central hole in the rear part of the base, this can be easily reached from below. For the weights and dimensions, see par. 13.1.

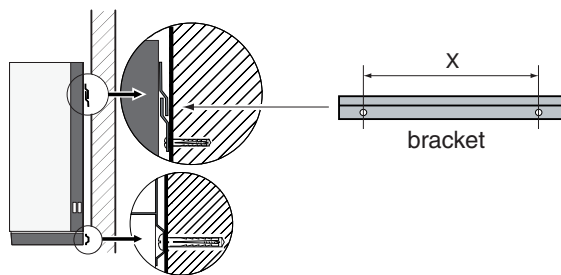


Fig. 3.3.1

Model	SEH 001...008	SEH 010...015	SEH 025...045	SEH065
X	220	220	310	400
Y	500	590	725	785
Z			115	38
Z'				112

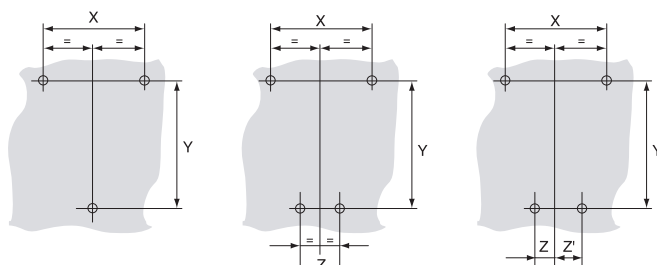


Fig. 3.3.2

3.4 Removal and reassembly of the front cover

With reference to Fig. 3.4.1, to remove the front cover of the humidifier, proceed as follows:

- turn the oval-shaped plate with the STULZ logo 90° revealing the head of the ground screw below;
- remove the screw using a screwdriver;
- hold the cover by the sides and lift it around 2 cm, removing the end strips from the protruding edges of the cover and the base of the structure;
- remove the cover by moving it forwards.

To close the appliance, proceed as follows:

- turn the oval-shaped plate with the STULZ logo, revealing the fastening hole below;
- slip the cover onto the structure, keeping it slightly raised, until it rests on the rear edges, and then move it downwards, slotting upper and lower end strips into the edges of the cover and the base of the structure respectively; check that the fastening hole below the logo is in line with the threaded bush on the structure;
- tighten the ground screw using a screwdriver;
- close (turn) the oval-shaped plate with the STULZ logo.

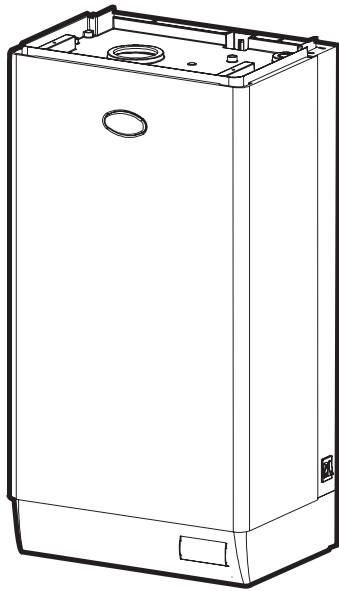


Fig. 3.4.1

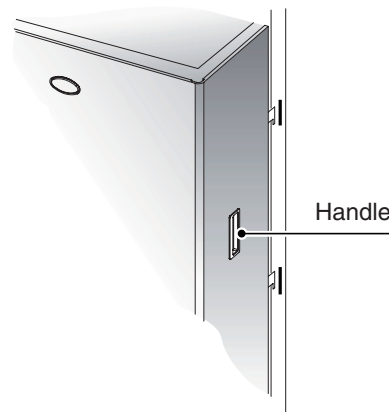


Fig. 3.4.2

For the humidifiers from 25 to 65kg/h

To remove the front cover, proceed as follows:

- turn the oval-shaped plate with the STULZ logo 90° revealing the head of the ground screw below;
- remove the screw using a screwdriver;
- hold the cover using the side handles and lift it upwards, making sure that the hooks on the sides are removed from the structure;
- remove the cover by sliding it off forwards.

To close the appliance, proceed as follows:

- turn the red oval-shaped plate with the STULZ logo, revealing the fastening hole below;
- slip the cover onto the structure, keeping it slightly raised, until the hooks slide into the structure; check that the fastening hole below the logo is in line with the threaded bush on the structure;
- tighten the ground screw using a screwdriver;
- close (turn) the oval-shaped plate with the STULZ logo.

4 WATER CONNECTIONS

Before making the connections, ensure that the machine is disconnected from the mains power supply.

4.1 Characteristics of the supply water

The humidifier must be supplied with mains water with the following characteristics:

- pressure between 0.1 and 0.8 MPa (1 and 8 bar), temperature between 1 and 40 °C and instant flow-rate no lower than the rating of the fill electrovalve
- hardness no greater than 22 °dH (equal to 400 ppm of CaCO₃), conductivity: from 125 to 1250 µS/cm
- absence of organic compounds
- the characteristics of the water of supply must fall within the following limits:

A LIMIT VALUES FOR THE SUPPLY WATER TO AN IMMERSSED ELECTRODE HUMIDIFIER RUNNING ON NORMAL WATER

				Limits	
				Min	Max
Hydrogen ions	pH	-		7	8.5
Specific conductivity at 20 °C	$\sigma_{R,20^{\circ}\text{C}}$	-	µS/cm	300	1250
Total dissolved solids	c_R	-	mg/l	(*)	(*)
Dry residue at 180 °C	R_{180}	-	mg/l	(*)	(*)
Total hardness	TH	-	mg/l CaCO ₃	150	400
Temporary hardness		-	mg/l CaCO ₃	=	200
Iron + Manganese		-	mg/l Fe+Mn	=	0.2
Chlorides		-	ppm Cl	=	30
Silica		-	mg/l SiO ₂	=	20
Chlorine residue		-	mg/l Cl-	=	0.2
Calcium sulphate		-	mg/l CaSO ₄	=	100

Tab. 4.1.1

(*) Values dependent on the specific conductivity; in general: $c_R \cong 0,65 * \sigma_{R, 20^{\circ}\text{C}}$; $R_{180} \cong 0,9 * \sigma_{R, 20^{\circ}\text{C}}$

B LIMIT VALUES FOR THE SUPPLY WATER TO AN IMMERSSED ELECTRODE HUMIDIFIER RUNNING ON WATER WITH A LOW SALT CONTENT

				Limits	
				Min	Max
Hydrogen ions	pH	-		7	8.5
Specific conductivity at 20 °C	$\sigma_{R,20^{\circ}\text{C}}$	-	µS/cm	125	500
Total dissolved solids	c_R	-	mg/l	(*)	(*)
Dry residue at 180 °C	R_{180}	-	mg/l	(*)	(*)
Total hardness	TH	-	mg/l CaCO ₃	0	200
Temporary hardness		-	mg/l CaCO ₃	=	150
Iron + Manganese		-	mg/l Fe+Mn	=	0.2
Chlorides		-	ppm Cl	=	20
Silica		-	mg/l SiO ₂	=	20
Chlorine residue		-	mg/l Cl-	=	0.2
Calcium sulphate		-	mg/l CaSO ₄	=	60

Tab. 4.1.2

(*) Values dependent on the specific conductivity; in general: $c_R \cong 0,65 * \sigma_{R, 20^{\circ}\text{C}}$; $R_{180} \cong 0,9 * \sigma_{R, 20^{\circ}\text{C}}$

A G 3/4 M fitting is used for the water connection.

Note: No relationship can be demonstrated between the hardness and the conductivity of the water.

IMPORTANT WARNING: The water does not need to be treated with softeners! This may lead to the formation of foam, with potential operating problems or anomalies!

The following are not recommended:

1. the use of well water, industrial water or water from cooling circuits and, in general, any potentially chemically or bacteriologically contaminated water;
2. the addition to the water of disinfectants or corrosion inhibitors, as these are potential irritants.

4.2 Characteristics of the drain water

Inside the humidifier the water boils and is transformed into steam, without the addition of any substances. The drain water, as a result, contains the same substances that are dissolved in the supply water, yet in greater quantities, depending on the concentration in the supply water and the set draining cycles, and may reach temperatures of 100 °C and an instant flow-rate of 5 l/min; not being toxic, it may be drained into the sewage system. The drain connection has an external diameter of 40 mm. As well as resisting high temperatures, the drain must guarantee the correct downflow of water, and as a result a downwards slope of at least 5° is recommended.

4.3 Pipe connections

The installation of the humidifier requires connection to the water supply and drain pipes.

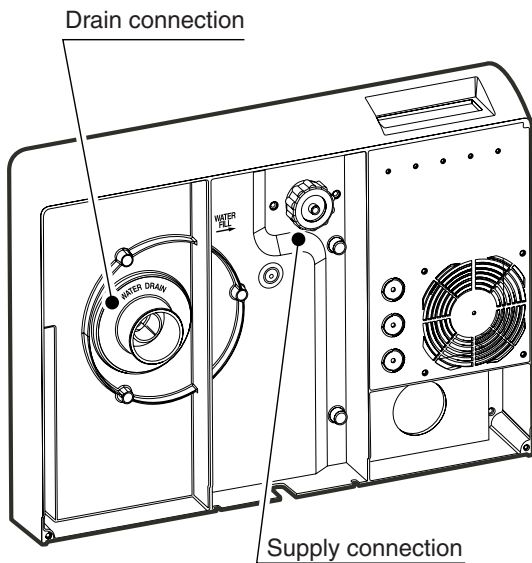


Fig. 4.3.1

Units up to 15 kg/h steam production

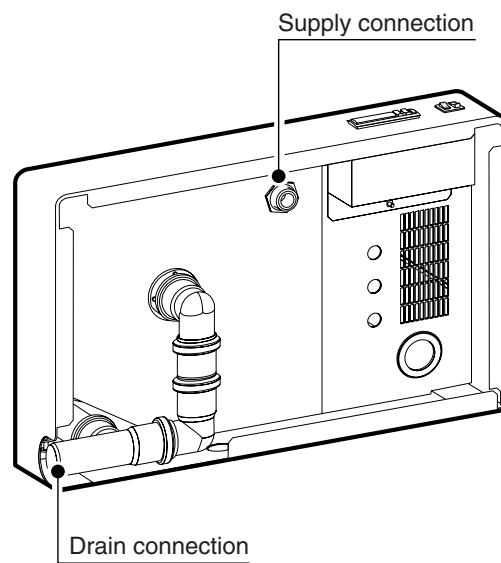


Fig. 4.3.2

Units from 25 kg/h up to 65 kg/h steam production

With reference to Fig. 4.3.1, 4.3.2 which represents the lower view of the base of the machine, the supply water may be connected using a rigid or flexible pipe with a minimum recommended internal diameter of 6 mm. This must be fitted with a shut-off tap to allow the appliance to be disconnected during maintenance operations. To simplify the installation it is recommended to use the fast connector 3/4"G (K87247) or the 90 ° curved connector (K87243) or a 90° copper-connector (K87244) (available on request).

A mechanical filter should be installed to trap any solid impurities; other types of filters are not recommended.

The drain water is connected using a section of rubber or plastic tubing resistant to 100 °C, with a recommended internal diameter of between 36 and 40 mm.

This section of pipe must be fastened using metal pipe clamps:

- above, to the outlet of the appliance;
- below, onto the rigid pipe, so as to create a minimum slope of 5°.

4.4 Diagram of water connections

The drain pipe must be fastened to the humidifier (see Fig. 4.4.1) using a connecting sleeve and two metal pipe clamps, not supplied.

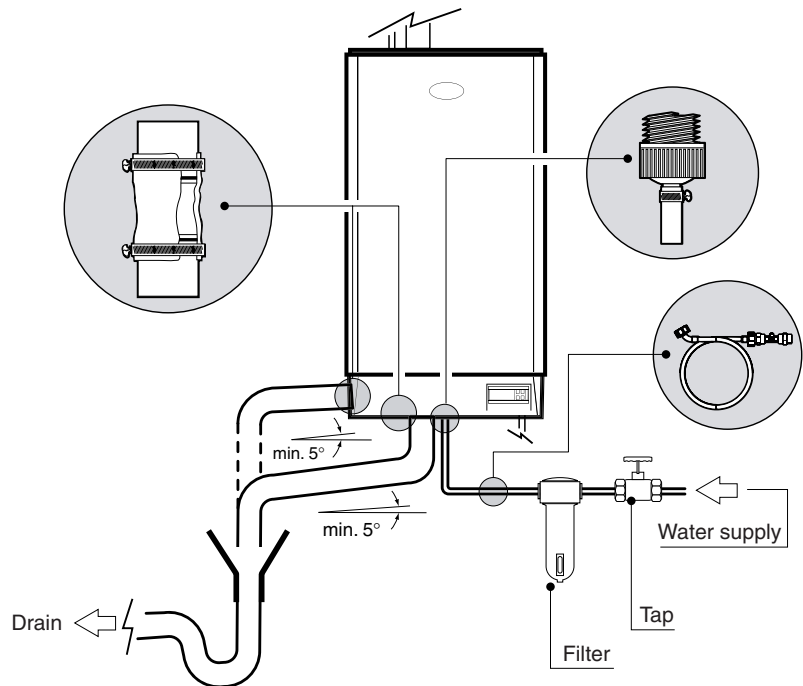


Fig. 4.4.1

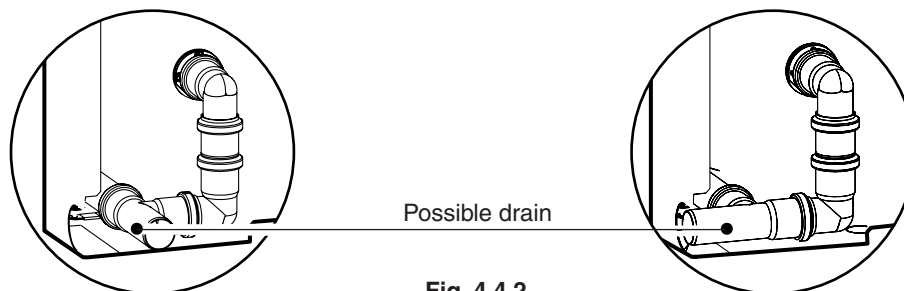


Fig. 4.4.2

IMPORTANT WARNING: The drain pipe must be free, without backpressure and with a drain trap immediately downstream from the connection to the humidifier. We recommend to install an external anti-flooding device (not supplied) to protect from faults of external hydraulic circuits.

4.5 Checks

The following conditions represent correct water connection:

- installation of a shut-off tap in the supply water line;
- presence of a mechanical filter in the supply water line;
- water temperature and pressure within the allowed values;
- drain pipe resistant to temperatures of 100°C;
- minimum internal diameter of the drain pipe of 36 mm;
- minimum slope of the drain pipe greater than or equal to 5°;
- electrically non-conductive sleeve.

IMPORTANT WARNING: When installation is completed, flush the supply pipe for around 30 minutes by piping the water directly into the drain without sending it into the humidifier. This will eliminate any scale or processing residues that may block the fill valve or cause foam when boiling.

5 STEAM DISTRIBUTION

To achieve optimal humidifier efficiency, the steam produced must be introduced into the room uniformly, in order to prevent the spraying of drops and notable condensation. This is best achieved using ventilated steam distributors or linear distributors. The right steam distributor must be chosen according to the place where the steam is to be introduced. If the steam is to be distributed directly into the environment (rooms, warehouses, etc.), ventilated steam distributors (optional) fitted with electric fans should be used. If, on the other hand, the steam is to be introduced into ducts or air handling systems, linear distributors must be used, which exploit the speed of the air itself for distribution.

5.1 Direct steam distribution: ventilated steam distributors

Ventilated steam distributors, used to distribute the steam directly into the room, may be fitted on top of the humidifier (see Fig. 5.1.1) or alternatively positioned separately and connected to the humidifier (see Fig. 5.1.2) using a steam and condensate drain pipe. The drawings show the minimum recommended distances to avoid the flow of humidified air from coming into direct contact with persons, lights, electrical appliances, false ceilings and cold surfaces before the steam has been totally absorbed by the environment.

For further details on the assembly, the electrical connections and the use of ventilated steam distributors, please refer to the specific instruction manual.

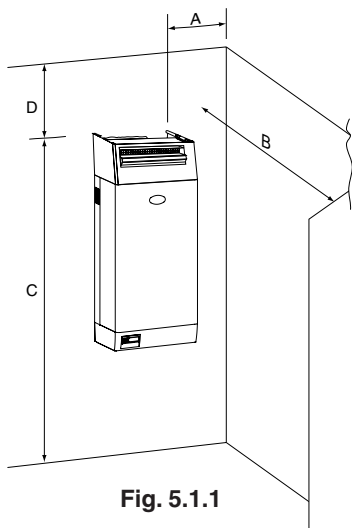


Fig. 5.1.1

	A	B	C	D
dimensions (m)	>0.5	>5	≥2.1	>0.5

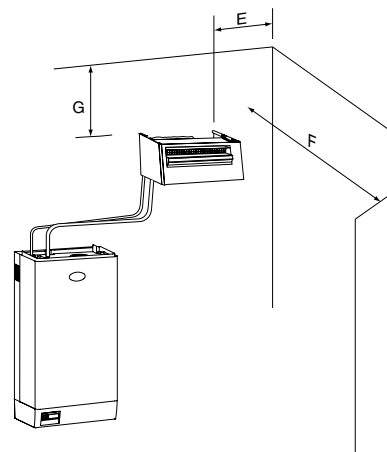


Fig. 5.1.2

	E	F	G
dimensions (m)	>0.5	>5	≥ 0.5

5.2 Steam distribution in cold rooms

Cold rooms can be humidified using a ventilated steam distributor, making sure that this operates within its operating limits. The cell must have operating temperatures of between -10 °C and +20 °C, with a percentage of relative humidity of no greater than 80% rH. If these limits are not possible, the steam can be distributed in the cold room using a linear distributor. In any case, the steam must not come into direct contact with flows of air cold from the refrigeration unit in the cold room, to avoid possible condensation.

5.3 Steam distribution in ducts - linear and concentrated jet distributors (OEM)

The humidifier may be used for small ducts with a static pressure of no greater than 500 Pa. For steam distribution into air ducts, the steam distributor must be sized according to the output of the humidifier and the cross-section of the ducting. For this purpose, STULZ supplies two ranges of linear distributors: one in aluminium, with plastic ends. Figures 5.3.1 provide the dimensions of the STULZ distributors, while table 5.3.1 specifies the minimum number and the model of the distributor recommended for the type of humidifier used.

humidifier fitting Ø mm				22	22	30	30	30	30	40	40	40	2x40
humidifier capacity kg/h				1/3.5	3	5	8	9	10	25	35	45	65
distributor fitting mm (øA)	max. distributor capacity kg/h	length (L) mm	code	SEH001	SEH003	SEH005	SEH008	SEH010	SEH015	SEH025	SEH035	SEH045	SEH065
22	4	332	DP035D22R0	1	1								
22	6	438	DP045D22R0	1	1								
22	9	597	DP060D22R0	1	1								
22	9	835	DP085D22R0	1	1								
30	5	343	DP035D30R0			1							
30	8	427	DP045D30R0			1	1						
30	12	596	DP060D30R0			1	1	1	1				
30	18	850	DP085D30R0			1	1	1	1	(2)*			
30	18	1048	DP105D30R0			1	1	1	1	(2)*			
30	18	1245	DP125D30R0			1	1	1	1	(2)*			
40	25	834	DP085D40R0							1	(2)**	(2)**	(4)**
40	35	1015	DP105D40R0							1	1	(2)**	2
40	45	1222	DP125D40R0							1	1	1	2
40	45	1636	DP165D40R0								1	1	2
40	45	2025	DP205D40R0								1	1	

Tab. 5.3.1

N.B.: If the duct is not wide enough for the steam distributor, it is possible to split the steam hose to allow the usage of multiple steam distributors (number in brackets).

* : "Y" kit available for dividing the steam hose, with 40 mm dia. inlet and 2 x 30 mm dia. outlets, (K87245)

** : "Y" kit available, 40 x 40 x 40, for spitting the steam hose

DP***D**R0 – linear distributors

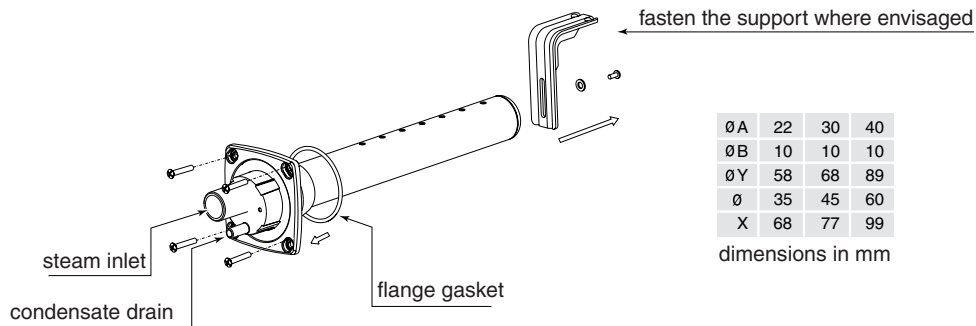


Fig. 5.3.1

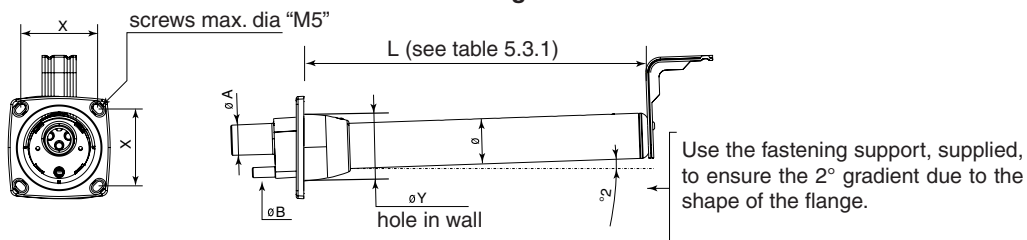


Fig. 5.3.2

The linear distributors are mounted (see Fig. 5.3.3):

- making a series of holes in the wall of the duct according to the drilling template indicated in Fig. 5.3.1 or 5.3.2;
- inserting the distributor with the steam holes facing upwards;
- fastening the flange of the distributor using 4 screws.

To allow the return of condensate using the drain connection (see par. 5.7), mount the distributor slightly inclined (at least 2°-3° see Fig. 5.3.3) with the inlet connection closer than the closed end, which, for this reason, must be adequately supported.

N.B.: The "L" fastening support (code 18C478A088) is sold together with the steam distributors, code DP085 - DP205. For shorter lengths the support is sold as an optional.

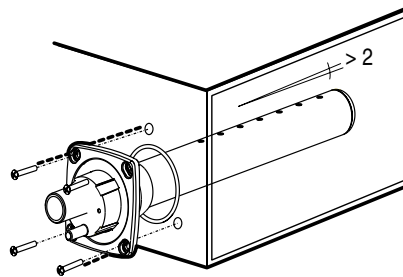


Fig. 5.3.3

5.4 Concentrated jet steam distributor (OEM)

For special applications (e.g. steam baths, technological machinery) a plastic OEM concentrated jet distributor is available, with hole (12 or 22 mm) or without hole, in this case made by the user according to specific needs (see Fig. 5.4.1). The OEM distributor may be fitted, horizontally or vertically with the hole facing upwards, on a support with the same holes as indicated on the drilling template for the aluminium linear distributor.

N.B.: In the case of the steam tubing with an internal diameter of 30 mm, remove the 22 mm steam inlet section.

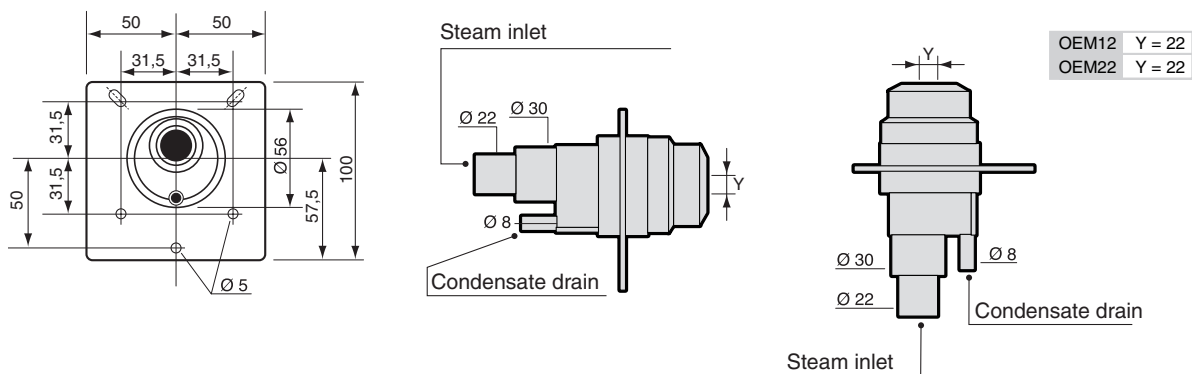


Fig. 5.4.1

5.5 Positioning the linear distributors in the air duct

As allowed by the dimensions of the air duct, the distributor must be as long as possible and located away from curves, branches, changes in cross-section, grills, filters and fans. The minimum recommended distance between the steam distributor and the nearest obstacle is around from 1 to 1.5 metres, yet this greatly depends on the operating conditions; this distance it in fact increases with:

- an increase in the air speed in the channel;
- an increase in the relative humidity of the air before and, above all, after humidification;
- a decrease in turbulence.

Follow the indications and the distances between the distributor and the walls of the ducting and/or between two distributors, as indicated in the figures below (distances in mm).

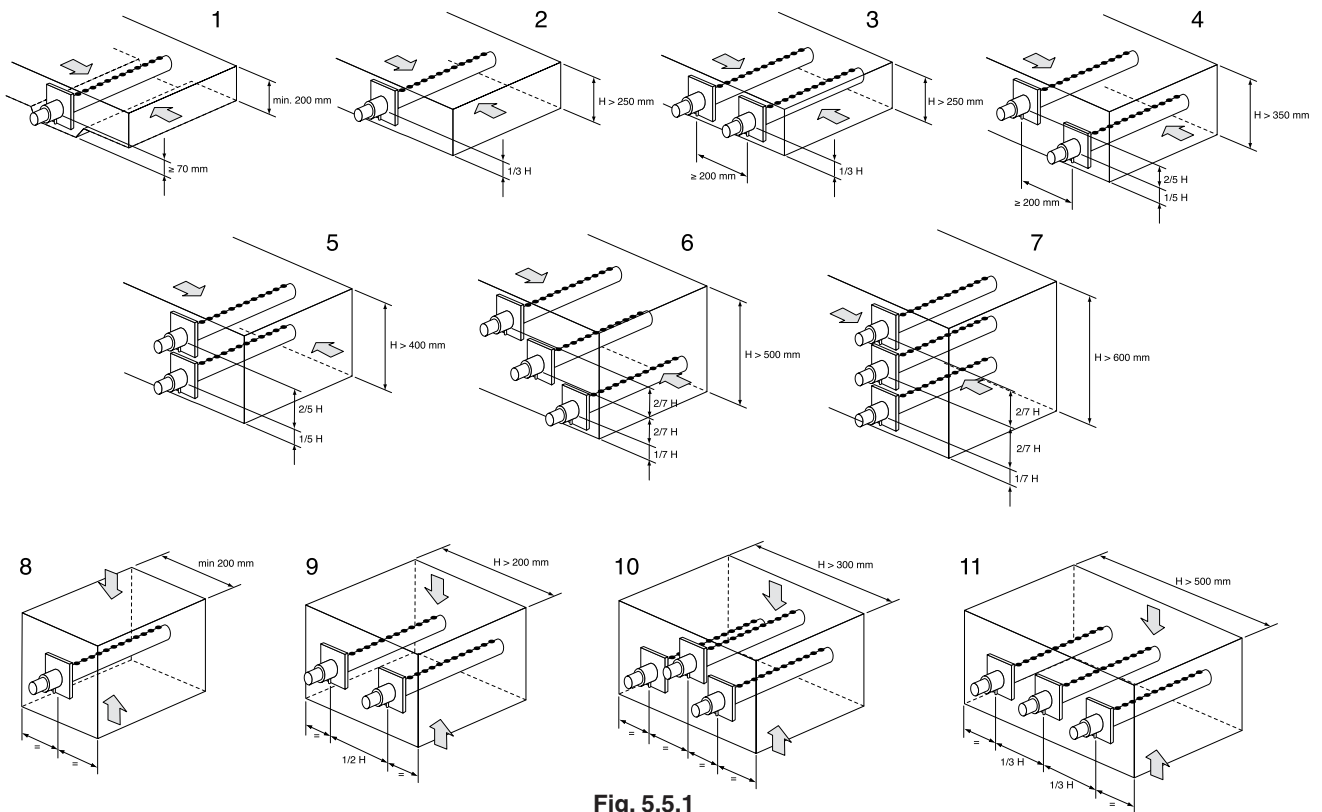


Fig. 5.5.1

5.6 Installation of the steam pipe

The humidifier must be connected to the distributor using a pipe suitable for this purpose, such as the STULZ flexible pipe. The use of unsuitable tubing may cause weakening and cracking and consequently steam leaks. The layout of the pipe must be such as to avoid the accumulation of condensate, with consequent noise (gurgling) and reduction in efficiency; the path of the pipe must exploit gravity to drain the condensed steam back to the boiler or to the distributor. Pockets or traps must thus be avoided, in that the condensate may be trapped; attention should also be paid to avoid choking the pipe due to sharp bends or twisting (see Fig. 5.6.1).

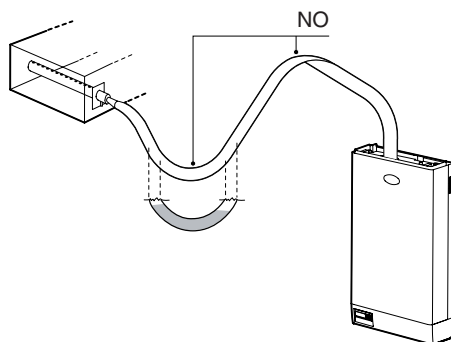


Fig. 5.6.1

Using screw clamps, tightly fasten the end of the pipe to the humidifier and steam distributor fittings, so that they do not slide off due to the effect of the temperature.

According to the position of the steam distributor, the path of the pipe may use one of two following solutions:

1. rise upwards with a vertical section of at least 300 mm, followed by a curve with a minimum radius of 300 mm and finally a downwards section with a constant gradient of no less than 5° (see Fig. 5.6.2);
2. for short paths (less than 2 metres), curves with a minimum radius of 300 mm, followed by a rising section with a gradient of no less than 20° (see Fig. 5.6.3).

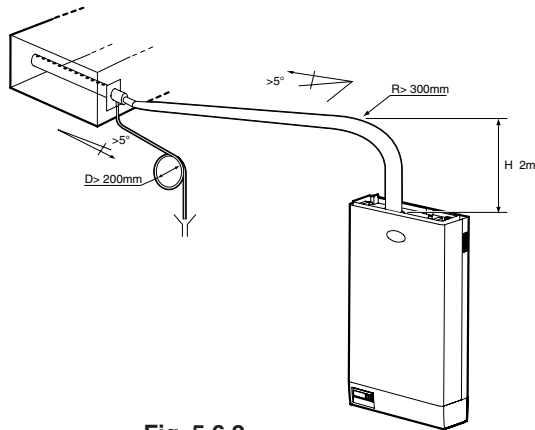


Fig. 5.6.2

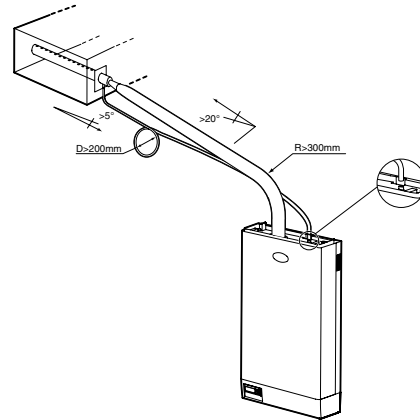


Fig. 5.6.3

IMPORTANT WARNING:

The length of the steam pipe should be less than 4 m.

5.7 Installation of the condensate return pipe

Due to the re-condensation of the steam produced, condensate forms inside the steam pipe and the distributor that must be removed to avoid gurgling and a reduction in efficiency. The condensate is drained by gravity using a flexible pipe that is suitable for the purpose. The use of unsuitable tubing may cause weakening and cracking with consequent steam leaks. To avoid the release of non-condensed steam from the condensate pipe, a drain trap must be made by looping part of the drain pipe. The end of the condensate pipe can be connected to the nearest drain pipe, with a minimum slope of 5° to assist correct downflow (see Fig.5.6.2). If the distance of the distributor allows, the pipe may be connected to fitting C, supplied, to be screwed onto the top of the humidifier, in order to drain the condensate back into in the supply tank of the boiler (see Fig. 5.6.3).

IMPORTANT WARNING:

For the unit to operate correctly, the drain trap must be filled with water before starting the humidifier.

5.8 Checks

The following conditions represent correct installation of the steam pipe:

- the position of the steam distributor complies with the instructions provided in this chapter, the steam outlet pipes are aimed upwards and the distributor has an upwards incline of at least 2°;
- the end of the pipes are fastened to the fittings using metal pipe clamps with fastening screws;
- the curves in the tubing are sufficiently wide (radius > 300 mm) so as to not cause bending or choking;
- the steam pipe has no pockets or traps for condensate to form;
- the paths of the steam and condensate pipe comply with the instructions provided in this chapter;
- the length of the steam pipe is no greater than 4 metres;
- the gradient of the steam pipe is sufficient to allow correct dragging of the condensate (> 20° for the upward sections, > 5° for the downward sections);
- the gradient of the condensate pipe is at least 5° at every point;
- the condensate pipe always follows a downwards path and features a drain trap (filled with water before starting operation) to avoid steam being released.

6 ELECTRICAL CONNECTIONS

Before making the connections, ensure that the machine is disconnected from the mains power supply.

Check that the power supply voltage of the appliance corresponds to the value indicated on the rating plate inside the electrical panel. Insert the power and ground connection cables into the electrical panel compartment using the tear-proof cable gland supplied, or through the cable gland with cable stop, and connect the ends to the terminals (see Fig. 1.2.1.1). The humidifier power line must be fitted, by the installer, with a disconnecting switch and fuses protecting against short circuits. Table 6.1.1 lists the recommended cross-sections of the power supply cable and the recommended fuse ratings; note, however, that this data is purely a guide and, in the event of non-compliance with local standards, the latter must prevail.

N.B.: To avoid unwanted interference, the power cables should be kept apart from the probe signal cables.

6.1 Power supply voltage

The following table lists the electrical data relating to the power supply of the various models and the specifications of each. Note that some models may be powered at different voltages, obviously with different power input and steam production.

power supply			nominal specifications						
base-model	Tens. ⁽¹⁾ (V - Typ)	current ⁽²⁾ (A)	TA (v. Fig. 5.1.1)		poten. ⁽²⁾ (kW)	produc. ^(2,4) (kg/h)	cable ⁽³⁾ (mm ²)	line-fuses ⁽³⁾ (A -Typ)	wiring diagram. (Fig.)
			Turns	TA RATE					
SEH011	230 - 1~N	4.9	2	20	1.12	1.5	1.5	10A / schnell	5.7.1
SEH031	230 - 1~N	9.8	1	20	2.25	3.0	2.5	16A / schnell	5.7.1
SEH033	400 - 3~	3.2	2	20	2.25	3.0	1.5	10A / schnell	5.8.1
SEH051	230 - 1~N	16.3	1	40	3.75	5.0	6.0	32A / schnell	5.7.1
SEH053	400 - 3~	5.4	1	20	3.75	5.0	1.5	10A / schnell	5.8.1
SEH083	400 - 3~	8.7	1	20	6.00	8.0	2.5	16A / schnell	5.8.1
SEH103	400 - 3~	10.8	1	20	7.5	10	2.5	16A / schnell	5.8.1
SEH153	400 - 3~	16.2	1	40	11.25	15	6.0	32A / schnell	5.8.1
SEH253	400 - 3~	27.1	1	300	18.75	25	16	50A / schnell	5.9.1
SEH353	400 - 3~	37.9	1	500	26.25	35	16	60A / schnell	5.9.1
SEH453	400 - 3~	48.7	1	500	33.75	45	25	80A / schnell	5.9.1
SEH653	400 - 3~	70.36	1	500 ⁽⁵⁾	48.75	65	35	100A / schnell	5.9.1

Tab. 6.1.1

⁽¹⁾ tolerance allowed on the rated mains voltage: -15%, +10%

⁽²⁾ tolerance on the rated values: +5%, -10% (EN 60335-1)

⁽³⁾ recommended values; referred to cables laid in closed PVC or rubber channels with a length of 20m; the standards in force must always be followed

⁽⁴⁾ instant steam production: the average steam production may be affected by external factors, such as: ambient temperature, water quality, steam distribution system

⁽⁵⁾ refer to the electrical diagram in fig. 6.11.1 - 6.12.1. The TAM measures only half of the phase current because there is only one turn wound.

Amperometric transformer configuration; the switch position on the board is shown in fig. 6.1.2 and fig. 6.1.3

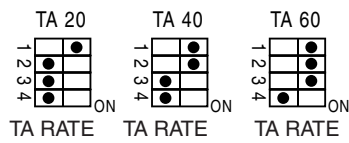
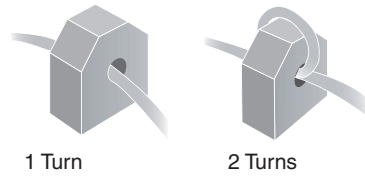


Fig. 6.1.2



1 Turn

2 Turns

EXTERNAL TAM

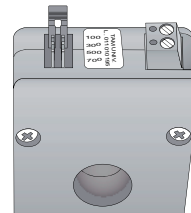
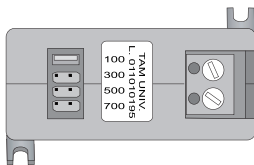


Fig. 6.1.3

6.2 Checking the voltage of the auxiliary circuit transformer

The multi-voltage auxiliary circuit transformer has two primary windings (for 230 V and 400 V) or three primary windings (for 200, 208 and 460 V) and one secondary winding (24 V). The transformer is connected and checked in the factory, according to the rated voltage. The transformer primary is protected by 10.3 x 38 mm cylindrical fuses on the disconnecting switch, with the ratings indicated in Table 10.3.1.1.

6.3 Main control board

Version H

The auxiliary connections, which depend on the model and the controller, must be made by inserting the cables from the outside into the electrical panel compartment using the smaller cable gland, located on the base of the humidifier until reaching, through the channel in the internal partition, the removable screw terminal block located on the main control board, as shown in Fig. 6.3.1 and described in the following paragraph:

1. terminal block G (dehumidification contact);
2. terminal block H (alarm contact);
3. terminal block K (manual remote DRAIN command);
4. terminal block I (control signals);
5. terminal block J (to remote terminal or supervisory system);
6. dip-switch for selecting TA RATE

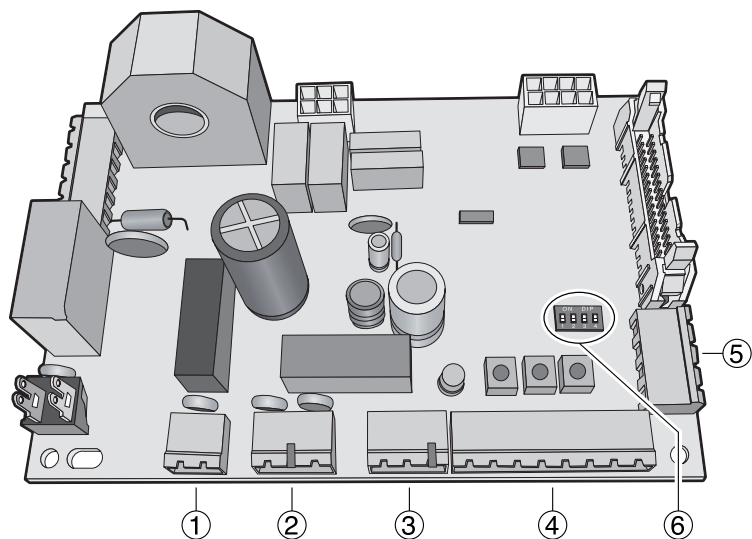


Fig. 6.3.1

For the humidifiers from 25 to 65 kg/h the electronic board without TAM is used: in its place are 2 terminals that are connected to the TAM fitted in electrical panel on the unit.

Table 6.3.1 below shows the terminal blocks and the corresponding connections (functions and electrical specifications):

termin.	function	electrical specifications
1I	outlet probe signal input	input impedance: 50 Ω if programmed for 0 to 20 mA or 4 to 20 mA 60 Ω if programmed for 0 to 1 V or 0 to 10 V or 2 to 10 V
2I	GND	
3I	\approx 32 Vdc	derived from rectifying 24 Vac; max 250 mA
4I	12 Vdc stabilised	precision \pm 5%; I _{max} = 50 mA
5I	room probe signal input or signal from the external regulator	input impedance: 50 Ω if programmed for 0 to 20 mA or 4 to 20 mA 60 Ω if programmed for 0 to 1 V or 0 to 10 V or 2 to 10 V
6I	GND	
7I 8I	remote enabling	imposes an external NO contact; R _{max} = 50 Ω ; V _{max} = 24 Vdc; I _{max} = 10 mA _{dc} ; humidifier enabled= contact closed
1H	NO alarm contact	
2H	common alarm contact	250 V; 8 A resistive; 2 A inductive
3H	NC alarm contact	
1G 2G	NO dehumidification contact	250 V; 8 A with resistive load; 2 A with inductive load
1J	\approx 28 V	derived from rectifying 24 Vac; max 250 mA
2J	L +	RS-485 standard
3J	L -	
4J	GND	
1K	remote button switch	NC contact
2K	terminal block	common contact
3K	for DRAIN control with simultaneous disabling of power supply	NO contact

Tab. 6.3.1

6.4 H controller with humidity or temperature control operation

The type H humidifiers with humidity control operation can be connected via RS485 to the STULZ Humivisor MT remote control panel or a remote supervisor. These can be controlled in the following four different ways (for further details, see chapter 2):

a) ON/OFF control

The humidifier is operated by a mechanical humidistat H, or a voltage-free remote contact CR, or alternatively by a combination of both.

The diagrams in Fig. 6.4.2 show the connections to be made on terminal block I, in the case of:

- operation controlled by a simple enabling contact;
- operation controlled by an external mechanical humidistat;
- a combination of the above.

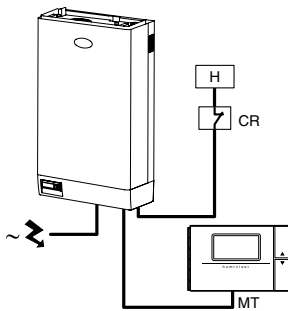


Fig. 6.4.1

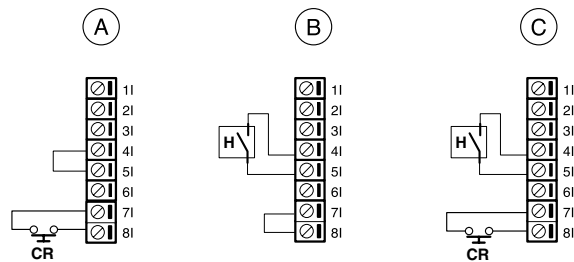


Fig. 6.4.2

b) Proportional control, with signal from an external regulator

Steam production is managed by an external regulator R, which sends the controller a humidity control signal; the controller can be set for one of the following modulating signals (see par. 8.3):

- voltage: 0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc;
- current: 0 to 20 mA; 4 to 20 mA.

The reference (zero) of the external regulator must be connected to terminal 6I on terminal block I, and the control signal to terminal 5I.

To avoid unbalanced control, the ground of the external regulator must be connected to the ground of the controller.

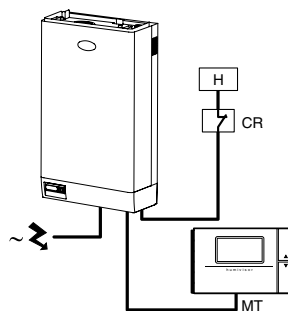


Fig. 6.4.3

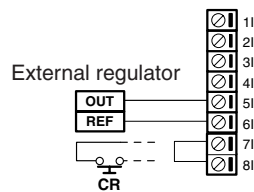


Fig. 6.4.4

c) Humidity control with room relative humidity probe (and optional outlet limiting probe)

With this configuration (see Fig. 6.4.5) the main control board, connected to a humidity probe HT, performs complete control according to the humidity measured.

An outlet humidity limiting probe can also be connected (see Fig. 6.4.6): with this configuration, typical of air handling systems, the main control board, connected to a humidity probe HT, performs complete control while limiting the steam production according to the relative humidity in the outlet duct, measured using the probe CH.

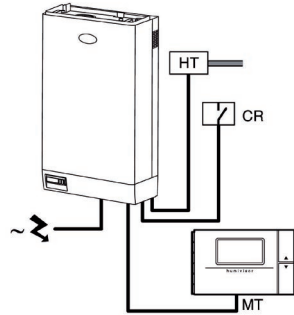


Fig. 6.4.5

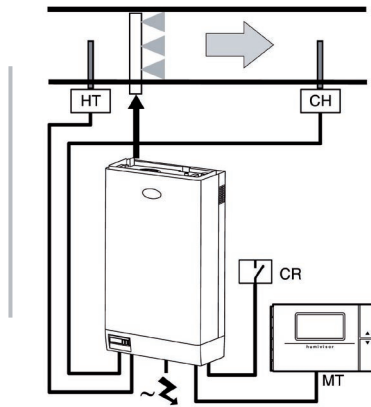


Fig. 6.4.6

The diagrams shown in Fig. 6.4.7 show the connections to be made using STULZ probes, with:

- just one relative humidity probe;
- outlet humidity limiting probe.

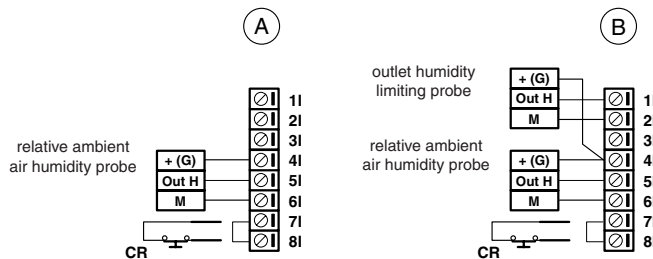


Fig. 6.4.7

d) Control for steam baths: temperature control with room temperature probe

With this configuration (see Fig. 6.4.8), the humidifier is connected to a temperature probe TT, and performs complete control according to the temperature measured inside the room. Fig. 6.4.9 shows the connection of an active probe (supply voltage 12/24 V AV). (Table 8.3.1). The control signal must be connected to terminal 5I, the reference for which (GND) is terminal 6I.

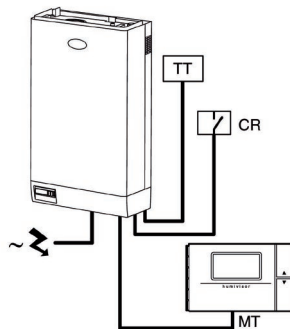


Fig. 6.4.8

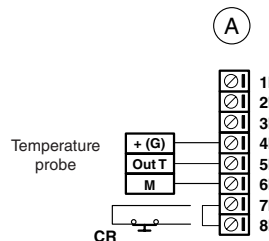


Fig. 6.4.9

6.5 Auxiliary contacts

6.5.1 Alarm contact

The humidifier controller is fitted with a voltage-free contact (changeover contact for version H, NO contact for version P) for the remote signalling of one or more faults or alarm events. Table 6.5.1.1 lists the types and the specifications of the alarm contacts for the various versions of the controllers.

control type	electrical specifications	alarm contact connection
H	250Vac; I _{max} : 8A resistive - 2A inductive	removable terminal block H, see Fig. 6.5.1.1

Tab. 6.5.1.1

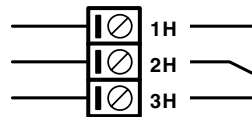


Fig 6.5.1.1

6.5.2 Dehumidification contact (H controller)

When the humidifier is used as in case c), section 6.4.3 (relative humidity control), a contact (NO, voltage-free) can be used to activate an external dehumidification device; in this case, the humidifier assumes the function of complete ambient relative humidity control. The connection to the alarm contact (250Vac; maximum load: 8 A resistive – 2 A inductive) is made using the removable terminal block G, as in Fig. 6.5.2.1. For further details, see chapter 12.



Fig 6.5.2.1

6.5.3 Remote terminal/supervisors (H controller)

The humidifier controller (version H only) can be connected to via RS485 serial line, as per the diagram in Fig. 6.5.3.1, to:

- a Humivisor remote control panel (see specific instruction manual), which can be connected to up to a four different humidifiers
- a remote supervisor.

The transmission line can extend to a maximum distance of 1000 metres between the two most distant points.

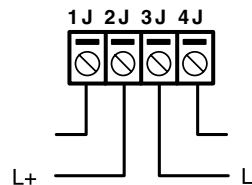


Fig 6.5.3.1

6.5.4 Using different brand probes

Different brand probes can be used, with the output signals selected by setting parameter A2 (see par. 8.3), from the following standard:

- voltage: 0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc.
- current: 0 to 20 mA; 4 to 20 m.

In addition, the min. and max. values of the signal must be set (parameters A3 and A4 for the room probe; A7 and A8 for the outlet probe).

The probes can be powered at the following voltages:

- 12 Vdc stabilised at terminal 4I;
- 28 V from the rectifying of 24Vac at terminal 3I.

The control signals must be connected:

- for the control probe HT (TT in the case of steam baths), to terminal 5I, the ground (GND) for which is terminal 6I;
- for the limit probe CH, to terminal 1I, the ground (GND) for which is terminal 2I.

IMPORTANT WARNINGS:

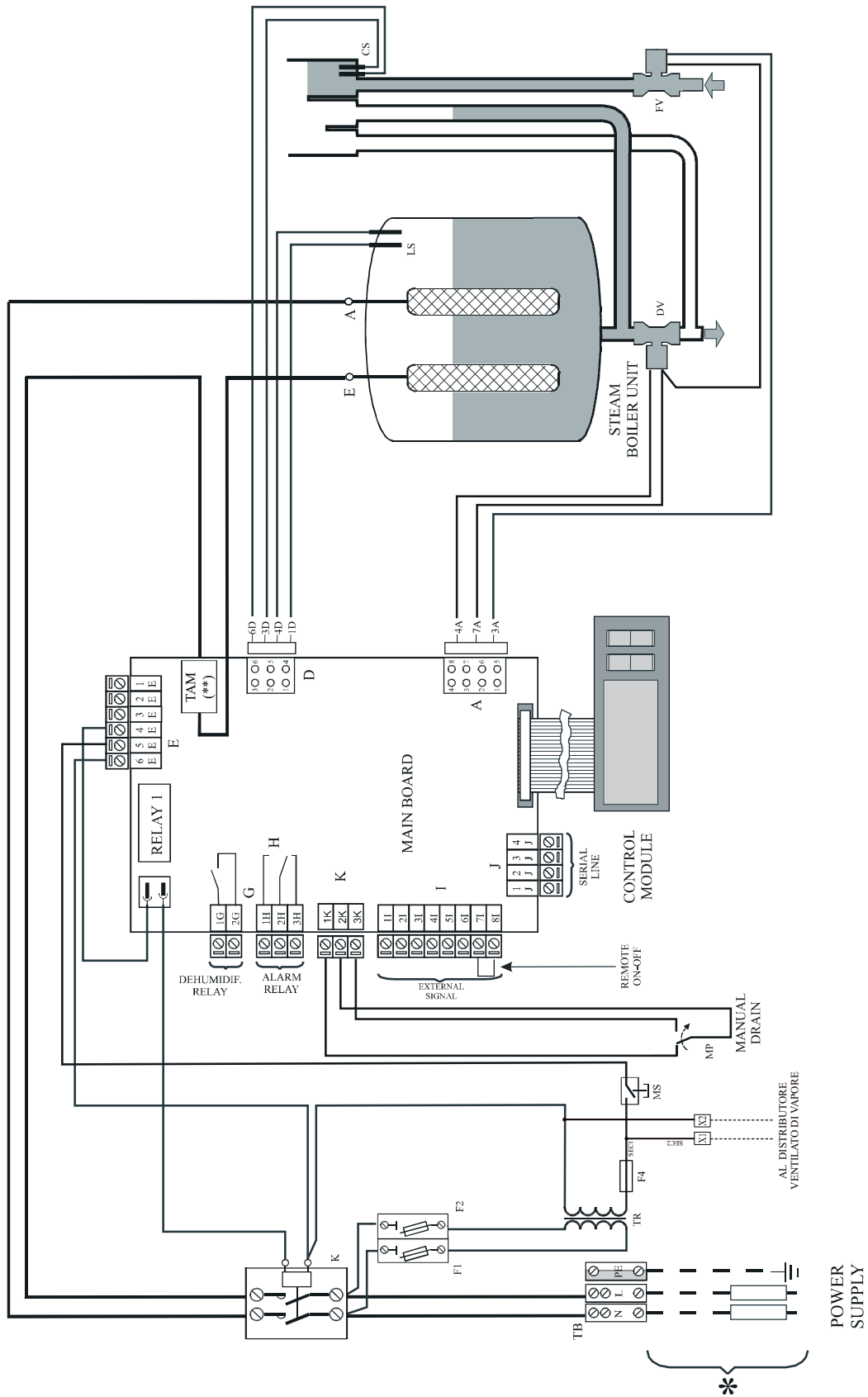
1. To avoid unbalanced control, the ground of the probes or the external regulators must be connected to the ground of the appliance's controller.
2. For the operation of the humidifier, terminals AB (for P versions) or terminals 7I and 8I (for H versions) must be connected to an enabling contact or alternatively jumpered (default solution). If these terminals are not connected, all the internal and external devices managed by the controller will be disabled, with the exception of the drain electrovalve for emptying the unit after extended periods (see chap. 12).

6.6 Checks

The following conditions represent correct electrical connection:

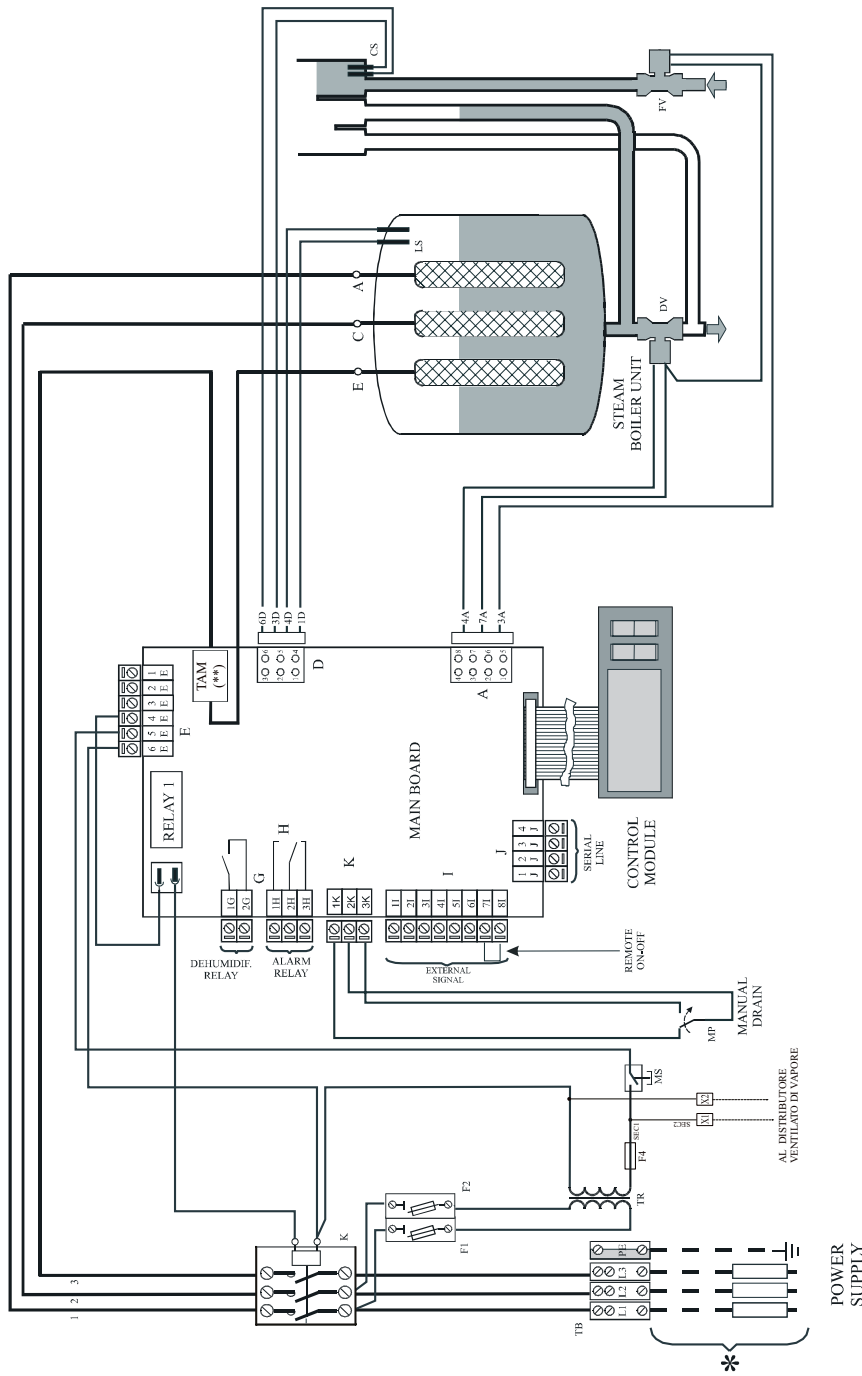
- the rated voltage of the appliance corresponds to the rated supply voltage;
- the fuses installed are suitable for the line and the power supply voltage;
- a mains disconnecting switch has been installed to disconnect power to the humidifier when required;
- the electrical connections have been performed as indicated in the diagrams;
- the power cable is fastened using the tear-proof cable gland;
- terminals 7I and 8I (version H) or terminals AB-AB (version P) are jumpered or connected to an enabling contact;
- the ground of any non-CAREL probes are connected to the controller's ground;
- if the appliance is controlled by an external regulator, the ground of the control signal is connected to the controller's ground.

6.7 Single-phase wiring diagram for 1-5 kg/h humidifiers



(**) Attention: for TAM configurations and connections see par. 6.1.1
Fig. 6.7.1 (see the key ph. 6.9)

6.8 Three-phase wiring diagram for 3-15 kg/h humidifiers



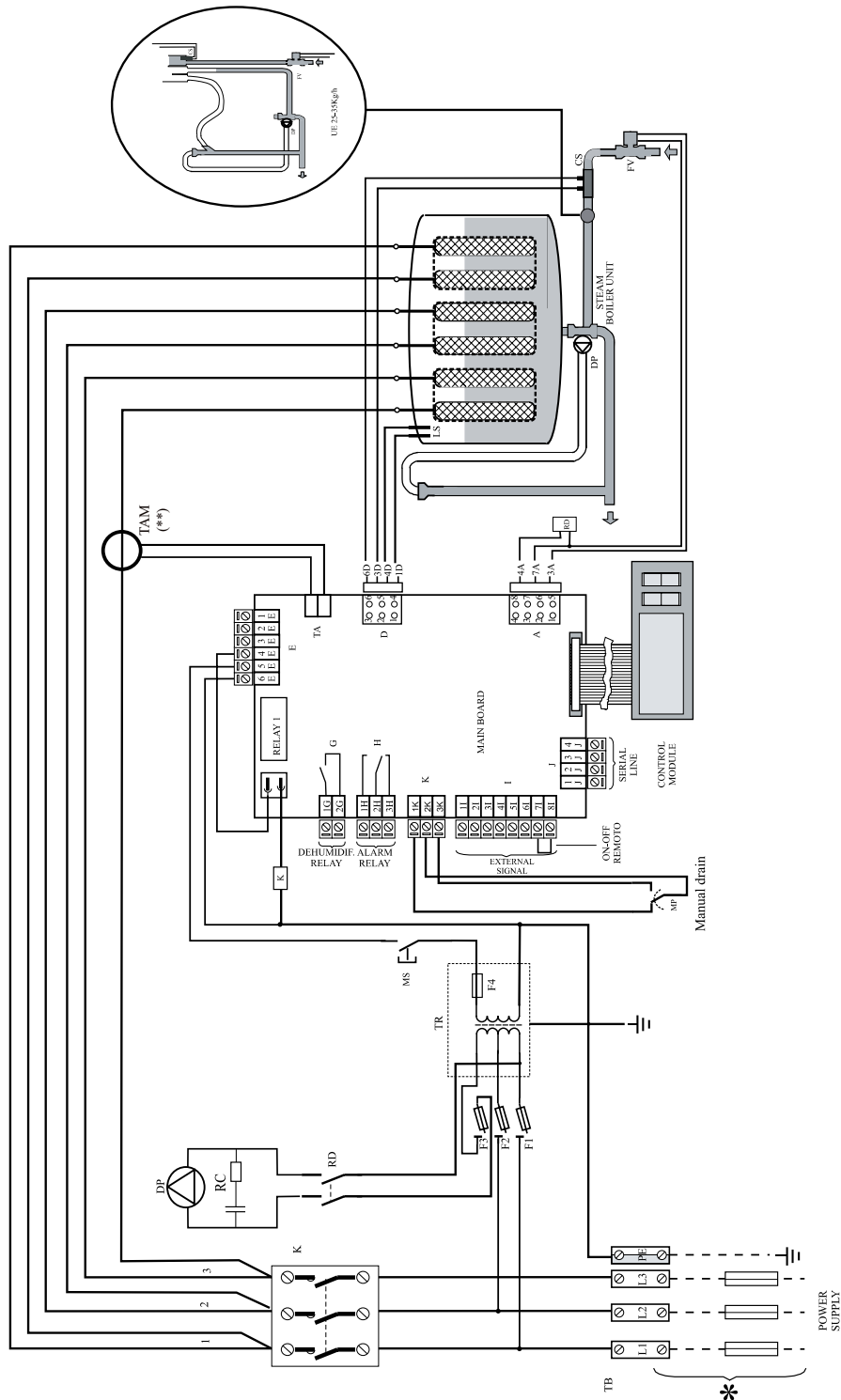
(**) Attention: for TAM configurations and connections see par. 6.1.1

Fig. 6.8.1

TB	terminal block	DV	drain valve
K	contactor	LS	high level electrodes
F1-F2	auxiliary fuses	CS	conductivity measurement electrodes
TR	transformer	MP	manual drain
MS	manual switch	TP	thermal protection
FV	fill valve		

* installer's responsibility

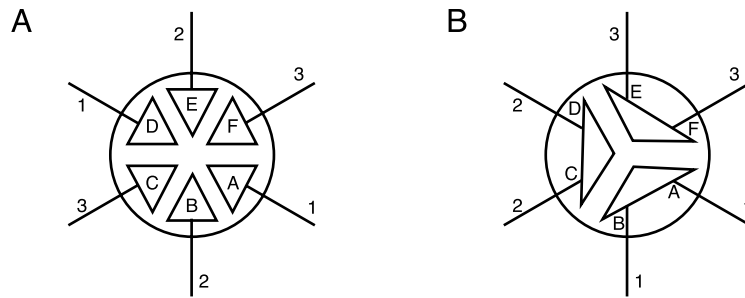
6.9 Three-phase wiring diagram for 25-65 kg/h humidifiers



(**) Attention: for TAM configurations and connections see par. 6.1.1
Fig. 6.9.1 (see the key paragraph 6.12)

TB	terminal block	DP	drain pump
K	contactor	LS	high level electrodes
F1-F2-F3	auxiliary fuses	CS	conductivity measurement electrodes
TAM	external TAM	RD	pump control relay
TR	transformer	MP	manual drain
MS	manual switch	RC	filter
FV	fill valve		
F4	auxiliar fuse		

6.10 Three-phase 25-65 kg/h boiler configuration



production (kg/h)	conductivity ($\mu\text{S/cm}$)	power supply (V)
25	125/350 $\mu\text{S/cm}$	400
	350/1250 $\mu\text{S/cm}$	B
35	125/350 $\mu\text{S/cm}$	B
	350/1250 $\mu\text{S/cm}$	B
45	125/350 $\mu\text{S/cm}$	A
	350/1250 $\mu\text{S/cm}$	B
65	125/350 $\mu\text{S/cm}$	A
	350/1250 $\mu\text{S/cm}$	B

Tab. 6.10.1

The fastening of the cable terminal with the higher nut must be performed with a force of 3 Newton.

7 START-UP, CONTROL AND SHUT-DOWN

IMPORTANT WARNINGS:

1. Before starting check that the humidifier is in perfect condition, that there are no water leaks and that the electrical parts are dry;
2. do not connect power if the appliance is damaged or even partially wet!

When installation is completed, flush the supply pipe for around 30 minutes by piping water directly into the drain, without sending it into the humidifier; this will eliminate any scale or processing residues that may cause foam when boiling.

7.1 Preliminary checks

Before starting the humidifier, the following should be checked:

- the water, electrical and steam distribution connections have been made according to the instructions contained herein;
- the water shut-off tap to the humidifier is open;
- the power fuses are installed and intact;
- the terminals 7I-8I or alternatively AB are jumpered or connected to the remote ON/OFF contact and the latter is closed;
- the steam pipe is not choked;
- in case of humidification in ducts, the operation of the humidifier is slaved to the operation of the air fan (instead of or in series with the remote ON/OFF contact);
- the condensate return pipe from the distributor is installed and free to drain;
- the drain pipe is correctly connected and free.

7.2 Starting the unit

7.2.1 Starting with a new cylinder

When starting the unit with a new cylinder (for example, starting the machine for the first time, or after replacing the cylinder), the automatic Cylinder Cleaning procedure should be activated (available only on models with type H control). This procedure:

1. opens the fill electrovalve and drain electrovalve at the same time (the electrodes are not powered), for around 10 minutes; this initial phase cleans the pipe for any impurities that may generate foam;
2. fills and subsequently empties the cylinder three times; this phase cleans the inside walls of the cylinder for any residual impurities that may generate foam; the cylinder is filled with the electrodes powered, as hot water improves cleaning.

The “cylinder cleaning” procedure can be activated after the start-up sequence when the humidifier is switched on (see par. 7.2.3), by pressing the SEL and ▼ buttons together for at least two seconds; the start of the procedure is confirmed by the code “PC” flashing periodically on the display.

The procedure can be stopped by pressing the SEL and arrow buttons ▼ again for at least two seconds.

At the end of the procedure, the code will no longer be displayed and the machine will be ready to start production.

7.2.2 Starting with an empty cylinder

When starting the unit with the cylinder empty, a significant period must pass (which, depending greatly on the conductivity of the supply water, may even be a number of hours) before the rated production is reached. In fact, to achieve a level of current sufficient to produce the rated thermal power, the salinity and thus the conductivity of the water must reach a sufficient level. This is due to the effect of the concentration of salts resulting from the repeated evaporation and filling with water. This obviously does not occur if the machine is started with cylinder containing water that already has a sufficient level of conductivity.

7.2.3 Start procedure

Figs. 7.2.3.1 and 7.2.3.2 show the electrical controls located on the lower right of the frame of the structure.

I – 0 switch: start. Arrow button “▼”: drain. After having powered the humidifier, switch the appliance by placing the rocker switch located next to the drain button in the lower right on the frame of the structure in position I.

The start-up sequence is thus initiated, which includes an initial phase followed by the actual operating phase.

The start-up sequence is highlighted by the lighting up of the LEDs on the control panel, as described in the following chapter.



Fig. 7.2.3.1

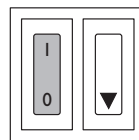


Fig. 7.2.3.2

7.2.4 Starting with an empty cylinder

The water contained in the cylinder can be drained manually by pressing the DRAIN button marked with the arrow (see Fig. 7.2.3.2). On releasing the button, if request for humidification persists, the controller will start production, filling with water if necessary.

7.3 The humidifier controller

The following type of electric controller is available for the immersed electrode humidifier:

• **Type H, with numeric LED display, on/off, proportional or probe-controlled operation.**

This type of controller allows the complete control of steam production, including the possibility of activating the dehumidification function (H configuration); it accepts signals from room probes or external electronic regulators with proportional or ON/OFF operation.

H controller, with numeric display LED, humidity control operation

7.3.1 Front panel

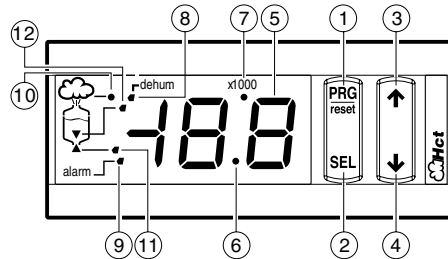


Fig. 7.3.1.1

n. description

1	button for accessing the most frequent operating parameters (codes Px, dx); also acts as an alarm relay reset button (if the alarm is no longer active)
2	displays the unit of measure of the value shown on the display; pressed for 2 seconds accesses the display/programming of the set point; if pressed together with button 1 for 5 seconds, accesses the routine for programming the configuration parameters
3	when pressed, displays the value measured by the main probe (in ON/OFF control, nothing is displayed); in programming mode increases the value or moves to the previous parameter
4	when pressed, displays the value measured by the compensation probe (only if featured); in programming mode decreases the value or moves to the following parameter
5	2 1/2 digit display indicating the numeric values and the codes of any alarms in progress; in programming mode shows the codes of the parameters and their values
6	LED representing the decimal point
7	LED representing that the value indicated on the display should be multiplied by one thousand
8	LED indicating the activation of the dehumidification relays
9	Flashing LED indicating the activation of the alarm relay
10	LED indicating steam production in progress; if flashing, indicates that production is lower than required
11	LED indicating the operation of the fill electrovalve
12	LED indicating the operation of the drain electrovalve

Tab. 7.3.1.1

7.3.2 Start-up sequence

When the humidifier is started, the following sequence occurs, as highlighted by the lighting up of the LEDs.

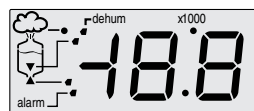


Fig. 7.3.2.1

1 - POWER ON

In this phase, which lasts around one second, all the LEDs on the display light up.

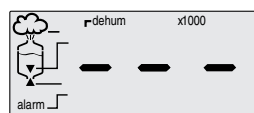


Fig. 7.3.2.2

2 - INITIALISATION

This phase lasts 4 seconds. The LEDs shown here light up on the display.

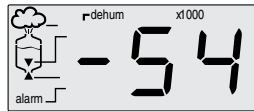


Fig. 7.3.2.3

3 - OPERATING

The humidifier starts operation and the controller indicates (see chap. 11) one of the following options:

- the steam production (in %) with slave control;
- the measurement of the main transducer with autonomous control;
- in the event where the humidifier is disabled, the segments -- to the right light up, alternating.

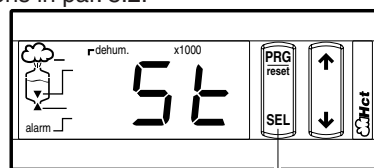
In the event where an alarm is in progress, the LED next to the ALARM marking lights up and the display shows the corresponding code.

7.3.3 Display

On start-up all the LEDs and the segments of the digits come on for 1 second, then, once the initial waiting phase has ended, indicated by --- the value of parameter C0 is displayed (in the event where the remote control is OFF, the symbol -- is also displayed, alternating). The following functions are active:

- Pressing the SEL button displays the unit of measure of the currently displayed value for 1 second.
- Holding the ▲ button displays the measurement of probe 1, preceded, for 1 second, by the unit of measure. This is valid even if the probe is not connected.
- Holding the ▼ button displays the measurement of probe 2, preceded, for 1 second, by the unit of measure. This is valid even if the probe is not connected. In the event of an alarm, the PRG button resets the alarm signal (if the cause of the alarm has been removed).

Furthermore, the frequently-used functional parameters can also be displayed, that is those more commonly used by the appliance: To do this, follow the instructions in par. 8.2.



press for around 2 seconds

Fig. 7.3.3.1

7.3.4 Changing the set point

To change the set point (main control setting), follow the instructions in par. 8.1.

7.3.5 Alarm indication

In the event of an alarm state, LED 9 (see Fig. 7.3.1.1) starts flashing, while the display shows the alphanumeric alarm code, alternating every 2 seconds with the programmed value of the operating parameter.

If more than one alarm is indicated, the display shows all the corresponding codes in sequence, at 2 second intervals.

At the same time, the controller activates the alarm relay (see par. 6.5.1). To interpret the type of alarm, refer to chap. 11. The controller will continue to indicate the alarm state (even if it is no longer active) until the reset button is pressed; still active alarm states can not be reset.

7.3.6 Manual drain function

As well as the drain button (see Fig. 7.2.3.2), the type H controller also features a manual drain function that is activated during the operating phase (following the start-up sequence), with the following procedure:

1. press the ▲ and ▼ and buttons together for at least 2 s;
2. after 2 seconds, the drain electrovalve is activated, and the display shows the message "dr".
3. the cylinder is completely emptied, after which the controller returns to normal operation.

The procedure can be stopped at any time by pressing the ▲ and ▼ buttons together again for 2 seconds.

7.4 Shut-down

During seasonal shut-down or alternatively shut-down for maintenance of the electrical parts and/or the plumbing, the humidifier should be placed out-of-service.

NOTE:

The water cylinder should be emptied before shutting down the humidifier, to prevent corrosion of the electrodes.

Follow the instructions below:

- open the mains power switch to the humidifier;
- open the rocker switch located in the lower right on the frame of the structure, placing it in position 0 (see Figs. 7.2.3.2 and 7.4.1) and checking that the display is off;
- close the water shut-off tap to the humidifier.

If during a shut-down the cylinder needs to be emptied, before disconnecting power from the unit press the drain button (see Fig. 7.2.3.2), to open the drain electrovalve, and hold it manually in this position until the water has been completely emptied.

In the event of malfunction of the drain electrovalve, the cylinder can be emptied manually by removing it from the connection manifold and slowly pouring the water into the bottom collection tank.

For the humidifiers 25 to 65kg/h, use the manual drain device on the manifold, (see fig. 7.4.2) drawing it until it makes a release.



Fig. 7.4.1

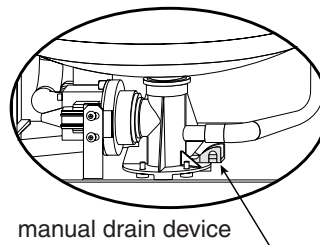


Fig. 7.4.2

8 CONTROLLER H PARAMETERS

The numerical, configuration and control parameters are grouped into three levels:

1. **LEVEL 1** – set point, that is, the value of the appliance's main setting St , accessible directly via the keypad for both reading and modification.
2. **LEVEL 2** – control parameters and measurements, that is, the physical values measured and the operating parameters involving the control of the humidification process; these too can be accessed directly via the keypad for reading and modification.
3. **LEVEL 3** – configuration parameters consisting of the data needed to customise the controller, according to the requirements of the humidifier. These parameters can be accessed only by password, to prevent the unwanted modification of the configuration and thus the humidifier's essential functions.

Each parameter is composed as follows:

code	alphanumeric symbol appearing on the display corresponding to the parameter in question
range of variation	limit values within which the parameter can be modified
default	value set in the factory for the parameter
unit of measure	symbol displayed showing the unit of measure used for the parameter

Tab. 8.1

8.1 Reading and setting the ambient humidity set point

To read and/or change the ambient humidity set point (main setting), proceed as follows:

- press the SEL button for around 2 seconds, until St appears;
- on releasing the button, the unit of measure of the set point is displayed for 1 second, and finally the current set value;
- to change the set point, press the ▲ and ▼ buttons, checking that the action is being performed on the display;
- press the SEL or PRG button to confirm the value displayed and conclude the program. of the set point.

The characteristics and the range of variation of the set point are listed in Table 8.1.1.

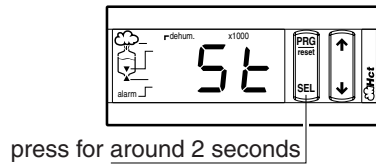


Fig. 8.1.1

	unit of measure	default value ⁽¹⁾	minimum limit	maximum limit
humidity control (A0= 2 or 3)	%H.R.	50	0	P7
temperature control (A0= 4)	°C	30	0	50

Tab. 8.1.1

⁽¹⁾: when accessing parameter A0, parameters P2, P3, P7 and St are automatically reset to the corresponding default value

WARNING: The outlet humidity set point is saved by parameter P7 (see the following paragraph).

8.2 Reading and setting the control parameters – reading the measurements

The control parameters represent the values relating to the process of ambient humidity (or temper.) control and are identified by a code ranging between P0 and P9, according to the criteria described in Table 8.2.1. The readings are on the other hand the physical values measured by the transducers connected to the control, depending on the model and the setting of the humidifier, and the number of operating hours since the previous reset; the measurements are identified by a code ranging between d1 and d9 (see Tab. 8.2.2).

Control parameters

code display	range of variation	def.	unit of meas.	description	
P0	20, ..., 100	70	%	maximum steam production of SEH humidifier	
P1	2.0, ..., 19.9	5.0	r.F., °C	humidification differential	accessible only in control mode (A0=2, 3 or 4)
P2 ⁽¹⁾	(P3), ..., 100	100	r.F.,	high humidity or high	
	(P3), ..., 60	60	°C	temperature alarm threshold	
P3 ⁽¹⁾	0, ..., (P2)	0	r.F., °C	low humidity/temp. alarm threshold	
P4	0*, ..., 100	1	Min.	alarm delay (0* = 30 s)	
P5	2, ..., 100	10	r.F.	dehumidification dead zone	accessible only with the dehumidification function enabled
P6	2.0, ..., 19.9	5.0	r.F.	dehumidification differential	(b 1 odd number) in humidity control mode (A0 = 2 or 3)
P7 ⁽¹⁾	(St), ..., 100	100	r.F.	outlet set point	accessible only with outlet limiting control (A0=3)
P8	2.0, ..., 19.9	5.0	r.F.	outlet differential in	
P9	0, ..., 100	100	r.F.	high outlet alarm threshold	

Tab. 8.2.1

To display the control parameters and the measurements, proceed as follows:

1. press the PRG button for around 5 seconds until the code P0 appears, representing the first parameter (see Fig. 8.2.1);
2. press the ▲ or ▼, button to scroll cyclically through the Px and dx parameters, including the set point;
3. press the SEL button to display the value of the selected parameter;,- the unit of measure of the parameter is displayed for 1 second;
4. press the buttons ▲ and ▼, to modify the value;
5. press the SEL button to temporarily confirm the value displayed: the ID code of the selected parameter will be displayed again;
6. press the PRG button to conclude the programming phase.

Note: The modifications are confirmed only by pressing the PRG button. For further details, see paragraph 8.4.

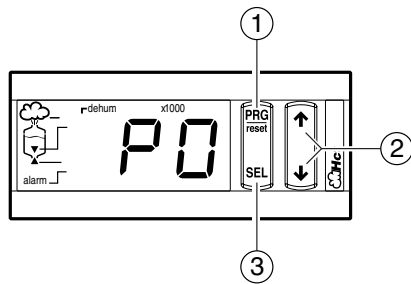


Fig. 8.2.1

Key:

1. press PRG for 5 seconds until P0 is displayed;
2. press repeatedly to scroll to the desired parameter;
3. press SEL to display the desired parameter.

List of measurements description

code display	range of variation	def.	unit of meas.	description	
d1 ⁽²⁾	0.0, ..., 199	read	r.F., °C, %	meas. signal from exter. regulator	not accessible in ON/OFF mode (A0=0)
d2	0.0, ..., 199	only	r.F.,	measurement from probe 2	accessible only with outlet limiting control (A0=3)
d3	0.0, ..., 199		kg/h	steam production (instant value)	
d4	0, ..., 19k9		h	hour counter	
d5	0, ..., 1k5		µS/cm	supply water conductivity	
d6	0.0, ..., 199		A	current	
d9	0.0, ..., 199		kg/h	rated steam production	

Tab. 8.2.2

⁽¹⁾ when accessing parameter A0, parameters P2, P3, P7 and St are automatically reset to the corresponding default value

⁽²⁾ in proportional operation (A0=1), d1 expresses the % of the control signal (see A0 and A2 in Tab. 8.3.1)

8.3 Reading and setting the configuration parameters

The configuration parameters are used to set the operating mode of the controller, that is, to assign the humidifier's essential functions.

The configuration parameters are divided into three groups:

- **Parameters for configuring standard operation** (operating mode and types of probes), identified by codes from A0 to A9: see table 8.3.1.
- **Parameters for configuring the operation of accessory devices**, identified by codes from b0 to b8: see table 8.3.2.
- **Parameters for the setting the serial connections and remote control**, identified by codes from C0 to C7: see table 8.3.4.

These parameters can be accessed only by password to prevent the unwanted modification of the configuration.

To read or modify the configuration parameters, proceed as follows:

1. press the SEL and PRG buttons at the same time until 00 is displayed, prompting the password (around 5 seconds);
2. press repeatedly the ▲ or ▼ buttons to scroll to the value of the password, 77;
3. press the SEL button to confirm the password. If the password is not correct, the function is terminated, otherwise A0 is displayed;
4. press the ▲ or ▼ buttons to cyclically scroll through the parameters (keeping the buttons pressed progressively increases the scrolling speed);
5. press the SEL button to display the value of the desired parameter (the unit of measure of the parameter is displayed for 1 second);
6. press the ▲ or ▼ buttons to modify the value (keeping the buttons pressed progressively increases the scrolling speed);
7. press the SEL button to confirm the value displayed. The ID code of the selected parameter is displayed again; modify, if necessary, any other parameters by repeating steps 4-5-6-7;
8. press the PRG button to permanently save the changes and end the programming phase.

Note: The modifications are confirmed only by pressing the PRG button. For further details, see paragraph 8.4.

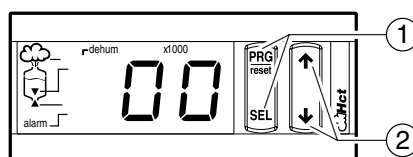


Fig. 8.3.1

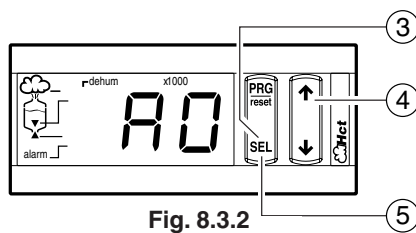


Fig. 8.3.2

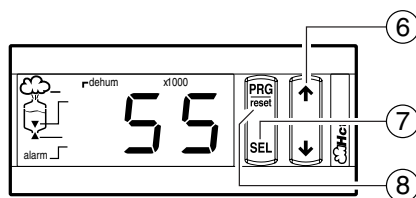


Fig. 8.3.3

Parameters for configuring standard operation

code display	range of variation	def.	unit of meas.	description	
A0 ⁽¹⁾	0, ..., 4	2		operating mode	0= ON/OFF control 1= proportional 2= humidity control 3= humidity control with outlet limiting 4= steam baths
A1	0, 1	0		unit of measure	0= °C, kg/h 1= °F, Pfd /h
A2	0, ..., 4	0		type of room probe; not accessible in ON/OFF mode (A0=0)	0= 0/1 V; 1= 0/10 V; 2= 2/10 V; 3= 0/20 mA 4= 4/20 mA
A3 ⁽²⁾	0, ..., (A4)	0	rH, °C	room probe minimum	accessible only in control mode (A0=2, 3 or 4)
A4 ⁽²⁾	(A3), ..., 255	100	rH, °C	room probe maximum	
A5	-10.0, ..., 10.0	0	rH, °C	room probe offset	
A6	0, ..., 4	0		type of outlet probe; accessible only in humidity control with	0= 0/1 V; 1= 0/10 V; 2= 2/10 V; 3= 0/20 mA 4= 4/20 mA
				type of outlet probe; accessible only in humidity control with outlet limiting (A0= 3)	
A7	0, ..., (A8)	0	rH	outlet probe minimum	accessible only in humidity control with outlet limiting, (A0= 3)
A8	(A7), ..., 100	100	rH	outlet probe maximum	
A9	-10.0, ..., 10.0	0	rH	offset	

Tab. 8.3.1

⁽¹⁾ by updating parameter A0, parameters P2, P3, P7 and St are automatically reset to the corresponding default value

⁽²⁾ see WARNING to the side of Fig. 8.1

Parameters for configuring the operation of accessory devices

code display	range of variation	def.	unit of meas.	description	
b1	0, ..., 127	0		see Tab. 8.3.3	
b2	0, ..., 120	0	s	shut-down delay time	
b3	-10.0, ..., 10.0	0.0	%	current measurement gain	
b4	0, ..., 199	0	µS/cm	water conductivity (0=automatic measurement)	
	0k2, ..., 2k0				
b5	0, ..., 199	1k5	µS/cm	conductivity pre-alarm threshold	
	0k2, ..., 2k0				
b6	0, ..., 199	2k0	µS/cm	conductivity alarm threshold	
	0k2, ..., 2k0				
b7	0, ..., 100	50	%	foam detection threshold (0=exclude foam detect, 1=max sens., 100=min sens.)	
b8	50, ..., 200	100	%	internal conductivity reached by the cylinder in stable conditions against rated value	
b9	50, ..., 200	100	%	adjust the duration of the drain for dilution	
bb	0*, ..., 4000	1500	h	cylinder maintenance limit time (in hours)	
				0*= excluding life alarm "Cy" and the obligatory maintenance alarm "Mn" 100 hour step if bb > 199 hours, hour step if bb < 199 hours	
bE	1, ..., 120	24	h	time limit between two periodical drain cycles	accessible only if periodical draining is enabled (weight 64 in "b1")
bF	1, ..., 199	3	days	days to wait to drain due to inactivity	not accessible if draining due to inactivity is disabled, weight 8 in "b1"

Tab. 8.3.2

STULZ SupraSteam® - Parameters b 1

FUNCTIONS

b1	DE-HUMIDIFICATION REQUEST	DILUTION DRAIN WITH CONTACTOR ...	DRAIN WHEN NEW DEMAND <= 2/3 CURRENT DEMAND (CONTACTOR OPENED)	TOTAL DRAIN FOR INACTIVITY	DISPLAY OF WARNINGS "CL" & "CP"	ALARM RELAY ACTIVATED WHEN ...	TOTAL PERIODICAL DRAIN
DEF0	OFF	OPEN	YES	ON, depending on bF	ON	ALARMS PRESENT	OFF
1	ON	OPEN	YES	ON, depending on bF	ON	ALARMS PRESENT	OFF
2	OFF	CLOSED	YES	ON, depending on bF	ON	ALARMS PRESENT	OFF
3	ON	CLOSED	YES	ON, depending on bF	ON	ALARMS PRESENT	OFF
4	OFF	OPEN	NO	ON, depending on bF	ON	ALARMS PRESENT	OFF
5	ON	OPEN	NO	ON, depending on bF	ON	ALARMS PRESENT	OFF
6	OFF	CLOSED	NO	ON, depending on bF	ON	ALARMS PRESENT	OFF
7	ON	CLOSED	NO	ON, depending on bF	ON	ALARMS PRESENT	OFF
8	OFF	OPEN	YES	OFF	ON	ALARMS PRESENT	OFF
9	ON	OPEN	YES	OFF	ON	ALARMS PRESENT	OFF
10	OFF	CLOSED	YES	OFF	ON	ALARMS PRESENT	OFF
11	ON	CLOSED	YES	OFF	ON	ALARMS PRESENT	OFF
12	OFF	OPEN	NO	OFF	ON	ALARMS PRESENT	OFF
13	ON	OPEN	NO	OFF	ON	ALARMS PRESENT	OFF
14	OFF	CLOSED	NO	OFF	ON	ALARMS PRESENT	OFF
15	ON	CLOSED	NO	OFF	ON	ALARMS PRESENT	OFF
16	OFF	OPEN	YES	ON, depending on bF	OFF	ALARMS PRESENT	OFF
17	ON	OPEN	YES	ON, depending on bF	OFF	ALARMS PRESENT	OFF
18	OFF	CLOSED	YES	ON, depending on bF	OFF	ALARMS PRESENT	OFF
19	ON	CLOSED	YES	ON, depending on bF	OFF	ALARMS PRESENT	OFF
20	OFF	OPEN	NO	ON, depending on bF	OFF	ALARMS PRESENT	OFF
21	ON	OPEN	NO	ON, depending on bF	OFF	ALARMS PRESENT	OFF
22	OFF	CLOSED	NO	ON, depending on bF	OFF	ALARMS PRESENT	OFF
23	ON	CLOSED	NO	ON, depending on bF	OFF	ALARMS PRESENT	OFF
24	OFF	OPEN	YES	OFF	OFF	ALARMS PRESENT	OFF
25	ON	OPEN	YES	OFF	OFF	ALARMS PRESENT	OFF
26	OFF	CLOSED	YES	OFF	OFF	ALARMS PRESENT	OFF
27	ON	CLOSED	YES	OFF	OFF	ALARMS PRESENT	OFF
28	OFF	OPEN	NO	OFF	OFF	ALARMS PRESENT	OFF
29	ON	OPEN	NO	OFF	OFF	ALARMS PRESENT	OFF
30	OFF	CLOSED	NO	OFF	OFF	ALARMS PRESENT	OFF
31	ON	CLOSED	NO	OFF	OFF	ALARMS PRESENT	OFF
32	OFF	OPEN	YES	ON, depending on bF	ON	ALARMS ABSENT	OFF
33	ON	OPEN	YES	ON, depending on bF	ON	ALARMS ABSENT	OFF
34	OFF	CLOSED	YES	ON, depending on bF	ON	ALARMS ABSENT	OFF
35	ON	CLOSED	YES	ON, depending on bF	ON	ALARMS ABSENT	OFF
36	OFF	OPEN	NO	ON, depending on bF	ON	ALARMS ABSENT	OFF
37	ON	OPEN	NO	ON, depending on bF	ON	ALARMS ABSENT	OFF
38	OFF	CLOSED	NO	ON, depending on bF	ON	ALARMS ABSENT	OFF
39	ON	CLOSED	NO	ON, depending on bF	ON	ALARMS ABSENT	OFF
40	OFF	OPEN	YES	OFF	ON	ALARMS ABSENT	OFF
41	ON	OPEN	YES	OFF	ON	ALARMS ABSENT	OFF
42	OFF	CLOSED	YES	OFF	ON	ALARMS ABSENT	OFF

b1	DE-HUMIDIFICATION REQUEST	DILUTION DRAIN WITH CONTACTOR ...	DRAIN WHEN NEW DEMAND <= 2/3 CURRENT DEMAND (CONTACTOR OPENED)	TOTAL DRAIN FOR INACTIVITY	DISPLAY OF WARNINGS "CL" & "CP"	ALARM RELAY ACTIVATED WHEN ...	TOTAL PERIODICAL DRAIN
42	OFF	CLOSED	YES	OFF	ON	ALARMS ABSENT	OFF
43	ON	CLOSED	YES	OFF	ON	ALARMS ABSENT	OFF
44	OFF	OPEN	NO	OFF	ON	ALARMS ABSENT	OFF
45	ON	OPEN	NO	OFF	ON	ALARMS ABSENT	OFF
46	OFF	CLOSED	NO	OFF	ON	ALARMS ABSENT	OFF
47	ON	CLOSED	NO	OFF	ON	ALARMS ABSENT	OFF
48	OFF	OPEN	YES	ON, depending on bF	OFF	ALARMS ABSENT	OFF
49	ON	OPEN	YES	ON, depending on bF	OFF	ALARMS ABSENT	OFF
50	OFF	CLOSED	YES	ON, depending on bF	OFF	ALARMS ABSENT	OFF
51	ON	CLOSED	YES	ON, depending on bF	OFF	ALARMS ABSENT	OFF
52	OFF	OPEN	NO	ON, depending on bF	OFF	ALARMS ABSENT	OFF
53	ON	OPEN	NO	ON, depending on bF	OFF	ALARMS ABSENT	OFF
54	OFF	CLOSED	NO	ON, depending on bF	OFF	ALARMS ABSENT	OFF
55	ON	CLOSED	NO	ON, depending on bF	OFF	ALARMS ABSENT	OFF
56	OFF	OPEN	YES	OFF	OFF	ALARMS ABSENT	OFF
57	ON	OPEN	YES	OFF	OFF	ALARMS ABSENT	OFF
58	OFF	CLOSED	YES	OFF	OFF	ALARMS ABSENT	OFF
59	ON	CLOSED	YES	OFF	OFF	ALARMS ABSENT	OFF
60	OFF	OPEN	NO	OFF	OFF	ALARMS ABSENT	OFF
61	ON	OPEN	NO	OFF	OFF	ALARMS ABSENT	OFF
62	OFF	CLOSED	NO	OFF	OFF	ALARMS ABSENT	OFF
63	ON	CLOSED	NO	OFF	OFF	ALARMS ABSENT	OFF
64	OFF	OPEN	YES	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
65	ON	OPEN	YES	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
66	OFF	CLOSED	YES	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
67	ON	CLOSED	YES	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
68	OFF	OPEN	NO	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
69	ON	OPEN	NO	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
70	OFF	CLOSED	NO	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
71	ON	CLOSED	NO	ON, depending on bF	ON	ALARMS PRESENT	ON, depending on bE
72	OFF	OPEN	YES	OFF	ON	ALARMS PRESENT	ON, depending on bE
73	ON	OPEN	YES	OFF	ON	ALARMS PRESENT	ON, depending on bE
74	OFF	CLOSED	YES	OFF	ON	ALARMS PRESENT	ON, depending on bE
75	ON	CLOSED	YES	OFF	ON	ALARMS PRESENT	ON, depending on bE
76	OFF	OPEN	NO	OFF	ON	ALARMS PRESENT	ON, depending on bE
77	ON	OPEN	NO	OFF	ON	ALARMS PRESENT	ON, depending on bE
78	OFF	CLOSED	NO	OFF	ON	ALARMS PRESENT	ON, depending on bE
79	ON	CLOSED	NO	OFF	ON	ALARMS PRESENT	ON, depending on bE
80	OFF	OPEN	YES	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
81	ON	OPEN	YES	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
82	OFF	CLOSED	YES	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
83	ON	CLOSED	YES	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
84	OFF	OPEN	NO	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
85	ON	OPEN	NO	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
86	OFF	CLOSED	NO	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
87	ON	CLOSED	NO	ON, depending on bF	OFF	ALARMS PRESENT	ON, depending on bE
88	OFF	OPEN	YES	OFF	OFF	ALARMS PRESENT	ON, depending on bE
89	ON	OPEN	YES	OFF	OFF	ALARMS PRESENT	ON, depending on bE
90	OFF	CLOSED	YES	OFF	OFF	ALARMS PRESENT	ON, depending on bE
91	ON	CLOSED	YES	OFF	OFF	ALARMS PRESENT	ON, depending on bE
92	OFF	OPEN	NO	OFF	OFF	ALARMS PRESENT	ON, depending on bE
93	ON	OPEN	NO	OFF	OFF	ALARMS PRESENT	ON, depending on bE
94	OFF	CLOSED	NO	OFF	OFF	ALARMS PRESENT	ON, depending on bE
95	ON	CLOSED	NO	OFF	OFF	ALARMS PRESENT	ON, depending on bE
96	OFF	OPEN	YES	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
97	ON	OPEN	YES	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
98	OFF	CLOSED	YES	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
99	ON	CLOSED	YES	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
100	OFF	OPEN	NO	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
101	ON	OPEN	NO	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
102	OFF	CLOSED	NO	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
103	ON	CLOSED	NO	ON, depending on bF	ON	ALARMS ABSENT	ON, depending on bE
104	OFF	OPEN	YES	OFF	ON	ALARMS ABSENT	ON, depending on bE
105	ON	OPEN	YES	OFF	ON	ALARMS ABSENT	ON, depending on bE
106	OFF	CLOSED	YES	OFF	ON	ALARMS ABSENT	ON, depending on bE
107	ON	CLOSED	YES	OFF	ON	ALARMS ABSENT	ON, depending on bE
108	OFF	OPEN	NO	OFF	ON	ALARMS ABSENT	ON, depending on bE
109	ON	OPEN	NO	OFF	ON	ALARMS ABSENT	ON, depending on bE
110	OFF	CLOSED	NO	OFF	ON	ALARMS ABSENT	ON, depending on bE
111	ON	CLOSED	NO	OFF	ON	ALARMS ABSENT	ON, depending on bE
112	OFF	OPEN	YES	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
113	ON	OPEN	YES	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
114	OFF	CLOSED	YES	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
115	ON	CLOSED	YES	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
116	OFF	OPEN	NO	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
117	ON	OPEN	NO	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
118	OFF	CLOSED	NO	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
119	ON	CLOSED	NO	ON, depending on bF	OFF	ALARMS ABSENT	ON, depending on bE
120	OFF	OPEN	YES	OFF	OFF	ALARMS ABSENT	ON, depending on bE
121	ON	OPEN	YES	OFF	OFF	ALARMS ABSENT	ON, depending on bE
122	OFF	CLOSED	YES	OFF	OFF	ALARMS ABSENT	ON, depending on bE
123	ON	CLOSED	YES	OFF	OFF	ALARMS ABSENT	ON, depending on bE
124	OFF	OPEN	NO	OFF	OFF	ALARMS ABSENT	ON, depending on bE
125	ON	OPEN	NO	OFF	OFF	ALARMS ABSENT	ON, depending on bE
126	OFF	CLOSED	NO	OFF	OFF	ALARMS ABSENT	ON, depending on bE
127	ON	CLOSED	NO	OFF	OFF	ALARMS ABSENT	ON, depending on bE

Tab. 8.3.3

Parameters for setting the serial connections and remote control

code display	range of variation	def.	unit of meas.	description	
C0	1, ..., 6	1		value normally displayed	1= room probe measurement 2= outlet probe measurement 3= steam production 4= hour counter 5= conductivity 6= current
C1	0, ..., 4	4		enable keypad and remote control	
				keypad: 0= reading of all param., (modification of C1 only) 1= reading and modification of all parameters 2= reading of all param., (modification of C1 only) 3= reading and modification of all parameters 4= reading and modification of all parameters	remote control: reading and modification of param. P, d and St reading and modification of param. P, d and St reading of parameters P, d and St reading of parameters P, d and St reading and modification of all parameters
C2	0, ..., 99	0		remote control enabling code (see paragraph 8.3)	
C3	0, ..., 199	1		serial address	
C4	0, ..., 3	3		supervisor: baud-rate	0=1200 1=2400 2=4800 3=9600
C5	0, ..., 11	0		supervisor: frame 0=8,N,2 1=8,N,1 2=8,E,2 3=8,E,1 4=8,0,2 5=8,0,1	(character bits, parity, stop bits) 6=7,N,2 7=7,N,1 8=7,E,2 9=7,E,1 10=7,0,2 11=7,0,1
C6	0, ..., 199	0	ms	serial reply send delay	
C7	0, ..., 3	0		graphic terminal configuration in cases 1,2,3 the OFF command is forced on start-up	0= terminal 1= terminal with ON/OFF control 2= term. with ON/OFF and room probe 3= term. with ON/OFF and outlet probe

Tab. 8.3.4

8.4 Validity of the modifications to the parameters

The modifications made to the parameters normally take effect when confirmed with the SEL button. For some parameters relating to the serial connection, the value will only take effect only the next time the unit is switched on. During the programming phase, 5 seconds after the last button is released, the display begins flashing (to remind the user that the programming phase is in progress). Sixty seconds after the last button is released, if the value of a parameter is being displayed, any modifications are ignored and the display returns to the parameter's ID code. After a further 5 seconds, the display begins flashing again, and after 60 seconds the programming phase is terminated and the parameters return to the values previous to the programming phase.

8.5 Recalling the default parameters (factory settings)

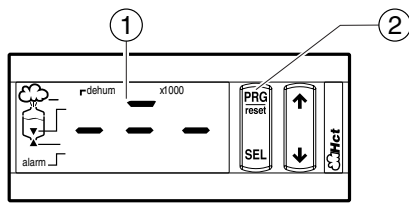


Fig. 8.5.1

Key:

1. flashing;
2. press for 5 s. on starting the machine.

If errors have occurred when setting the parameters, the default values set in the factory can be recalled, as follows:

- in the first 5 seconds from start-up (while the three dashes are displayed), press the PRG button until the upper dash in the centre flashes, as indicated in the figure;
- release the PRG button within 3 seconds to confirm the recall and permanent saving of the default parameters; to confirm the saving of the values, the upper dash will stay on for 2 seconds (as displayed in Fig. 8.5.1);
- the operation is not effected if the PRG button is pressed for more than 3 seconds, until the upper dash disappears.

Recalling **the default parameters does not change the parameter relating to the unit of measure (A 1)**; and it is thus recommended to check and if necessary select and save the unit of measure as required, and then recall the default parameters. In this way the default values will automatically be converted.

8.6 Resetting the hour counter

To reset the hour counter (parameter d4), proceed as follows:

- press the PRG button for 5 seconds, until the code P0 is displayed, indicating the first modifiable parameter; using the ▲ and ▼ buttons, scroll the parameters until d4 is displayed;
- press the SEL button to display the value of the hour counter (preceded for 1 second by the unit of measure);
- press the ▲ and ▼ buttons together for 5 seconds until the value is set to zero, preceded by a brief flash.

8.7 Displaying and modifying the unit of measure of the parameters

The unit of measure of many parameters depends on the type of configuration, displaying the unit of measure can avoid incorrect interpretation of the values of the parameters.

In the case of non-dimensional measurements, the unit of measure is not displayed.

display	unit of measure
A	current in amperes
°C	temperature in degrees centigrade
°F	temperature in degrees Fahrenheit relative
r.F.	humidity in %
Pr	steam production in kg/h
Lb	steam production in pounds/h

Tab. 8.7.1

display	unit of measure
M	time in seconds
M'	time in minutes
h	time in hours
uS	conductivity $\mu\text{S}/\text{cm}$
%	percentage

Tab. 8.7.2

9 THE REMOTE CONTROL (optional accessory)

The remote control is a standard accessory that can be used only on humidifiers with type H control. It is available in two versions:

- TELUEI000 with the buttons marked in Italian;
- TELUEE000 with the buttons marked in English. The infra-red remote control can command the call-up and display on the control module (see chap. 8) of the humidifier's parameters, which, if necessary, can be modified remotely.

Furthermore, the remote control simplifies access to the main parameters, by pressing the corresponding marked buttons, avoiding the code search phase. The remote control will operate at up to a distance of 3 metres, and can be used with all appliances in the STULZ SupraSteam® family. In the event where there is more than one humidifier within the remote control's operating range, the appliance to be operated can be determined by assigning each controller an individual access code (parameter C2). Selecting the value of parameter C1 (see par. 8.3) allows the parameters that can be read or modified using the remote control to be enabled.

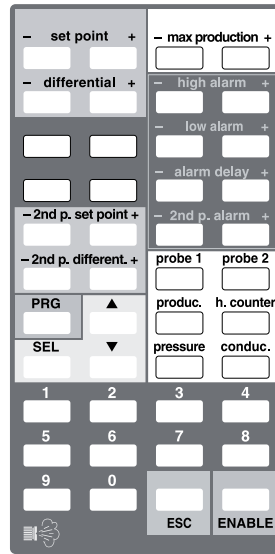


Fig. 9.1

9.1 Description of the remote control

The buttons can be divided into three groups, according to their function.

9.1.1 Buttons for activating/deactivating the remote control

These allow the activation or deactivation of the remote control, saving the values associated with the parameters where necessary (see Fig 9.1.1.1).

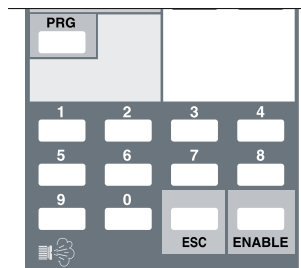


Fig. 9.1.1.1

button	function
ENABLE	enables the use of the remote control
PRG	concludes the programming, saving the values attributed to the parameters where necessary
ESC	cancels any modifications
number buttons	set the access code to the parameters

Tab. 9.1.1.1

9.1.2 Buttons for modifying the main parameters (direct access buttons)

The more-frequently used parameters are indicated directly on the remote control, grouped into areas of different colours according to the function. Each modifiable parameter has a button with the + sign and one with the - sign to increase or decrease the value. The buttons without + or - signs only allow the display of the associated value on the control module.

9.1.3 Buttons for the remote control of the controller keypad

The section highlighted in green/blue on the remote control (see Fig. 9.1.3.1) reproduces the buttons on the instrument and allows the operations listed in Table 9.1.3.1 to be performed remotely (see chap. 8).

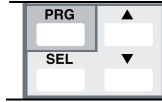


Fig. 9.1.3.1

button	function
PRG	permanently saves the values and exits the programming phase
SEL	displays the unit of measure and the value of the selected parameter confirms the modified value and displays the parameter code
▲	scrolls from one parameter to the next the value on the display during the setting of the parameters
▼	scrolls from one parameter to the previous move from one parameter to the previous; the value on the display during the setting of the parameters

Tab. 9.1.3.1

9.2 Programming from the remote control

To activate or deactivate the access code to use the remote control, enter into the control module configuration mode using password 77 (see par. 8.3).

Assigning parameter C2 a value other than 0 (from 01 to 99), activates this number as the access code that must be entered each time the remote control is used to program that unit.

Obviously, in installations with more than one unit, it is recommended to use a different code for each unit.

Setting parameter C2 back to 0 means the remote control can be used without requiring the access code.

When not in programming phase, the SEL (limited to the display of the unit of measure), PRG (limited to the function of alarm reset) and the display-only buttons are always active.

9.2.1 Start parameter programming without requiring access code (C2=0)

Exit the programming phase if necessary, press the ENABLE button to enable the remote control; the humidifier's controller will show the code for the first accessible parameter.

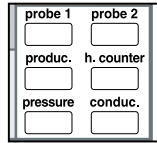
9.2.2 Start parameter programming with access code required (C2≠0)

Exit the programming phase if necessary, press the ENABLE button to enable the remote control: All the units located within the operating range of the remote control will display their own access code. To access the programming/reading routine, use the numeric keypad (Fig. 9.1.1.1) to enter the access code for the machine to be operated on. Any zeroes must be included (e.g.: if the display shows 05, press the 0 and then the 5 button).

If the code is correct, the first accessible parameter is displayed.

9.2.3 Reading the available measurements

To directly display one of the available measurements, press the corresponding button (Fig. 9.2.3.1) twice.



9.2.4 Modifying the main parameters (with specific button)

With reference to Fig. 9.2.4.1:

- perform the operations for starting parameter programming (see paragraph 9.2.1 or 9.2.2);
- press either the + or - button corresponding to the parameter to be modified; the display shows the parameter code;
- press the SEL button again to display the value;
- then press the + or - button to increase or decrease the value.

The values in the memory of the control module will automatically be modified on exiting the programming phase (paragraph 9.3).

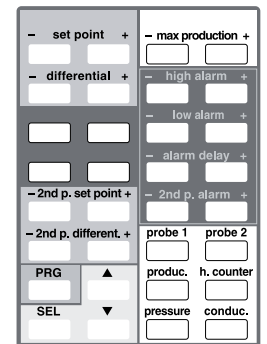


Fig. 9.2.4.1

9.2.5 Modifying the main parameters (without specific button)

The parameters without a specific button can also be modified, proceeding as follows:

- perform the operations for starting parameter programming (see paragraph 9.2.1 or 9.2.2);
- press the ▲ or ▼, button until the code of the required parameter is displayed;
- press the SEL button to display its value; then press ▲ or ▼, again to increase or decrease the value; finally, press SEL to temporarily confirm the new value;
- to modify other parameters, repeat the same operations.

9.3 Exiting the programming phase

To exit the programming phase and save the modifications made to the parameters, press the PRG button.

To exit without saving the modifications, press the ESC button.

To exit the programming phase without confirming the modifications made:

- do not press any button for 60 seconds, if the parameter code is displayed;
- do not press any button for 120 seconds, if the value of the parameter is displayed.

10 MAINTENANCE AND SPARE PARTS

10.1 Replacing the cylinder

IMPORTANT WARNING: The cylinder may be hot. Allow it to cool before touching it or use protective gloves.

To access the cylinder:

- completely drain the water contained in the cylinder (see par. 7.4);
- turn the appliance off (Fig. 7.4.1) and open the main power switch (safety procedure);
- open and remove the cover (see par. 3.3);
- remove the steam pipe from the cylinder;
- disconnect the electrical connections from the top of the cylinder;
- release the cylinder from its fastening device and lift it up to remove it;
- fit the new cylinder in the humidifier by performing the previous operations in reverse.

Cylinder maintenance

The life of the cylinder depends on a number of factors, including: the complete filling with lime scale and/or the partial or complete corrosion of the electrodes, the correct use and sizing of the humidifier, the output, and the quality of the water, as well as careful and regular maintenance. Due to the aging of the plastic and the consumption of the electrodes, even an openable steam cylinder has a limited life, and it is therefore recommended to replace it after 5 years or 10,000 operating hours.

IMPORTANT WARNINGS:

The humidifier and its cylinder contain live electrical components and hot surfaces, and therefore all service and/or maintenance operations must be performed by expert and qualified personnel, who are aware of the necessary precautions.

Before performing any operations on the cylinder, check that the humidifier is disconnected from the power supply; carefully read and follow the instructions contained in the humidifier manual. Remove the cylinder from the humidifier only after having drained it completely using the corresponding button. Check that the model and the power supply voltage of the new cylinder correspond to the data on the rating plate.

Periodic checks

- After one hour of operation
For both disposable and openable cylinders, check that there are no significant water leaks.
- Every fifteen days or no more than 300 operating hours
For both disposable and openable cylinders check operation, that there are no significant water leaks and the general condition of the container. Check that during operation there are no arcs or sparks between the electrodes.
- Every three months or no more than 1000 operating hours
For disposable cylinders, check operation, that there are no significant water leaks and, if necessary, replace the cylinder; for openable cylinders, check that there are no markedly blackened parts of the container: If this is the case, check the condition of the electrodes, and if necessary replace them together with the o-rings and the cover gasket.
- Annually or no more than 2500 operating hours
For disposable cylinders, replace the cylinder; for openable cylinders check operation, that there are no significant water leaks, the general conditions of the container, check that there are no markedly blackened parts of the container: If this is the case, check the condition of the electrodes, and if necessary replace them together with the o-rings and the cover gasket.
- After five years or no more than 10,000 operating hours
For both disposable and openable cylinders, replace the cylinder.

After extended use or alternatively when using water with a high salt content, the solid deposits that naturally form on the electrodes may reach the stage where they also stick to the inside wall of the cylinder; in the event of especially conductive deposits, the consequent heat produced may overheat the plastic and melt it, and, in more severe cases, puncture the cylinder, allowing water to leak back into the tank.

As a precaution, check, at the frequency recommended further on, the deposits and the blackening of the wall of the cylinder, and replace the cylinder if necessary.

CAUTION:

Always disconnect the appliance before touching the cylinder in the event of leaks, as current may be passing through the water.

10.2 Maintenance of the other plumbing components

IMPORTANT WARNINGS:

- **When cleaning the plastic components do not use detergents or solvents;**
- **scale can removed using a solution of 20% acetic acid and then rinsing with water.**

The steam humidifier has just one part that requires periodical replacement: the steam production cylinder. This operation is necessary when the lime scale deposits that form inside the cylinder prevent the sufficient passage of current. This situation is displayed on the controller by an alarm signal. The frequency of this operation depends on the supply water: The higher the content of salts or impurities, the more frequently the cylinder will need replacing.

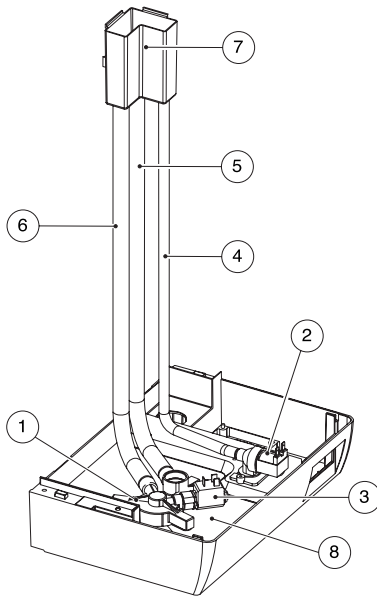


Fig. 10.2.1A

n.	description
1	S/D manifold (supply-drain) fill
2	electrovalve
3	drain electrovalve
4	tank fill pipe
5	cylinder supply
6	overflow pipe
7	tank
8	base
9	drain column
10	drain pipe
11	drain pump
12	conductivity meter

Tab. 10.2.1

- **Fill electrovalve** (Fig. 10.2.1, part no. 2) After having disconnected the cables and the pipe, remove the electrovalve and check the condition of the inlet filter; clean if necessary using water and a soft brush.
- **Supply and drain manifold** (Fig. 10.2.1, parts no. 1) Check that there are no solid residues in the cylinder attachment, remove any impurities.
Check that the seal (o-ring) not is damaged or cracked; replace if necessary.
- **Drain electrovalve /drain pump** (Fig. 10.2.1, part no. 3/12) Disconnect electrical power, remove the coil and remove the valve body after having unscrewed the two fastening screws from the manifold; remove any impurities and rinse.
- **Bottom collection tank** (Fig. 10.2.1, part no. 8)
Clean the tank from any deposits and check that the water flows freely from the tank to the drain at the drain valve.
- **Tank** (Fig. 10.2.1, part no. 7)
Check that there are no blockages or solid particles and that the conductivity measuring electrodes are clean, remove any impurities and rinse.
- **Supply, fill, overflow pipes** (Fig. 10.2.1, parts no. 4,5 and 6/9) Check that these are free and do not contain impurities; remove any impurities.

IMPORTANT WARNING:

After having replaced or checked the plumbing, check that the connections have been carried out correctly and the corresponding seals have been used. Re-start the machine and perform a number of supply and drain cycles (from 2 to 4), then, applying the safety procedure, check for any water leaks.

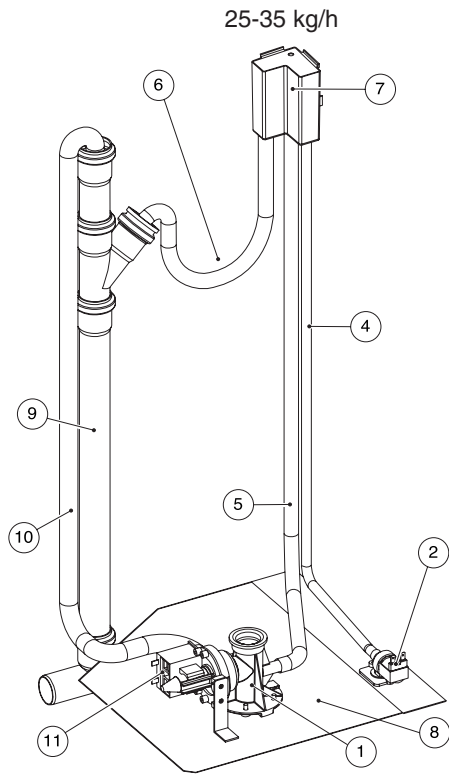


Fig. 10.2.1B

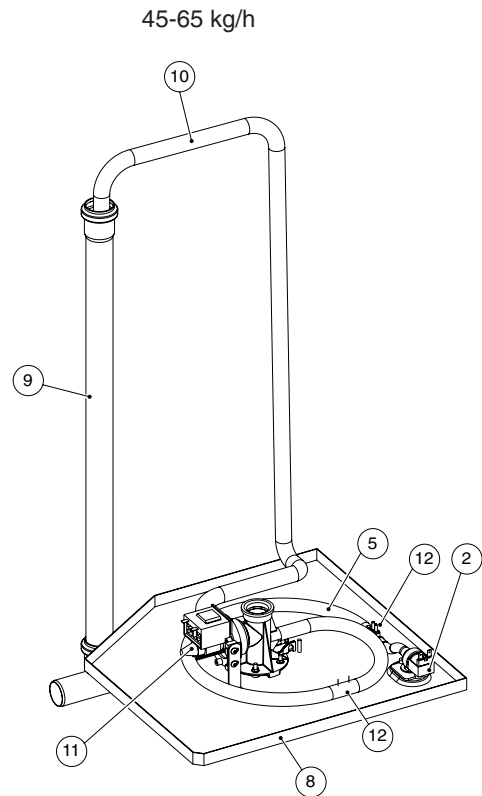


Fig. 10.2.1C

10.3 Component replacement

10.3.1 Fuses in the auxiliary circuits

Use fuses with the ratings indicated in Table. 10.3.1.1.

model	SEH001	SEH003	SEH005	SEH010	SEH015	SEH 025-45-065
Fuses 1-2 transformer – power supply	1 A, GL, 10.3 x 38 contained in the fuse carriers on omega rail					
Fuse 3 - pump protection						1 A FAST 10.3 x 38 in the fuse carrier on omega rails
Fuse 4 protection of the secondary winding						2.5 A T 5 x 20 ceramic

Tab. 10.3.1.1

Note: For the H version board up to 15 kg/h the secondary winding protection is carried out through the thermofuse within the transformer.

10.4 Spare parts

10.4.1 SINGLE-PHASE humidifiers

Standard spare parts			
Modell	SEH001	SEH003	SEH005
Water parts			
tank + conductivity meter	UEKVASC000	UEKVASC000	UEKVASC000
fill electrovalve kit	KITVC00006	KITVC00006	KITVC00006
drain electrovalve kit	13C499A030	13C499A030	13C499A030
internal pipe kit	UEKT00000S	UEKT00000S	UEKT00000S
Non-openable cylinders			
200/230 Vac 1~, conductivity 350/1250 μ S/cm	BL0S1F00H1	BL0S1F00H1	BL0S2F00H0
Electrical parts			
contactor	0203000AXX	0203000AXX	0203001AXX
power transformer: voltage 230/400-24 V	09C565A001	09C565A001	09C565A001
voltage 200/208/460/575-24 V	09C476A030	09C476A030	09C476A030
fuse carrier	0606192AXX	0606192AXX	0606192AXX
fuse	0605319AXX	0605319AXX	0605319AXX
Electronic parts			
control module ver. H-T	UEH01v00ri ¹	UEH03v00ri ¹	UEH05v00ri ¹
control board ver. H-T flat	UEI00000ri	UEI00000ri	UEI00000ri
connection cable	59C460A003	59C460A003	59C460A003
remote control	TELUE0*000	TELUE0*000	TELUE0*000

Tab. 10.4.1.1

*: I = Italian, E = English; **: specify kg/h, voltage of power supply, options

v = voltage

¹ together with the code of the controller specify also the complete code of the humidifier and its series no

r = release

i = 0 single packaging/ 1 multiple packaging

Spare parts for special applications

The following spare parts are supplied separately from the standard humidifier, that is, must be ordered separately.

Model	SEH001	SEH003	SEH005
Non-openable cylinders			
200/230 Vac 1~, conductivity 125/350 μ S/cm	BL0S1E00H1	BL0S1E00H1	BL0S2E00H0
Openable cylinders			
200/230 Vac 1~, conductivity 125/350 μ S/cm			BLCS2E00W0
200/230 Vac 1~, conductivity 350/1250 μ S/cm			BLCS2F00W0
electrode kit (200/230 Vac 1~, 125/350 μ S/cm)			KITBLCS2E0
electrode kit (200/230 Vac 1~, 350/1250 μ S/cm)			KITBLCS2F0
electrode gasket kit			KITBLC2FG0

Tab. 10.4.1.2

10.4.2 THREE-PHASE humidifiers

Standard spare parts

Model	SEH003	SEH005	SEH008	SEH010	SEH015	SEH025	SEH035	SEH045	SEH065
Water parts									
tank + conductivity meter fill	UEKVASC000	UEKVASC000	UEKVASC000	UEKVASC000	UEKVASC000	UEKVASC000	UEKVASC000	UEKVASC000	UEKVASC000
electrovalve kit	KITVC00006	KITVC00006	KITVC00006	KITVC00012	KITVC00012	KITVC00040	KITVC00040	KITVC00040	KITVC00070
drain electrovalve kit	13C499A030	13C499A030	13C499A030	13C499A030	13C499A030	KITPS00000	KITPS00000	KITPS00000	KITPS00000
internal pipe kit	UEKT00000S	UEKT00000S	UEKT00000S	UEKT00000M	UEKT00000M	UEKT00000L	UEKT00000L	UEKT00000L	UEKT0000XL
conductivity probe 208-230V 400-460-575V								18C431A004	18C431A004
Non-openable cylinders									
200/230 Vac 3-, conductivity 350/1250 µS/cm		BL0T2B00H0	BL0T2B00H0	BL0T3B00H0	BL0T3B00H0	BL0T4C00H0	BL0T4B00H0	BL0T5B00H0	
400 Vac 3-, conductivity 350/750 µS/cm	BL0TIC00H1	BL0T2C00H0	BL0T2C00H0	BL0T3C00H0	BL0T3C00H0	BL0T4D00H0	BL0T4D00H0	BL0T4C00H0	BL0T5C00H0
460 Vac 3-, conductivity 350/1250 µS/cm	BL0TID00H1	BL0T2D00H0	BL0T2D00H0	BL0T3D00H0	BL0T3D00H0	BL0T4D00H0	BL0T4D00H0	BL0T4D00H0	BL0T5D00H0
575 Vac 3-, conductivity 350/1250 µS/cm	BL0T2D00H0	BL0T2D00H0	BL0T3D00H0	BL0T3D00H0	BL0T4000H0	BL0T4D00H0	BL0T4D00H0	BL0T4D00H0	BL0T5D00H0
Electrical parts									
contactor	0203000AXX	0203000AXX	0203000AXX	0203001AXX	0203001AXX	0203001AXX	0203008AXX	0203009AXX ⁽⁴⁾	0203007AXX ⁽²⁾⁽³⁾⁽⁴⁾
power transformer:									
230/400-24 V	09C565A001	09C565A001	09C565A001	09C565A001	09C565A001	09C479A063	09C479A063	09C479A063	09C479A063
200/208/460/575-24 V	09C476A030	09C476A030	09C476A030	09C476A030	09C476A030				
200/208/460/480-575-24 V						09C479A062	09C479A062	09C479A062	09C479A062
fuse carrier	0606192AXX	0606192AXX	0606192AXX	0606192AXX	0606192AXX	0606193AXX	0606193AXX	0606193AXX	0606193AXX
fuse 208-230 V								0606144AXX	
1-2 230-400 V	0605319AXX	0605319AXX	0605319AXX	0605319AXX	0605319AXX	0605319AXX	0605319AXX	0605319AXX	0605319AXX
208-460-575 V	0606141AXX	0606141AXX	0606141AXX	0606141AXX	0606141AXX	0606141AXX	0606141AXX	0606141AXX	0606141AXX
fuse 3 400 V						0605319AXX	0605319AXX	0605319AXX	0605319AXX
208-230-460-575 V						0606147AXX	0606147AXX	0606147AXX	0606147AXX
fuse 4						0605624AXX	0605624AXX	0605624AXX	0605624AXX
pump relay						0102001AXX	0102001AXX	0102001AXX	0102001AXX
Electrical parts									
control module ver. H-T	UEH03v00ri1	UEH05v00ri1	UEH08v00ri1	UEH10v00ri 1	UEH15v00ri 1	UEH25v00ri 1	UEH35v00ri 1	UEH45v00ri 1	UEH65v00ri
control board ver. H-T	UEI00000ri	UEI00000ri	UEI00000ri	UEI00000ri	UEI00000ri	UEIN0000ri	UEIN0000ri	UEIN0000ri	UEIN0000ri
flat connection cable	59C460A003	59C460A003	59C460A003	59C460A003	59C460A003	59C460A003	59C460A003	59C460A003	59C486A003
remote control	TELUE0*000	TELUE0*000	TELUE0*000	TELUE0*000	TELUE0*000	TELUE0*000	TELUE0*000	TELUE0*000	TELEUE0*000

Tab. 10.4.2.1

*: I = Italian, E = English; **: specify kg/h, voltage of power supply, options

v = voltage

r = release

i = 0 single packaging / 1 multiple packaging

¹ together with the code of the controller specify also the complete code of the humidifier and its series no.

² for power supply voltage 400VAC

³ for power supply voltage 460-575VAC

⁴ for power supply voltage 230VAC

⁵ for power supply voltage 208VAC

Spare parts for special applications

The following spare parts are supplied separately from the standard humidifier, that is, must be ordered separately.

Model	SEH003	SEH005	SEH008	SEH010	SEH015
Non-openable cylinders					
200/230 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$	BL0T1A00H1	BL0T2A00H0	BL0T2A00H0	BL0T3A00H0	BL0T3A00H0
400 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$	BL0T1A00H1	BL0T2B00H0	BL0T2B00H0	BL0T3B00H0	BL0T3B00H0
400 Vac 3-, conductivity 750/1250 $\mu\text{S}/\text{cm}$	BL0T1D00H1	BL0T2D00H0	BL0T2D00H0	BL0T3D00H0	BL0T3D00H0
460 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$	BL0T1B00H1	BL0T2C00H0	BL0T2C00H0	BL0T3C00H0	BL0T3C00H0
575 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$		BL0T2C00H0	BL0T2C00H0	BL0T3C00H0	BL0T3C00H0
Openable cylinders					
200/230 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$		BLCT2A00W0	BLCT2A00W0	BLCT3A00W0	BLCT3A00W0
200/230 Vac 3-, conductivity 350/1250 $\mu\text{S}/\text{cm}$		BLCT2B00W0	BLCT2B00W0	BLCT3B00W0	BLCT3B00W0
400 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$		BLCT2B00W0	BLCT2B00W0	BLCT3B00W0	BLCT3B00W0
400 Vac 3-, conductivity 350/750 $\mu\text{S}/\text{cm}$		BLCT2C00W0	BLCT2C00W0	BLCT3C00W0	BLCT3C00W0
400 Vac 3-, conductivity 750/1250 $\mu\text{S}/\text{cm}$		BLCT2D00W0	BLCT2D00W0	BLCT3D00W0	BLCT3D00W0
460/575 Vac 3-, conductivity 125/350 $\mu\text{S}/\text{cm}$		BLCT2C00W0	BLCT2C00W0	BLCT3C00W0	BLCT3C00W0
460/575 Vac 3-, conductivity 350/1250 $\mu\text{S}/\text{cm}$		BLCT2D00W0	BLCT2D00W0	BLCT3D00W0	BLCT3D00W0
electrode kit (200/230 Vac 3-, 125/350 $\mu\text{S}/\text{cm}$)		KITBLCT2A0	KITBLCT2A0	KITBLCT3A0	KITBLCT3A0
electrode kit (200/230 Vac 3-, 350/1250 $\mu\text{S}/\text{cm}$)		KITBLCT2B0	KITBLCT2B0	KITBLCT3B0	KITBLCT3B0
electrode kit (400 Vac 3-, 125/350 $\mu\text{S}/\text{cm}$)		KITBLCT2B0	KITBLCT2B0	KITBLCT3B0	KITBLCT3B0
electrode kit (400 Vac 3-, 350/750 $\mu\text{S}/\text{cm}$)		KITBLCT2C0	KITBLCT2C0	KITBLCT3C0	KITBLCT3C0
electrode kit (400 Vac 3-, 750/1250 $\mu\text{S}/\text{cm}$)		KITBLCT2D0	KITBLCT2D0	KITBLCT3D0	KITBLCT3D0
electrode kit (460/575 Vac 3-, 125/350 $\mu\text{S}/\text{cm}$)		KITBLCT2C0	KITBLCT2C0	KITBLCT3C0	KITBLCT3C0
electrode kit (460/575 Vac 3-, 350/1250 $\mu\text{S}/\text{cm}$)		KITBLCT2D0	KITBLCT2D0	KITBLCT3D0	KITBLCT3D0
electrode gasket kit		KITBLC2FG0	KITBLC2FG0	KITBLC3FG0	KITBLC3FG0

Tab. 10.4.2.2

11 ALARMS, TROUBLESHOOTING

11.1 Alarms

The presence of an alarm is indicated on the controller by a message that identifies the type of alarm. In the cases of potentially dangerous alarms, the controller automatically shuts down the humidifier. For some alarm events (see Table 11.2), at the same time as the signal, the alarm relay is activated, as described in par. 6.5.1. If the cause of the alarm has passed, the humidifier and alarm relay can be reset automatically or manually, depending on the type of fault, while the message displayed is reset manually by pressing the reset-PRG button. Even if no longer active, the alarm status continues to be displayed until the reset-PRG button is pressed. Active alarm states cannot be reset.

If control is disabled (remote control OFF), the alarm relay is deactivated, even though the alarm condition is still present. The column corresponding to the remote terminal indicates the alarm message that appears on the STULZ Humivisor remote LCD, if connected to the humidifier. In the event of an alarm condition, LED 9 (see Fig. 11. 1. 1) starts flashing, while, unless in programming mode, the display shows the alphanumeric alarm code.

The message is displayed cyclically, for two seconds, alternating with the normally displayed value. In the event of more than one alarm, the display indicates all the corresponding codes in sequence, at two second intervals. The alarm E1 (user parameter error) can appear in two distinct cases:

1. Malfunction when reading from the parameter memory (typically on start-up).

The default parameters are temporarily recalled, without being saved in the parameter memory (the parameters can be accessed and the correct values restored).

2. Malfunction when writing to the parameter memory (typically on pressing the PRG button).

In both cases, the default parameter recall procedure should be used (see par. 8.5).

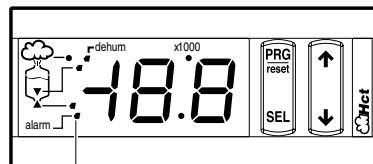


Fig. 11.1.1

11.2 Table of alarms and signals

code displayed

con- troller	remote term.*	causes	solution	action		reset display (H)	alarm relay	reset relay (H)
				P	H			
H								
EH	E102	over-current at the electrodes; probable electrode malfunction or water conductivity tempo- rarily too high (especially when starting after a short stop)	1. check the operation of the drain electrovalve 2. check the seal of the fill electrovalve when not energised 3. drain part of the water and re-start.	total shut- down	total shut- down	not available	active	not available
EL	E103	power not available; with the machine on no steam is produced	1. with the machine off and disconnected from the mains, check the internal electrical connections.	total shut- down	total shut- down	not available	active	not available
EC	E105	high supply water conductivity	1. check limit set for b6; 2. turn the machine off and clean the water conductivity measuring electrodes; 3. if the problem persists, change the source of supply water or install a suitable treatment system (demineralisation, even partial). N.B.: the problem will not be resolved by softening the supply water.	-	total shut- down	not available	active	not available
EP	E113	excessive reduction in production	1. cylinder completely depleted or water with excessive foam. Perform maintenance on the cylinder	total shut- down	machine disabled	manual	active	manual
EF	E114	no water	1. check that the fill pipe from the mains to the humidifier and the internal pipe are not blocked or bent and that there is sufficient pressure (0.1-0.8 MPa, 1-8 bar); 2. check the operation of the fill electrovalve; 3. check that the steam outlet is not working against excessive back -pressure, preventing the flow of water into the cylinder by gravity; 4. check that the steam outlet pipe is not is choked and that there are no pockets of condensate.	total shut- down	machine disabled	automatic when water returns (see par. 12.2.10)	active	automatic when water returns
ER	E115	excessive foam in the cylinder during boiling	the formation of foam is generally due to the presence of surfactants in the water (lubricants, solvents, detergents, water treatment agents, softeners) or an excessive concentration of dissolved salts: 1. drain the water supply lines 2. clean the cylinder 3. check for the presence of softeners (in this case, use another type of water or reduce the softening)	-	signal only	manual	active	manual
EC	E116	drain malfunction	check the drain circuits and the correct operation of the drain electrovalve	total shut- down	machine disabled	manual	active	manual
ED	E131	high water conductivity pre-alarm	check the conductivity of the supply water if necessary, install a suitable treatment system N.B.: the problem will not be resolved by softening the supply water.	-	signal only	automat.	not active	
E ⁻	E121	high humidity in the room (high temp. for T control)	check the operation of the probe and the limit set for parameter P2	-	signal only	manual	active	auto
E ₋	E122	low humidity in the room (low temp. for T control)	check the operation of the probe and the limit set for parameter P3	-	signal only	manual	active	auto
E ⁼	E124	high outlet humidity	check the operation of the outlet probe	-	signal only	manual	active	auto

code displayed

con- troller	remote term.*	causes	solution	action		reset display (H)	alarm relay	reset relay (H)
				P	H			
H								
E0	E101	internal memory error	1. reset the default parameters (see chap. 8.5) 2. if the problem persists, contact the STULZ service centre	total shut-down	machine disabled	reprog. by STULZ	active	reprog. by STULZ
E1	E112	error in the parameters user	1. with the machine off, check that there are no defective electrical connections or faults, then reprogram the parameters 2. reset the default parameters (see chap. 8.5) 3. if the problem persists, contact the STULZ service centre	-	machine disabled	reprog. params.	active	reprog. params.
E2	E130	hour counter error	with the machine off check that there are no defective electrical connections or faults, then reset the hour counter (see par. 8.6)	-	hour counter saving disabled	reset manual hour counter	not active	-
E3	E120	room probe not connected	check the connection of the probe, parameter A2 for the room probe and the setting of parameter A0 (see chap. 8)	-	machine disabled	manual	active	auto
E4	E123	outlet probe not connected	check the connection of the probe, parameter A6 for the outlet probe and the setting of parameter A0 (see chap. 8)	-	signal only	manual	active	auto
CP	E132	cylinder being depleted signal	perform maintenance and/or replace the cylinder	-	signal only	manual	not active	auto
CL	E133	cylinder depleted signal	perform maintenance and/or replace the cylinder	signal only	signal only	not available	active	-
EU	E134	cylinder full with machine off signal	with the machine off, 1. check for any leaks from the fill electrovalve or the condensate return pipe 2. check that the level sensors are clean	total shut-down	machine disabled	manual	active	manual
PC	-	cleaning cylinder started signal	see paragraph 7.2.1	-	-	-	-	-
CY	E135	timeout signal (see parameter "bb") for maintenance exceeded	perform maintenance and/or replace the cylinder	-	signal only	manual reset hour counter**	active	after the manual reset hour counter
Fn	E136	reached final limit (1.5x _{bb}) of cylinder operating life	replace the cylinder	-	disable unit	manual reset hour counter**	active	after the manual reset hour counter
dr	-	complete draining of the cylinder activated	see paragraph 7.2.4	-	-	-	-	-
idr	-	complete draining for extended inactivity	see paragraph 12.2.5	-	-	-	-	-
dr	-	complete periodical draining active	see paragraph 12.2.9	-	-	-	-	-
AF	-	anti-foam algorithm active	see paragraph 12.2.3	-	-	-	-	-

Tab. 11.2.1

* STULZ Humivisor (H or I)

** it is recommended to replace the cylinder first

11.3 Troubleshooting table

problem	causes	solution
the humidifier does not turn on	<ol style="list-style-type: none"> 1. no electrical power; 2. external switch of the humidifier in position 0 (open); 3. control connectors badly connected; 4. broken fuses; 5. transformer fault 	<ol style="list-style-type: none"> 1. check the protection devices upstream from the humidifier and the presence of power; 2. close the switch on the panel: position I; 3. check that the connectors are properly inserted in the terminal block; 4. check the condition of fuses F1/F2/F3; 5. check that the voltage across the secondary winding of the transformer is 24Vac
the humidifier does not start operation	<ol style="list-style-type: none"> 1. remote ON/OFF contact open (relay/terminals AB – AB or 7I – 8I); 2. the humidistat has not been connected correctly; 3. humidistat fault 4. control signal not compatible with the type set 5. value measured by the probe/s higher than the corresponding set point 	<ol style="list-style-type: none"> 1. close ON/OFF contacts (relay/terminals AB – AB or 7I – 8I); 2. check the external connection; 3. replace the humidistat; 4. set parameters A0, A2-A9 correctly; 5. check the values of the set point St and P7
the humidifier loads up water without producing steam	<ol style="list-style-type: none"> 1. too high steam inlet counterpressures; 2. inlet filter to the clogged cylinder; 3. limestone in the supply tank; 4. drain solenoid valve malfunction 	<ol style="list-style-type: none"> 1. check that the steam inlet pipe is not folded or choked; 2. clean the filter; 3. clean supply tank; 4. check the anomalous presence of 24Vac on drain solenoid valve and/or drain solenoid replacement
the thermal-magnetic overload switch is activated	<ol style="list-style-type: none"> 1. thermal-magnetic overload switch is under-rated 2. over-current at the electrodes 	<ol style="list-style-type: none"> 1. check that the thermal-magnetic overload switch is rated for a current of at least 1.5 times the rated current of the humidifier; 2. see description for alarm EH
the humidifier wets the duct	<ol style="list-style-type: none"> 1. the distributor is not installed correctly (too near the top of the duct or the condensate return is blocked); 2. system over-sized; 3. humidifier active when the fan in the duct is off 	<ol style="list-style-type: none"> 1. check that the steam distributor is installed correctly; 2. decrease the steam production set on the control; 3. check the connection of the device (flow switch or differential pressure switch) slaving the humidifier to the ventilation in the duct (terminals AB - AB or 7I – 8I)
the humidifier wets the floor below	<ol style="list-style-type: none"> 1. the humidifier drain is blocked; 2. the supply water or overflow circuit has leaks; 3. the condensate drain pipe does not bring the water back to the supply tank; 4. the steam outlet pipe is not properly fastened to the cylinder 	<ol style="list-style-type: none"> 1. clean the drain in the bottom tank; 2. check the entire water circuit; 3. check the correct position of the condensate drain pipe in the supply tank; 4. check the fastening of the pipe clamps on the steam outlet

Tab. 11.3.1

12 SETTING THE ALARM THRESHOLDS AND OTHER FUNCTIONS

12.1 Setting the alarm thresholds

The control panel allows the setting of limit thresholds for the activation of the alarm signals in the event where such thresholds are exceeded.

These alarm thresholds can be programmed using the following control parameters:

- **P2:** high relative humidity or high temperature alarm threshold, measured by the room probe;
- **P3:** low relative humidity or low temperature alarm threshold, measured by the room probe;
- **P4:** alarm signalling delay (to prevent false signals);
- **P9:** high relative humidity alarm threshold, measured by the outlet probe (for ducted humidification).

Parameters P2, P3 and P4 can only be set when A0=2, 3 or 4; parameter P9 can only be set when A0=3.

Furthermore, the controller signals excess conductivity in the supply water (see paragraph 11.1 et seqq.).

WARNING:

The parameter A0 and the operating and alarm parameters are factory set (default values valid for normal applications). Nonetheless, these can be modified by the user, following the instructions contained in chap. 8.

12.2 Other functions

12.2.1 Measurement of the conductivity of the supply water

The conductivity of the supply water can be measured. This is done when opening the fill electrovalve, using special electrodes located in the tank. The range of reading is from 0 to 1500 $\mu\text{S}/\text{cm}$. Two thresholds are available for this measurement:

- b5:** pre-alarm threshold (signal only, without activation of the alarm relay, automatic signal reset when the causes pass);
- b6:** alarm threshold (total machine shut-down, activation of the alarm relay). The alarms are activated when the measurement exceeds one of the two thresholds continuously for 60 minutes, or alternatively instantly if the measurement exceeds 3 times the threshold. To exclude one of these thresholds, simply set the corresponding value to a level outside the range of reading of the conductivity meter, that is, above 1500 $\mu\text{S}/\text{cm}$.

12.2.2 Automatic draining

Automatic draining is managed by the controller: part of the water contained in the cylinder is drained automatically, and replaced with fresh water to prevent an excessive concentration of salts following the process of evaporation.

The drain electrovalve is opened for a set interval whenever the internal conductivity exceeds the maximum limit allowed; this situation can also be seen indirectly by evaluating the speed of evaporation. During automatic draining, the electrodes are not powered, so as to prevent the drained water from carrying electrical current (also see paragraph 12.2.6). During this phase, the display signals "AF".

12.2.3 Anti-foam procedure

Some particular types of supply water may give rise to situations in which, during the production of steam, foam forms on top of the water; this situation must be avoided as it may lead the release of droplets of water together with the steam. For this purpose, the top of the cylinder is fitted with two detection electrodes. When these electrodes reveal the presence of foam, a drain procedure is activated to eliminate this problem. The procedure consists of repeated draining up to, in more critical situations, the automatic and complete cleaning of the cylinder.

12.2.4 Dehumidification request signal

If activated, this function closes the contact of a relay when the relative humidity measured by the transducer connected to the controller exceeds the set threshold. This signal can be used to start an external dehumidification device (also see paragraphs 2.2.3 and 2.2.4).

12.2.5 Automatic emptying of the cylinder for extended shut-down

If the humidifier remains on but is not actively producing for a number of days equal the value set for the parameter "bF" (default 3 days), the water contained inside the cylinder is completely drained. This function prevents the corrosion of the electrodes by strongly saline water in the case where the humidifier is off for extended periods. Refer to par. 8.3, in particular parameter b1 of the special functions, during this drain phase the display shows the code "idr".

12.2.6 Powered draining

When automatic draining is performed to discharge the accumulated salts (also see par. 12.2.2), the electrodes are not powered. This creates a temporary reduction in steam production. If, vice-versa, the electrodes should remain powered in this phase too, "powered draining" can be enabled.

Refer to par. 8.3, in particular parameter b1 of the special functions.

12.2.7 Draining due to a significant reduction in the request for production

In the event of a significant reduction in the request for steam production, the humidifier, rather than wait for the level of water (and thus the production) to decrease due to the effect of the production itself, drains some of the water. The reduction in the request for steam production is considered significant if the current is 33% higher than that relating to the requested level. This function can be disabled. Refer to par. 8.3, in particular parameter b1 of the special functions.

12.2.8 Disabling the "cylinder being depleted" and "cylinder depleted" alarms

The "cylinder being depleted" and "cylinder depleted" alarms are both present. The two alarms can be enabled/disabled as follows:

Set parameter b1: if $b1 < 16$, the two messages are already disabled; if $b1 \geq 16$, decrease the value by 16 to disable both the messages. Example: $b1=8$ if the messages are already disabled; $b1=18$: the messages are enabled if decrease b1 from 18 to 2 ($=18-16$) to disable both the messages (see par. 8.3).

N.B.: the alarms are enabled/disabled together, they cannot be enabled/disabled separately.

12.2.9 Complete periodical draining (H controllers)

With certain types of water the cylinder needs to be periodically drained (water with impurities, humus, very aggressive water). To activate the periodical draining function, the weight 64 must be set for parameter b1. At this point, as default every 24 hours the controller will run a complete drain cycle of the cylinder, and the display will show the code "dP" (periodical drain). If periodical draining is enabled, the number of hours between two drain cycles can be changed, by setting the parameter "bE".

12.2.10 Automatic water supply management

The controller detects if there is no supply water or alternatively if the flow-rate is too low, by controlling the increase in the phase current at the electrodes after the opening of the fill electrovalve.

When insufficient supply water is detected, the controller runs the following sequence:

1. displays the alarm "EF" and activates the alarm relay;
2. opens the remote control switch and closes the fill electrovalve for 10 min;
3. after 10 min, opens the fill electrovalve and closes the remote control switch, and then measures the phase current: If the current increases, the controller concludes water has returned, and cancels the alarm on the display, deactivates the alarm relay and returns to normal operation; otherwise, it returns to step 2, awaiting the next check.

13 TECHNICAL SPECIFICATIONS

Model	SEH001*	SEH003*	SEH003**	SEH005*	SEH005**	SEH008**	SEH010**	SEH015**	SEH025**	SEH035**	SEH045**	SEH065**
steam												
connection (diam. mm)	208-230 V		22/30		30					2 x 40		
	400-460-575 V		22/30		30			1 x 40				2 x 40
outlet pressure limits (Pa)			0 / 2000		0 / 1600		0 / 1700		0 / 2300			
supply water												
connection	3/4" G											
temperature limits (°C)	1...40											
pressure limits (MPa)	0.1...0.8 (1...8 bar)											
hardness limits (°fH)	40											
instant flow-rate (l/min)	0.6			1.2			4			7		
conductivity range (µS/cm)	125...1250											
drain water												
connection (diam. mm)	40											
typical temperature (°C)	100											
instant flow-rate (l/min)	5						22.5					
environmental conditions												
ambient operating temperature (°C)	1...40											
ambient operating humidity (% rH)	10...60											
storage temperature (°C)	-10...70											
storage humidity (% rH)	5...95											
index of protection	IP20											
electronic controller												
type	UES-UEP-UEH											
auxiliary voltage / frequency (V - Hz)	24/50/60											
maximum auxiliary power (VA)	30						40					
probe inputs for versions H	selectable by signal: 0 to 1 Vdc, 0 to 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA											
(general characteristics)	input impedance: 60 Ω with signals: 0 to 1 Vdc, 0 to 10 Vdc, 2 to 10 Vdc											
	50 Ω with signals: 0 to 20 mA, 4 to 20 mA											
power to active probes for versions H	28 V (24 Vac rectified), I _{max} = 250 mA											
(general characteristics)	12 Vdc 5%, I _{max} = 50 mA											
alarm relay outputs for versions H	250 V 5 A (2 A) - microinterruption action type 1C											
(general characteristics)												
alarm relay and dehum. outputs for vers. H	250 V 8 A (2 A) - microinterruption action type 1C											
(general characteristics)												
remote enabling input (general characteristics)	free contact; max. resistance 50 Ω; V _{max} = 24 Vdc; I _{max} = 5 mA											
serial communication for versions H	RS-485 two-wire											
power												
rated power supply voltage: 208 V - 1-N code U												
instant steam production (1) (kg/h)	1.5	3.0		5.0								
power input at rated voltage (kW)	1.12	2.25		3.75								
rated power supply voltage: 230 V - 1-N code D												
instant steam production (1) (kg/h)	1.5	3.0		5.0								
power input at rated voltage (kW)	1.12	2.25		3.75								
rated power supply voltage: 208 V - 3- code W												
instant steam production (1) (kg/h)			3.0		5.0	8.0	10.0	15.0	25	35	45	
power input at rated voltage (kW)		2.25		3.75	6.00	7.50	11.25	18.75	26.25	33.75		
rated power supply voltage: 230 V - 3- code K												
instant steam production (1) (kg/h)			3.0		5.0	8.0	10.0	15.0	25	35	45	
power input at rated voltage (kW)			2.25		3.75	6.00	7.50	11.25	18.75	26.25	33.75	
rated power supply voltage: 400 V - 3- code L												
instant steam production (1) (kg/h)			3.0		5.0	8.0	10.0	15.0	25	35	45	65
power input at rated voltage (kW)			2.25		3.75	6.00	7.50	11.25	18.75	26.25	33.75	48.75
rated power supply voltage: 460/480 V - 3- code M												
instant steam production (1) (kg/h)			3.0		5.0	8.0	10.0	15.0	25	35	45	65
power input at rated voltage (kW)			2.25		3.75	6.00	7.50	11.25	18.75	26.25	33.75	48.75
rated power supply voltage: 575 V - 3- code N												
instant steam production (1) (kg/h)					5.0	8.0	10.0	15.0	25	35	45	65
power input at rated voltage (kW)					3.75	6.00	7.50	11.25	18.75	26.25	33.75	48.75

Tab. 13.1

* single-phase, ** three-phase

(1) the average steam production is affected by factors such as: the ambient temperature, the quality of the water and the steam distribution system

13.1 Dimensions and weights

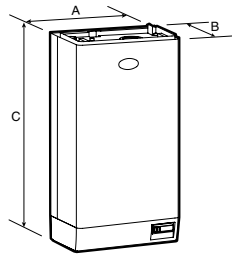


Fig. 13.1.1

		SEH 001...008	SEH 010...015	SEH 025...045	SEH 065
dimensions (mm)	A	365	365	555	650
	B	275	275	360	455
	C	620	710	890	945
weight (kg)	packaged	16	20	39	51
	empty	13.5	17	34	44
	installed *	19	27	60.5	94

Tab. 13.1.1

*: in operating conditions, filled with water

13.2 Technical specifications of the remote control

Type	Description
power supply	2 x 1.5 V alkaline batteries (type UM-4 AAA, IEC R03)
container	plastic / metal cover plate
dimensions (mm)	60 x 160 x 18
storage temperature (°C)	-25T70
operating temperature (°C)	0T40
type of transmission	infrared
weight (g)	80 (without batteries)

Tab. 13.2.1

13.3 Technical specifications of the ventilated steam distributor

humidifier model	SEH001	SEH003	SEH005	SEH008	SEH010	SEH015	SEH025	SEH035	SEH045	SEH065
ventilated steam distributor model	VSDUOA						VRDXL			
rated power (W)	30	30	30	30	30	30	35	35	35	35
air flow-rate (m3/h)	170	170	170	170	170	170	650	650	650	650
noise level (open field, max speed, 1m from front panel) (dBA)	50	50	50	50	50	50	40	40	40	40
operating temperature / humidity (°C / % rH)	-10T40/ 10T60	-10T40/ 10T60	-10T40/ 10T60	-10T40/ 10T60	-10T40/ 10T60	-10T40/ 10T60	-10T60/ 0T80	10T60/ 0T80	-10T60/ 0T80	-10T60/ 0T80

Tab. 13.3.1

STULZ reserves the right to modify or change its products without prior notice.

