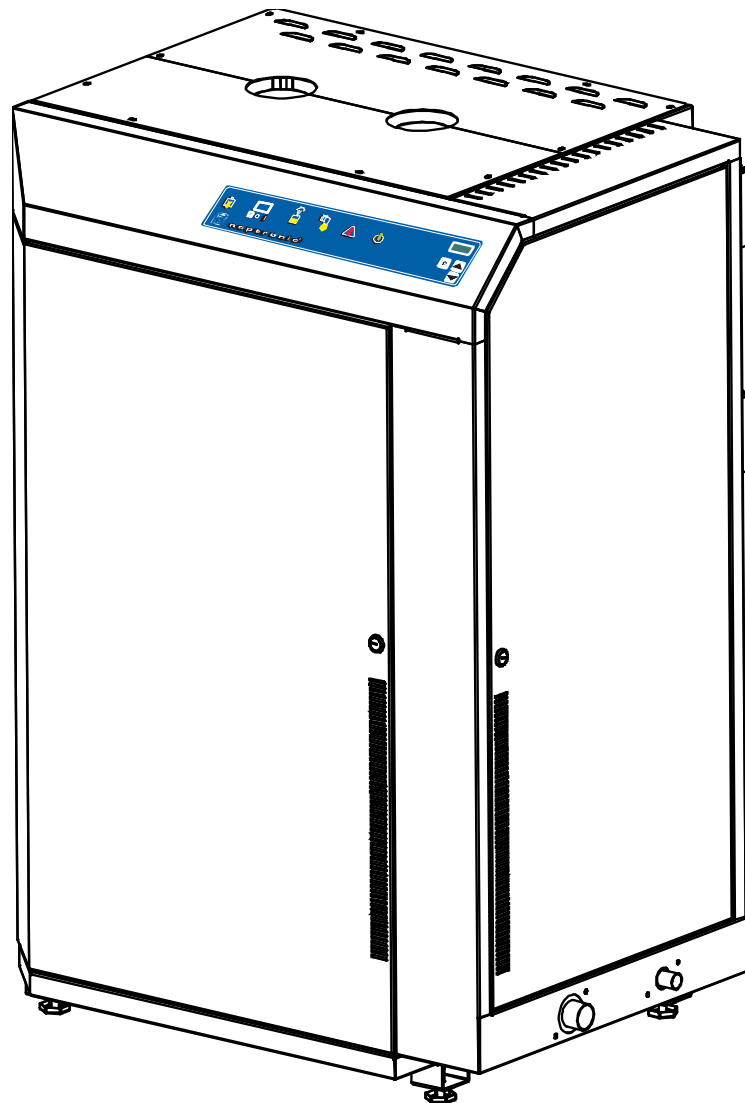




neptronic®

Electric Steam Humidifier SKE90/100/110/120 Series SKE-XL

INSTALLATION INSTRUCTIONS



CE

Read and save these instructions

ELECTRICITY

All work concerned with electrical installation **MUST** only be performed by skilled and qualified technical personnel (e.g. electrician or technician with appropriate training). The customer is always responsible for ensuring the suitability of the technical personnel.

Please observe the local regulations concerning the provision of electrical installations.

HEALTH & SAFETY

Neptronic[®] has considered aspects of the design of their humidification systems to reduce as far as possible the risk of Legionnaires' disease and other similar conditions but it is important that users are also aware of their responsibilities.

To prevent the growth of Legionella, users are required to:

- Avoid water temperature that favors the growth of Legionella 20-45°C.
- Avoid water stagnation.
- Clean and disinfect the humidification system.
- Have a competent person carry out a risk assessment of the water system supplying the humidifier to ensure the water supply is of an acceptable quality

CORRECT USE

Neptronic[®] systems and products are designed only for humidification use.

Any other application is not considered use for the intended purpose. The manufacturer cannot be made liable for any damage resulting from incorrect use.

ACCESS

NEVER LEAVE SKE-XL CABINET KEYS IN THE DOORS AS UNAUTHORIZED ACCESS TO LIVE ELECTRICAL PARTS MAY BE GAINED – ALWAYS STORE KEYS CENTRALLY WITH NOMINATED RESPONSIBLE PERSON.

WATER

Neptronic[®] systems are designed to be used with mains, reverse osmosis, demineralized or partially softened water. On no account attempt to introduce any other fluid or chemical into the system without first consulting Neptronic[®] or its authorized distributor.

Water supply must not exceed the max pressure of 480 kPa, or pressure limits laid out in the Specification and Installation Instructions, and must comply with local regulations.

***Neptronic
Company
Overview***

Founded in 1976, we're a private corporation that designs, manufactures and distributes products for the HVAC industry. Our product line includes intelligent controllers, electronic actuators, actuated valves, humidifiers and electric heaters.

Our products are designed and manufactured by over 250 dedicated employees in our 7,500 m² (80,000 ft²) state-of-the-art facility located in Montreal, Canada. Using a vertical integration model, our entire manufacturing chain is under one roof from software and hardware development, to SMT circuit board assembly, to sheet metal fabrication, to product testing ensuring that our products are engineered to last.

We currently hold several national and international patents and with our continued commitment to research and development, we provide innovative products and technologies for the ever-evolving challenges of the HVAC industry. Exporting over 70% of our sales, we have an exclusive distribution network around the globe that provides comprehensive solutions to our worldwide customers.

About the Manual

These installation and operation instructions have been developed to facilitate the installation of the SKE-XL Steam Humidifier.

The strict application of these instructions will ensure the conformity of your installation and operation as per the manufacturer's recommendations.

The application of these instructions is one of the conditions for the application of the warranty.

The application of these instructions does not ensure, at any time conformity to procedures, regulation or local codes, regarding electric installation and connection to local water supply.

This product has been declared to conform to applicable European safety and electromagnetic compatibility standards and directives and bear the CE mark. The certificate of conformity CE is available upon request to the manufacturer.

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Electricity

All work concerned with electrical installation **MUST** only be performed by skilled and qualified technical personnel such as an electrician or a technician with appropriate training). The customer is always responsible for ensuring the suitability of the technical personnel.

Please observe the local regulations concerning the provision of electrical installations.

Correct Use

Neptronic systems and its products are designed only for humidification use. Any other application is not considered appropriate for the intended purpose. The manufacturer cannot be made liable for any damage resulting from incorrect use.

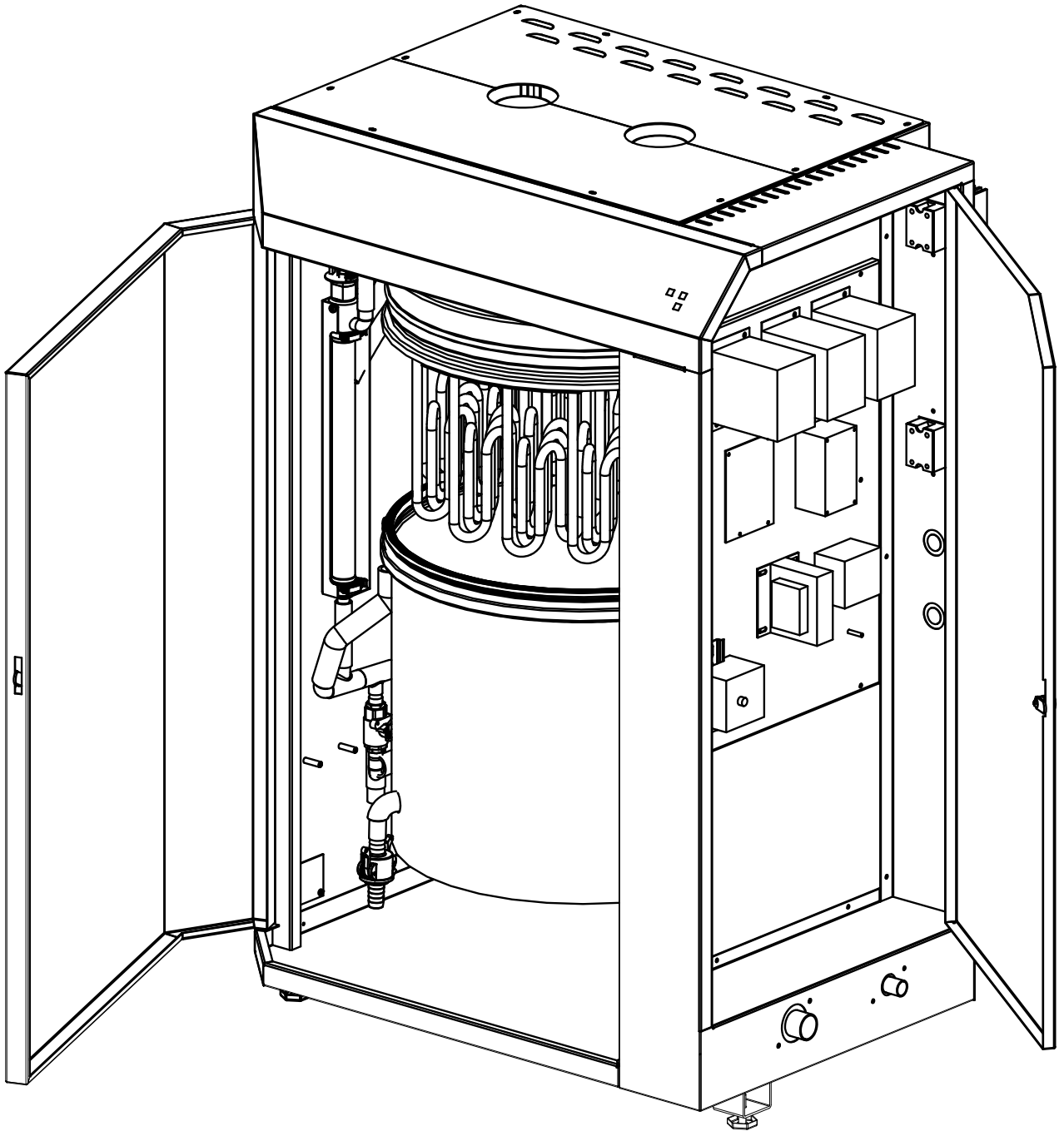
General Warranty

This product is subject to the terms and conditions described at <http://www.neptronic.com/Sales-Conditions.aspx>.

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Technical Specifications

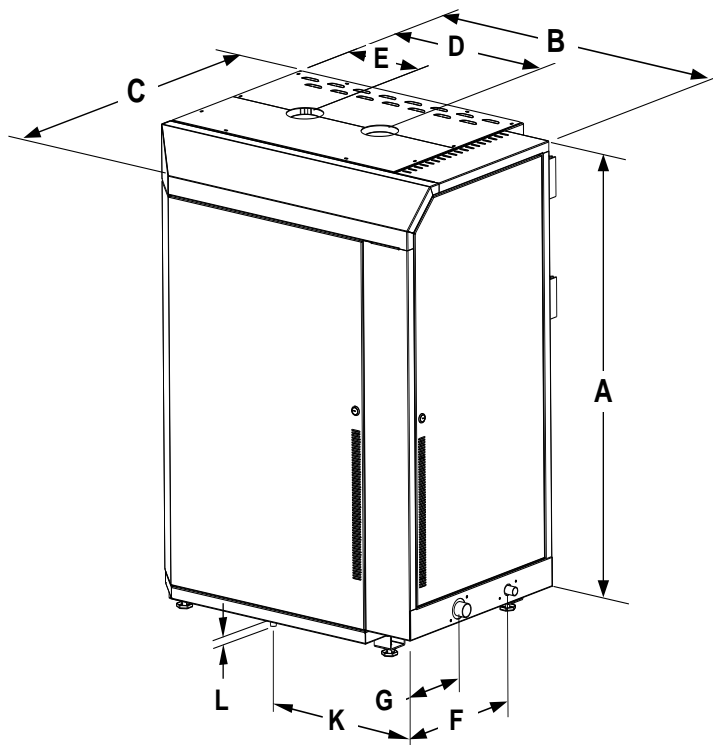


3D opened view
(Illus.1)

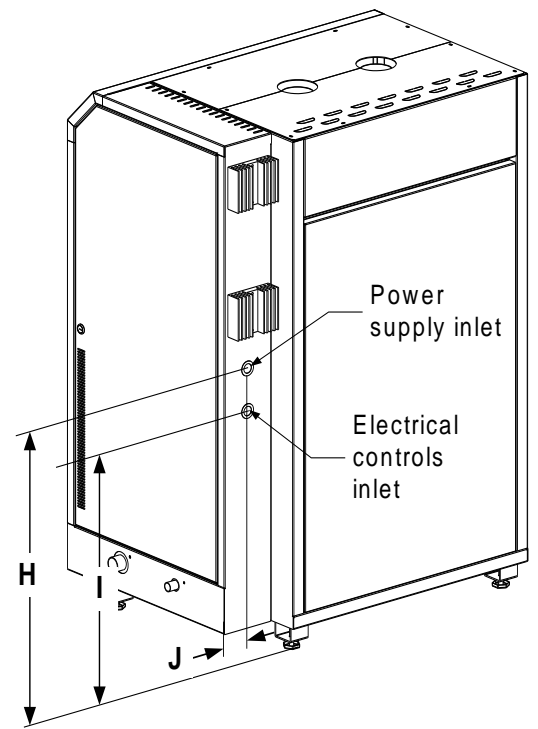
Model	Steam cap. [kg/h]	Power (kW)	Current (A)	Nb of outlets	Multi-Steam header diam. [mm]
			400V / 3ph		
SKE90	90	66	96	1	Ø76 mm
SKE100	100	74	107	1	Ø76 mm
SKE110	110	82	119	2	Ø76 mm
SKE120	120	90	130	2	Ø76 mm

Notes: Maximum static duct pressure is 1.25 kPa. For higher static duct pressures please consult Neptronic® or its authorized distributor.

Dimensions & Weights



Front view
(Illus. 2a)



Back view
(Illus. 2b)

General Dimension & Weight

Model	Dimensions in mm			Weight in kg	
	A	B	C	Empty	Full of water
SKE90 SKE100 SKE110 SKE120	1221	838	635	145	200

Water Inlet, Steam and main Drain outlets Dimensions

Model	No of Steam Outlets	Dimensions in mm						
		Steam Outlet Diam.	D	E	Drain Outlet Diam	Water Inlet Diam	F	G
SKE90 SKE100	1	Ø76	462	n/a	Ø20	1/2" NPT	383	190
SKE110 SKE120	2	Ø76	462	230	Ø20	1/2" NPT	383	190

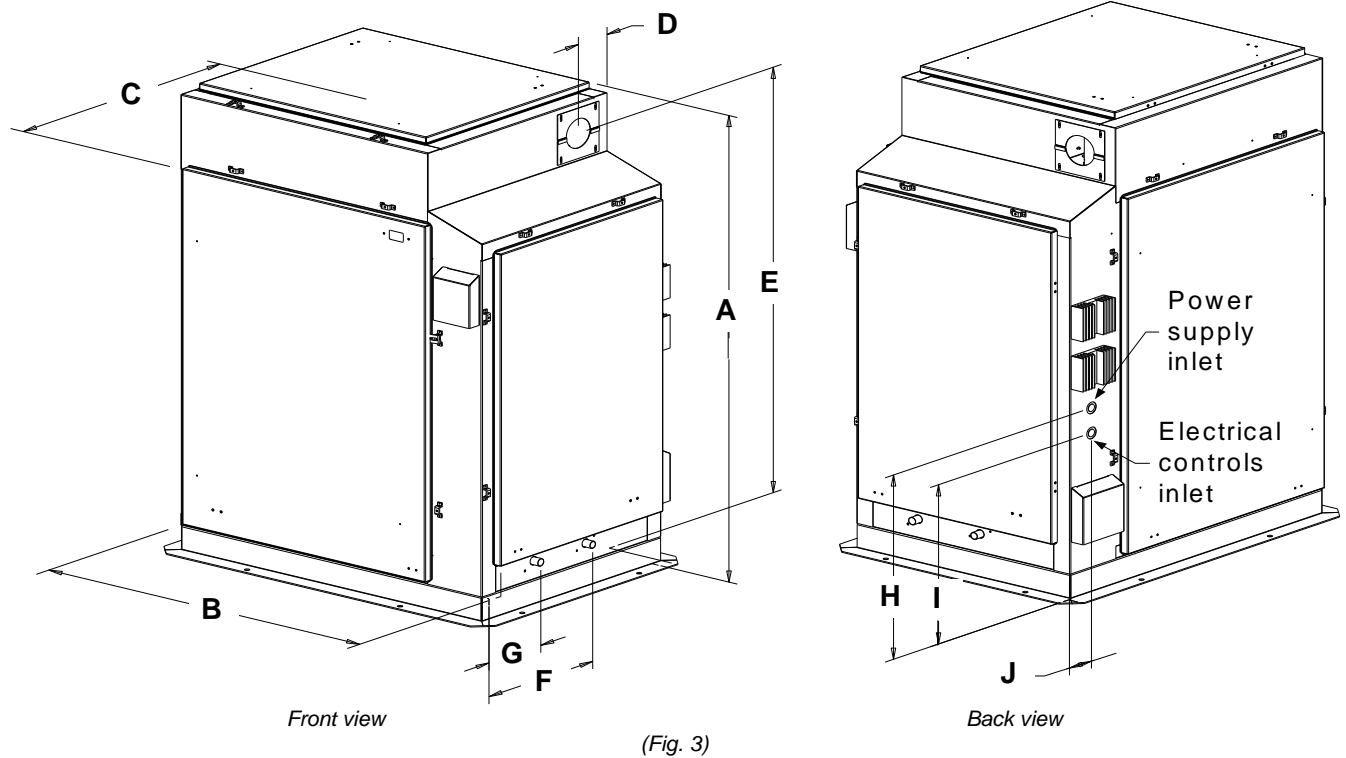
Note: Drain outlet and water supply inlet are located on the right hand side of the humidifier. Left hand side location of any of is available upon request.

Electrical inlets and Pan drain outlet Dimensions

Model	Dimensions in mm						
	Electrical KO Diam.	H	I	J	Pan Drain Outlet Diam.	K	L
SKE90 SKE100 SKE110 SKE120	Ø22 & 35	670	569	55	Ø15	488	25

Dimensions & Weights

Option: Weather proof enclosure general dimensions and weights



General Dimension & Weight

Model	Dimensions in mm			Weight in kg	
	A	B	C	Empty	Full of water
SKE90 SKE100 SKE110 SKE120	1417	965	727	184	240

Water Inlet, Steam and main Drain outlets Dimensions

Model	No of Steam Outlets	Dimensions in mm						
		Steam Outlet Diam.	D	E	Drain Outlet Diam	Water Inlet Diam	F	G
SKE90 SKE100	1	Ø76	109	1291	20	Ø½" NPT	383	190
SKE110 SKE120	1	Ø100	109	1291	20	Ø½" NPT	383	190

Note: Steam outlet, drain outlet and water supply inlet are located on the right hand side of the humidifier
Left hand side location of any of is available upon request.

Electrical inlets and Pan drain outlet Dimensions

Model	Dimensions in mm			
	Electrical KO Diam.	H	I	J
SKE90 SKE100 SKE110 SKE120	Ø22 & 35	560	483	78

Handling & Unpacking



Handling and Lifting

Lifting or handling **MUST** only be carried out by trained and qualified personnel. Ensure that the lifting operation has been properly planned, risk assessed and that all equipment has been checked by a skilled and competent Health & Safety representative and effective control measures put in place.

It is the customer's responsibility to ensure that operators are trained in handling heavy goods and to enforce the relevant lifting regulations.

Refer to Dimensions & Weight section for system dry weights.

The SKE-XL Steam Humidifier **MUST** always be handled and lifted with care and must remain in its original packaging for as long as possible prior to installation

The SKE-XL Steam Humidifier package may be carried using a forklift from the underside. Caution must be exercised to ensure balanced load before lifting.

Lifting sling angle must be greater than 30° to the horizontal.

Unpacking

SKE-XL Steam Humidifier is shipped on a wooden crate.

Remove packing wooden crate and skids prior to installation.

List of accessories supplied

Standard enclosure

- 2 sets of keys.
- 2 adjustable steam hose collars per steam outlet.
- The present *Installation Instructions and User Manual*.
- *Wiring diagram* affixed onto the interior of the electrical compartment door.

Installation Overview



All installation work must comply with local regulations.

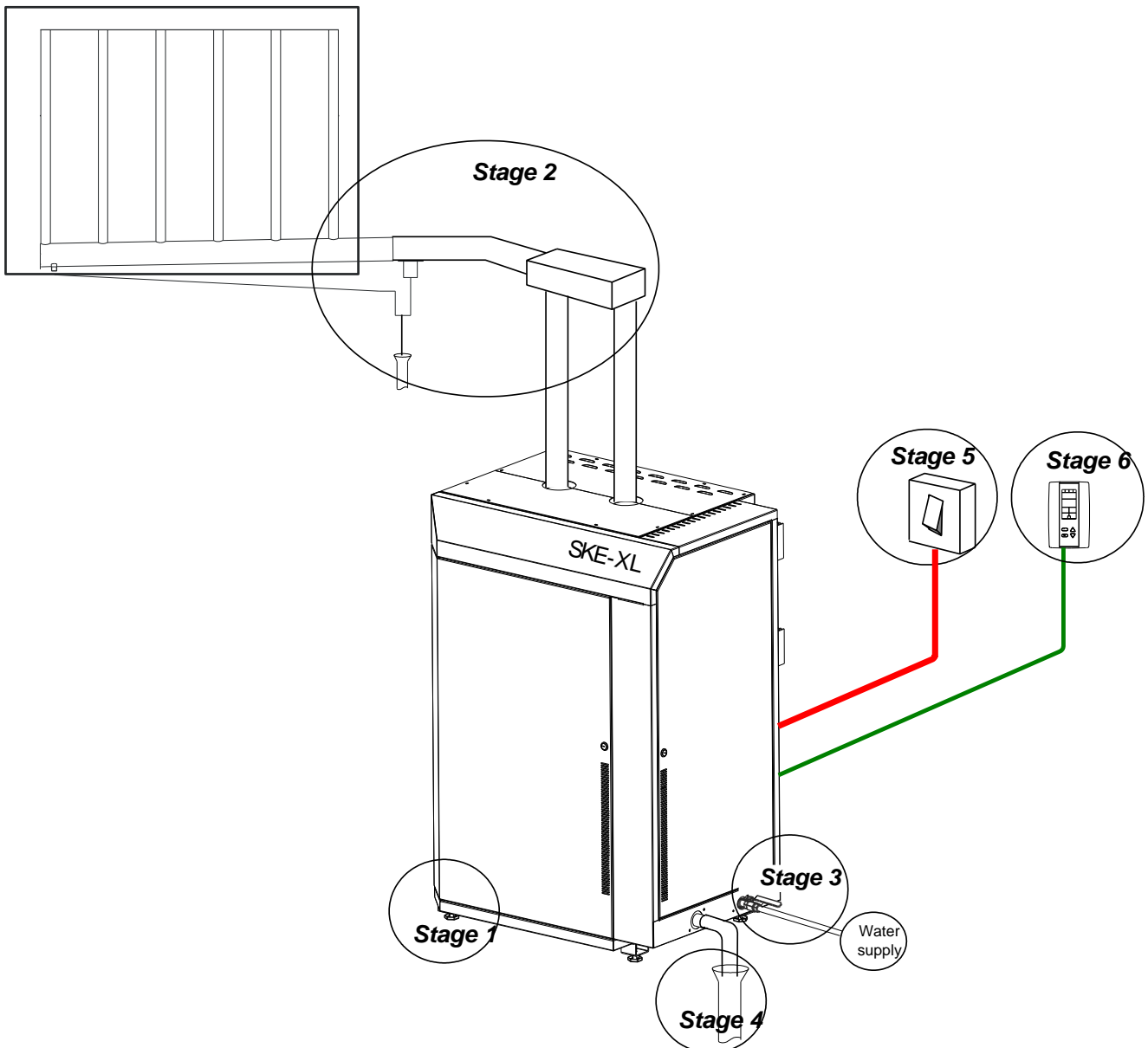
All work related to the installation of the SKE-XL Steam Humidifier **MUST** only be performed by skilled and qualified technical personnel (e.g. qualified gas installer, fitters, electricians, plumbers or technicians with appropriate training).

The customer is responsible for ensuring their suitability.

To install the SKE-XL Steam Humidifier and its associated components, no special tooling is required above that of a fitter's toolkit.

Installation method statement

- Stage 1: Unit Positioning and Mounting
- Stage 2: Steam Distribution Installation
- Stage 3: Water Supply Installation
- Stage 4: Water Drain Connection
- Stage 5: Electrical Supply and Installation
- Stage 6: Electrical Control Connections



(Illus. 4)

Stage 1 – Unit Positioning and Mounting

General considerations



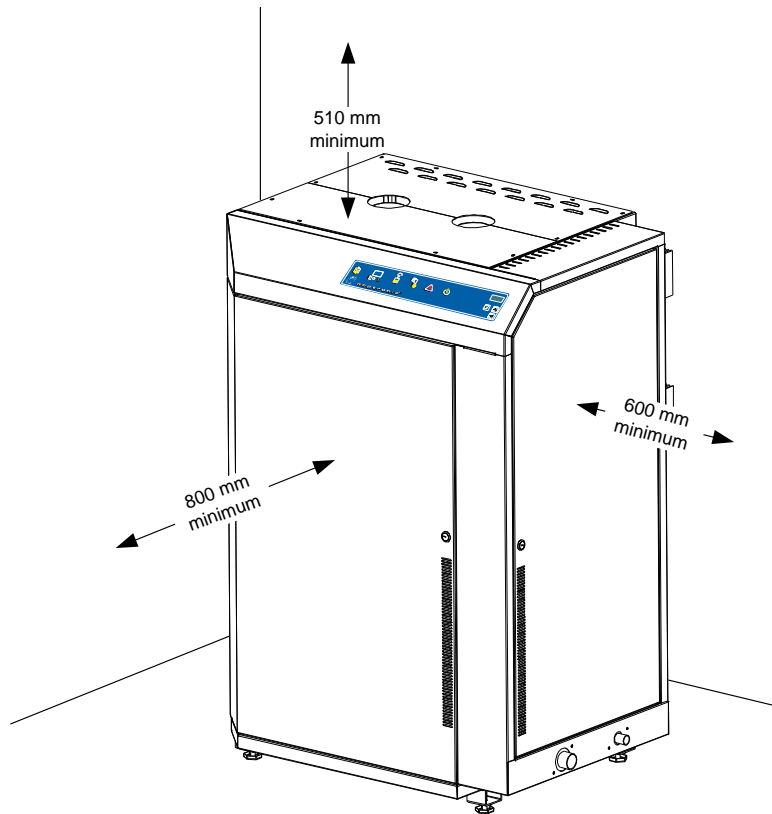
Positioning the Humidifier

Any installation work MUST be carried out by suitably qualified personnel. The following considerations must be taken into account before deciding on the location for the SKE-XL Steam Humidifier:

- Plan a location easy to access in order to permit an easy inspection and servicing of the humidifier.
- Do not install humidifier where failure of the appliance could cause damage to the building structure or to costly equipment.
- Location area must be well ventilated, ambient temperature must not exceed 30°C.

The humidifier must be installed to ensure the steam hose length is kept to the shortest possible length.

- For flexible steam hose: the total steam line length must not exceed 5 meters. For longer distances use insulated hard piping.
- For insulated hard piping: the total steam line length must not exceed 15 meters. For longer steam line runs, consult factory.
- Observe the minimum access distances as shown in Illustration 5.



(Illus. 5) Standard enclosure

Minimum Clearances

Minimum clearances are :

- Top: 510mm minimum
- Electrical panel side: 600mm minimum
- Front: 800mm minimum

The humidifier is designed to be installed directly on the floor.

Provide a level, solid foundation for the humidifier.

Ensure that the floor beneath the humidifier is water proof to withstand any water spillage during servicing or if a problem occurs.

The humidifier is provided with adjustable legs in order to ensure proper level.

Stage 2 – Steam Distribution Installation

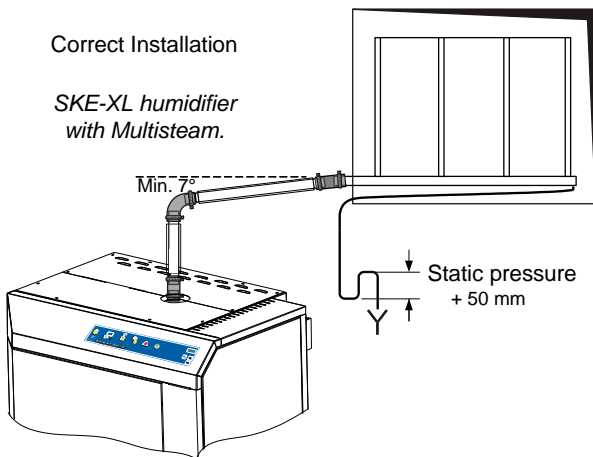
Fundamental Design Concepts



1. Maximum steam velocity in a pipe must not exceed 12m/s velocity. Velocities above this will generate noise.
2. Minimum steam pipe gradient must be 125mm rise in 1m run.
3. The lowest point of any steam hose or rigid pipe must be the humidifier. A steam separator (S trap) must be installed higher than the static pressure of the system by at least 50mm.
4. Total length of the flexible steam hose must not exceed 5 m or insulated rigid piping must not exceed 15 m.
5. Whenever possible use rigid copper piping, flexible steam hose can be used for short runs or for interconnecting between rigid pipe runs, ensure that there is no kink in the flexible hose. When using rigid copper pipe, insulation must be used to diminish condensation build up.

Correct Installation

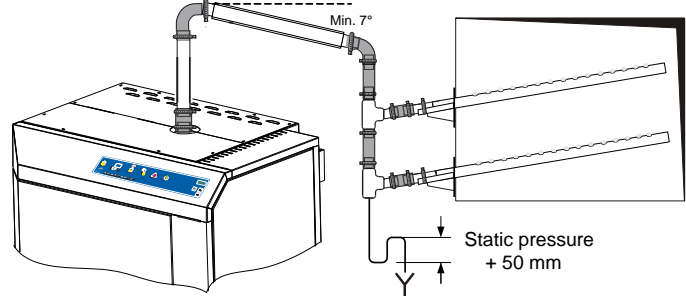
SKE-XL humidifier with Multisteam.



(Illus. 6)

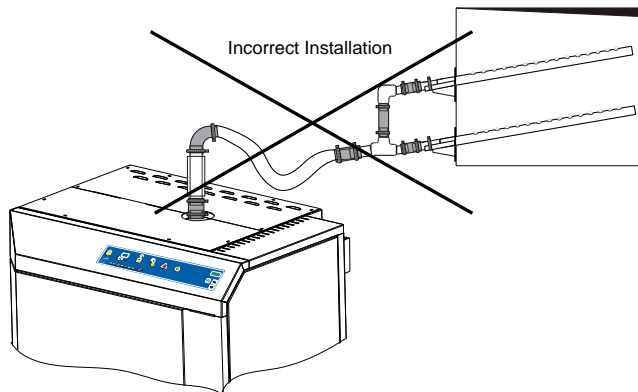
Correct Installation

SKE-XL humidifier with 2 SAMB E2 manifolds



(Illus. 7)

Incorrect Installation



(Illus. 8)

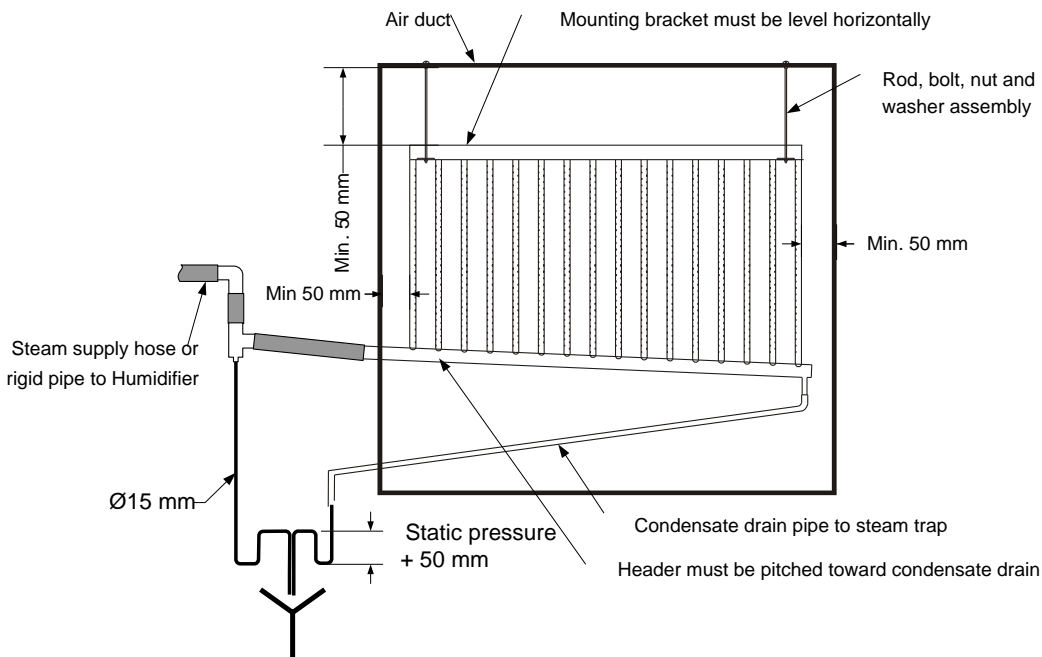
6. Connection pipe sizes between SKE-XL and steam distributor in the duct must be 108mm up to 240kg/h
7. All Humidifiers above 100kg/h capacity must use Multi-Steam.



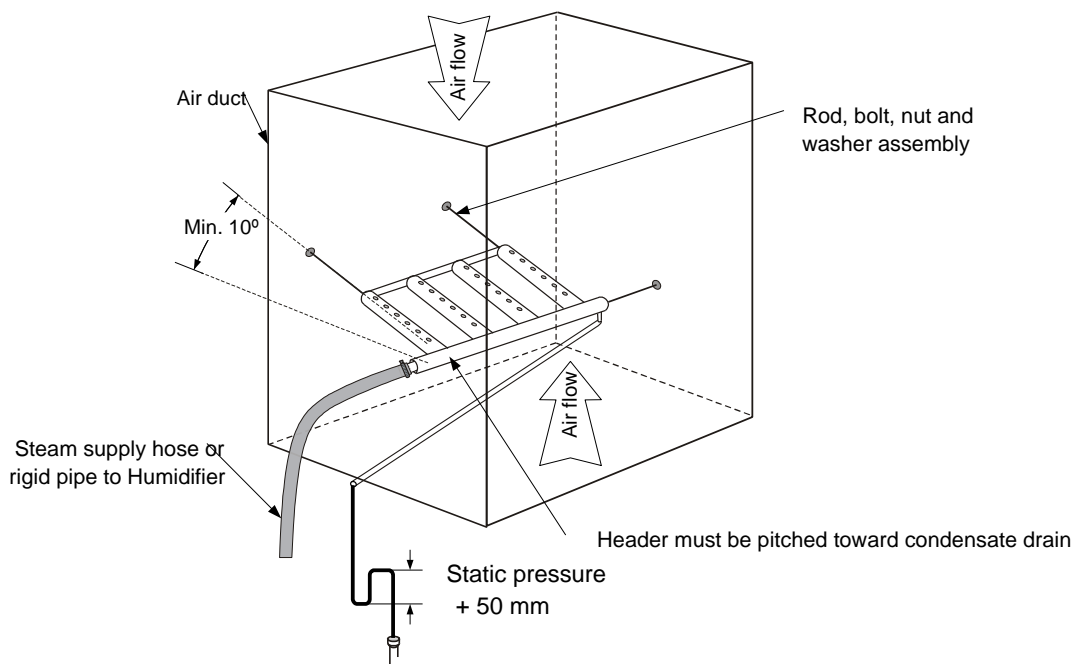
Stage 2 – Steam Distribution Installation

Selection of Multi-Steam

1. For all Multi-Steam units use the Neptronic® Humidisoft program to size the unit.
2. Where two Multi-Steam units are required, duties in excess of 240kg/h make your selection using the following rules:
 - Divide the air volume flow in half.
 - Divide the AHU / air Duct **width** in half.
 - **Height** of the duct must remain at 100% its height.
 - This will size Multi-Steam units so that they can be placed side by side.
3. For installation of Multi-Steam units please refer to Neptronic® Multi-Steam Installation Instructions



Horizontal duct (Illus. 9)

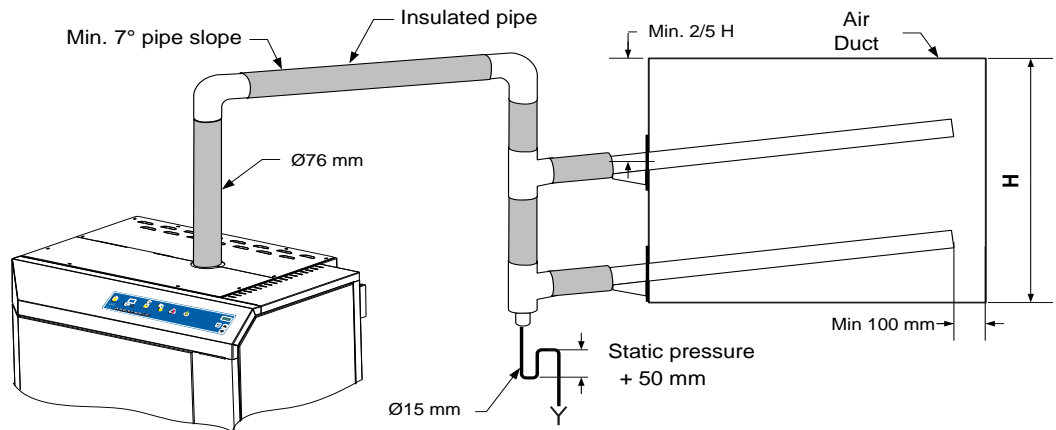


Vertical duct (Illus. 10)

Stage 2 – Steam Distribution Installation

Steam pipe work to Duct connections

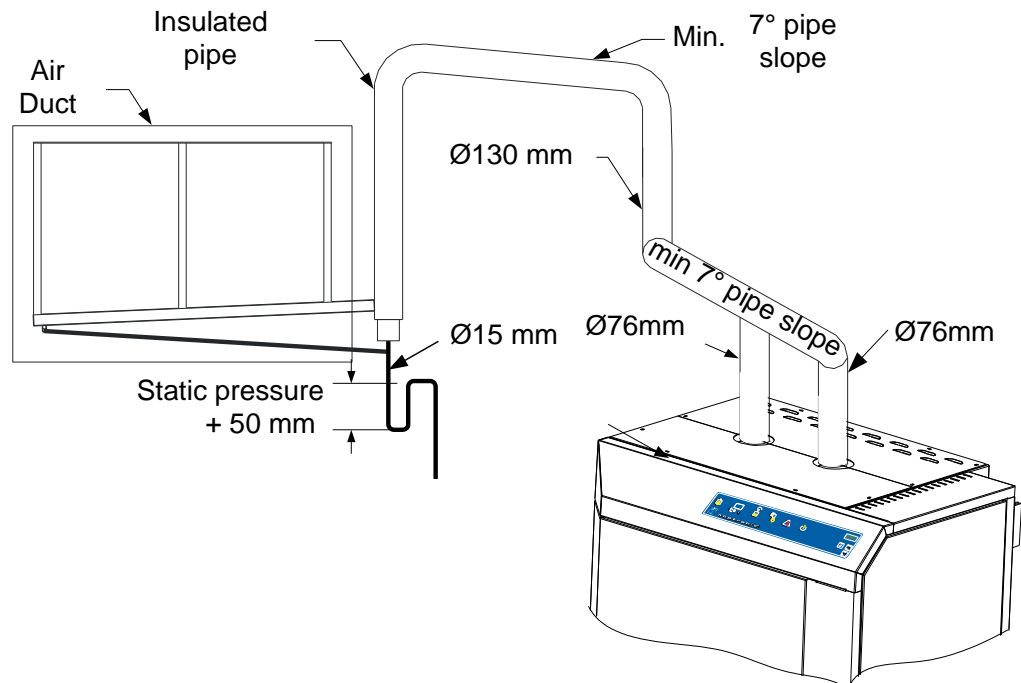
SKE90&100



(Illus. 11)

A single Ø76mm feed pipe must be connected to a single Multi-Steam with a suitable reduction at the lowest point to allow a Ø15mm condensate drain from the main steam supply.

SKE110&120



(Illus. 12)

Two Ø76mm steam outlets to a single Ø130mm feed pipe must be connected to a single Multi-Steam with a suitable reduction at the lowest point to allow a Ø15mm condensate drain from the main steam supply.

Stage 3 – Water Supply Installation



Water supply installation must conform to local codes and regulations.
 Any installation work must be carried out by suitably qualified personnel.

Water inlet Specifications

Neptronic® SKE-XL Humidifier is designed to be used with mains, reverse osmosis, de-ionized and de-mineralized water.

Maximum water supply pressure: 70 to 480kPa

Minimum water temperature: +4°C

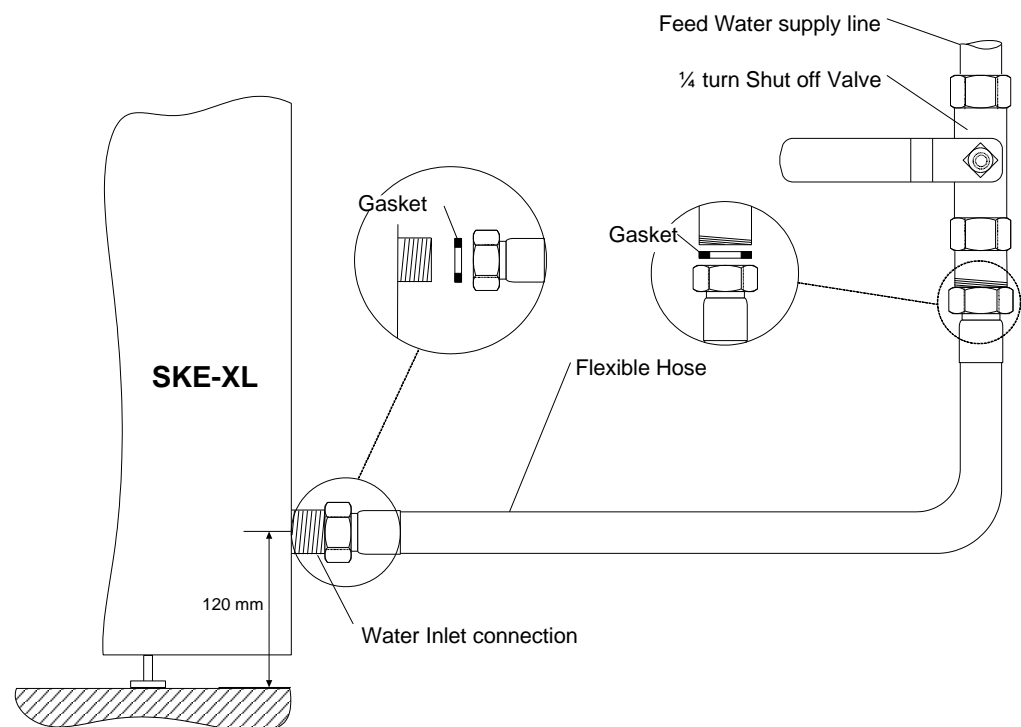
Maximum water temperature: +40°C

<i>Model</i>	<i>Water inlet Connection size</i>
SKE90 SKE100 SKE110 SKE120	\varnothing 15 mm

Water supply line Installation

To facilitate servicing, it is recommended to install a shut off valve (not supplied) in the water line, within 1m of the humidifier.

It is recommended to install a water hammer arrestor, in order to absorb hydraulic shock and minimize water hammer when the fill valve closes.



(Illus. 13)

Stage 4 – Water Drain Connection



Water Drain Specification

Water Drain installation must conform to local codes and regulations.
 Any installation work must be carried out by suitably qualified personnel.

Water Drain temperature: 60°C

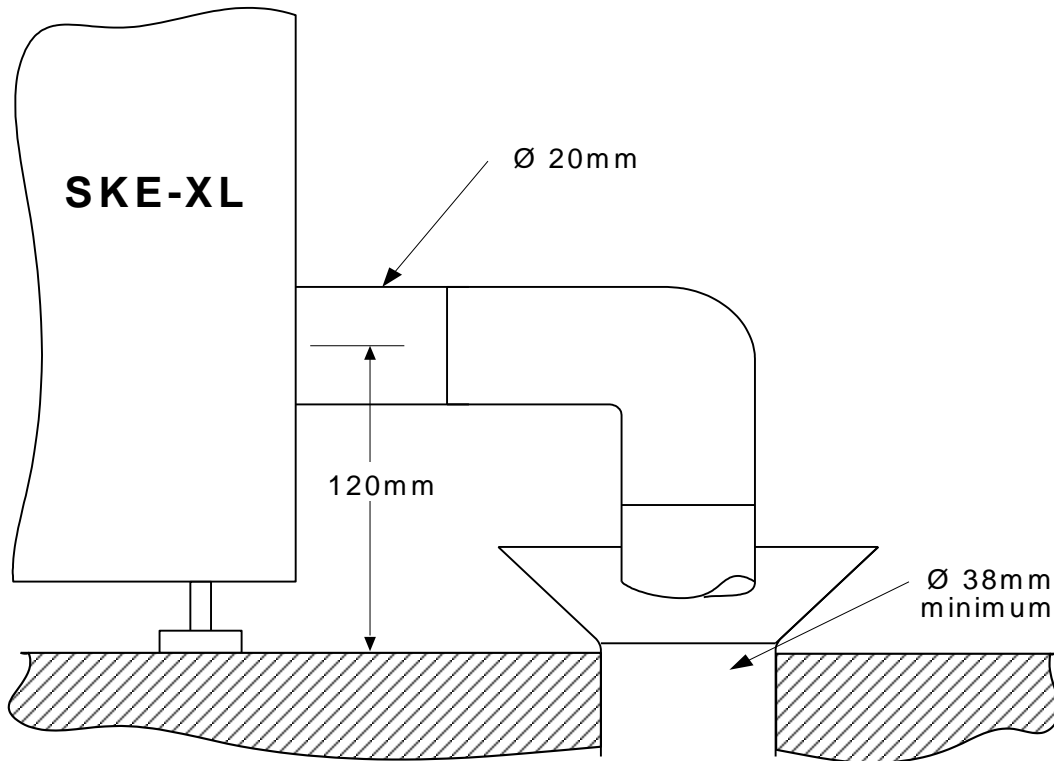
Model	Water Drain Outlet Connection size	Pan Drain Outlet Connection size
SKE90 SKE100 SKE110 SKE120	Ø 20mm	Ø 15mm

Water Drain Installation

Water drain outlet connection must be connected to drain pipe of sufficient size. We recommend the use of Ø 20mm minimum standard copper hydraulic pipes.

Minimum water drain pipe gradient must be 6.5mm per 300mm horizontal run.

No drain trap is required.



(Illus. 14)

Weather Proof Enclosure Water Drain Valve

The weather proof enclosure is equipped with a normally open valve, enabling the humidifier to drain all water during a power failure, in order to prevent water from freezing within the unit. During normal operation, the humidifier reduces drain water temperature to +60°C.



CAUTION: During a power failure, the drain water temperature is not reduced. Installed drain piping must be rated to +100°C.

Stage 5 – Electrical Supply and Installation

Electrical Power Supply

The SKE-XL Steam Humidifier requires 400V three phase supply.

Model	Current (A)
SKE90	96
SKE100	107
SKE110	119
SKE120	130



Electrical connection

All incoming power supplies **MUST** be externally fused for over current protection. The electrical supply must also be isolated for the purpose of emergency and servicing. A disconnect switch must typically be installed within one meter of the humidifier.

The isolator must have a contact separation of at least 3mm.

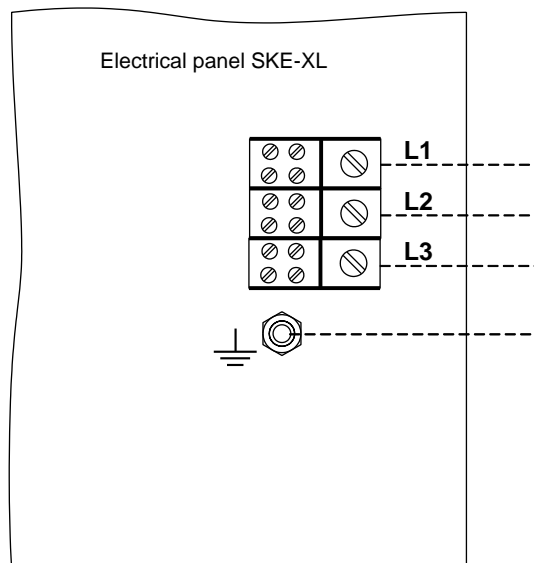
All work related to electrical installation **MUST** only be performed by skilled and qualified technical personnel (e.g. electrician or technicians with appropriate training).

Please observe local codes and regulations concerning the provision of electrical installations.

- **WARNING.** Risk of electric Shock. Ensure that the electrical supply is isolated before beginning any installation.
- **WARNING: RISK OF FIRE.** Do not interchange the power terminal block designated L1, L2 and L3 with Low voltage terminal block designated 1, 2 and 3.

The installation engineer must ensure the following:

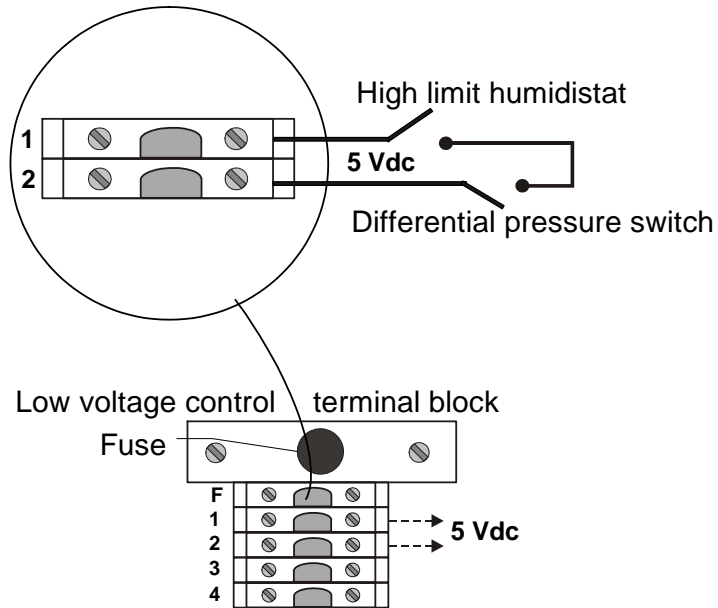
- Use of copper power conductor only.
- Size of the power conductors are suitable for the maximum current supplied.
- Incoming power cable is secured via suitably sized cable gland.
- Each terminal connection is secured firmly with a cable ferrule.
- The ground conductor must be equipped with ring terminal and must be connected directly to the electrical panel on the indicated location.
- Humidifier cabinet has an uninterrupted or unbroken electrical ground.



(Illus. 15)

Stage 6 – Electrical Control Connections

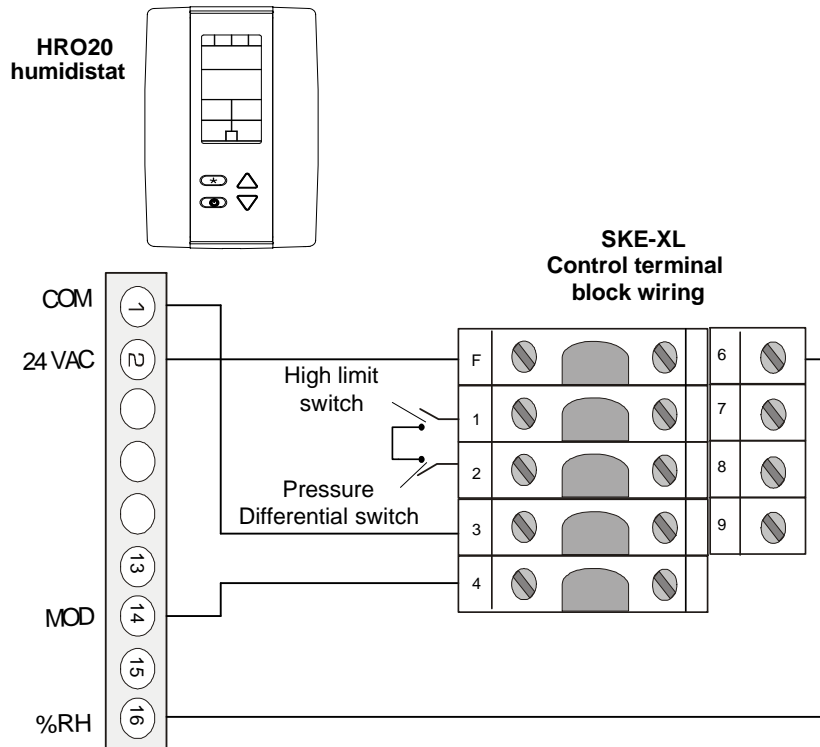
Safety Contacts Neptronic® SKE-XL Steam Humidifier has two safety contacts:



High level humidistat contact must be wired in series with **P.D. Switch** contact and humidistat signal between terminals TB1 & 2
 In case of opening of any on this contact. Operation of humidifier will stop and **Alarm** message will be displayed.

Humidifier Control with humidity controller

Neptronic® SKE-XL modulating Steam Humidifier can be installed in conjunction with Neptronic® **HRO** and **SHC** humidity controller.

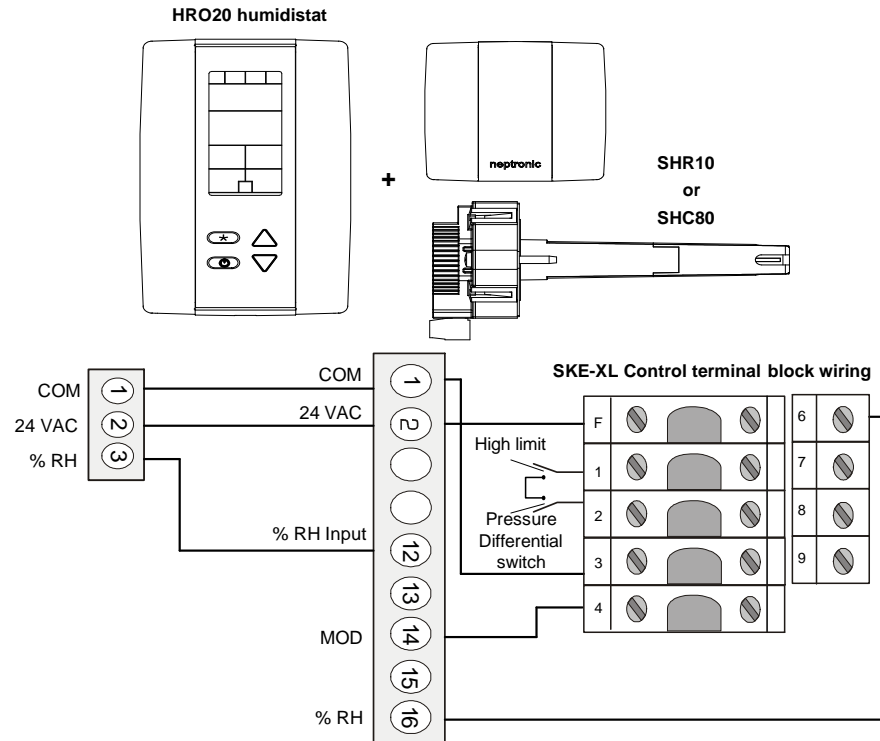


(Illus. 17)

Stage 6 – Electrical Control Connections

Humidifier Control with humidity controller and room or duct sensor

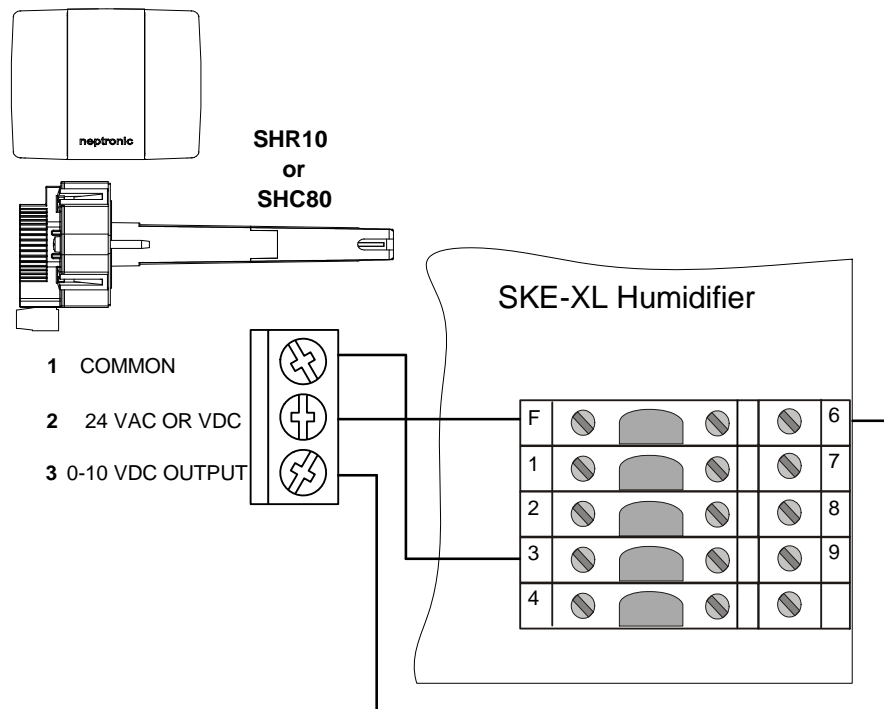
Neptronic® SKE-XL Steam Humidifier can be controlled with Neptronic® HRO20 or HRO20 + SHR10 or SHC80 humidity sensors.



(Illus. 18)

Humidifier Control with humidity sensors

Neptronic® SKE-XL Steam Humidifier can be installed in conjunction with Neptronic® SHR10 or SHC80 humidity sensors.

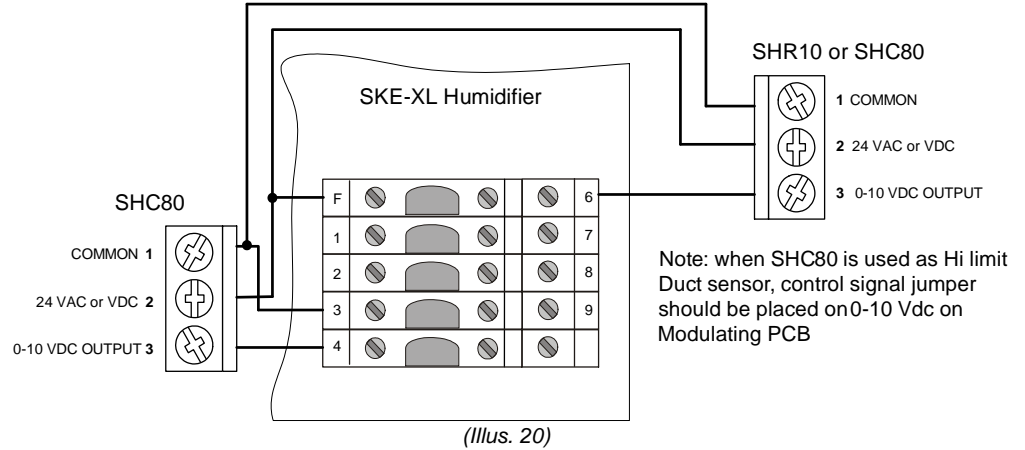


(Illus. 19)

Stage 6 – Electrical Control Connections

VAV System

Neptronic® SKE-XL modulating Steam Humidifier can be installed in conjunction with a VAV system, in this case Neptronic® **SHC** Duct humidity sensor will act as a Hi level Duct Humidity sensor. Humidity will be controlled by Neptronic® **SHR or SHC** Room or Duct humidity controller.

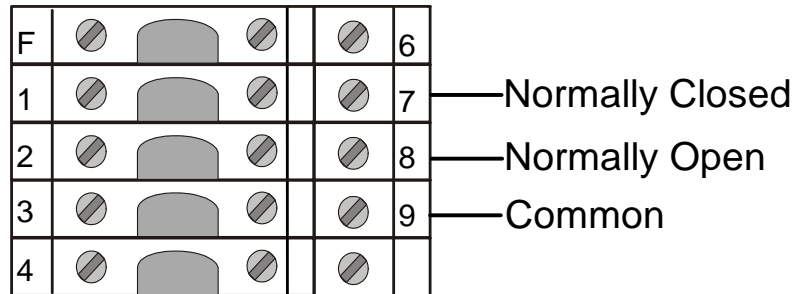


Dry Contacts

2 volt free contacts are provided :

- Operation (fan) contacts:
One normally connected to common and one normally open contact

These contacts are used to switch a low voltage control, up to 24Vac or Vdc, with a switching current of no more than 3 A.



(Illus. 21)

Stage 6 – Electrical Control Connections

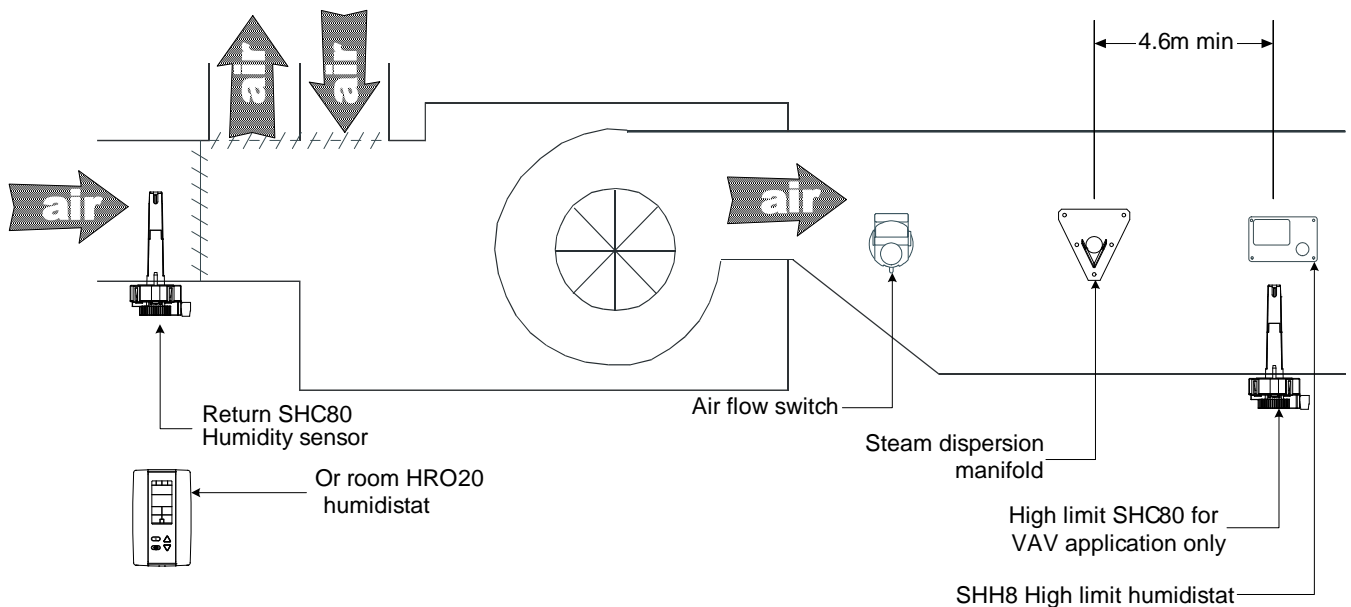
Controls placement

A typical humidifier control system includes the following along with the humidifier:

- A wall or return duct humidistat
- A high limit duct humidistat,
- An air proving switch.

Placement of these devices is critical to proper operation of the overall system.

- The return duct humidistat must always be located before any outside air intake, in order to ensure accurate sensing of the air from the humidified space.
- Alternatively a room humidistat can be used. The room humidistat must be located on an inside wall or column. It must not be near any discharge air from supply ducts or sources of heat or cold.
- The airflow switch must be positioned to accurately open on a loss of air flow, to prevent the humidifier from running when there is no air to absorb humidity.
- The high limit humidistat must be positioned far enough - minimum 4.6m - downstream of the steam dispersion manifold(s) to prevent it from getting wet, but still allows it to accurately prevent over humidification of the duct that could result in condensation.



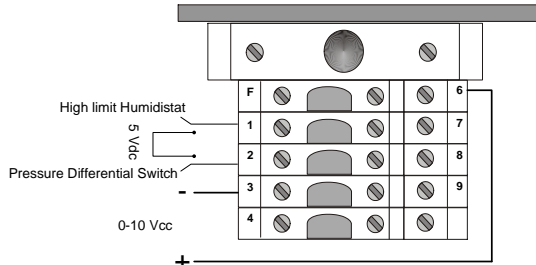
(Illus. 22)

Humidity signal set-up

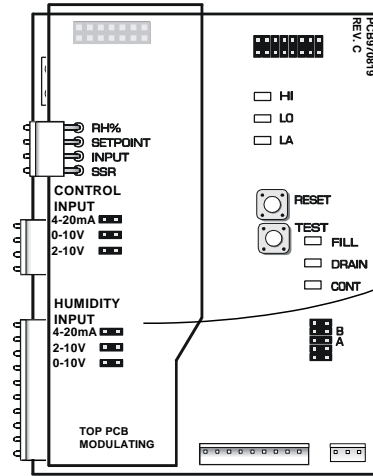
Terminal Block

Modulating Printed Circuit Board

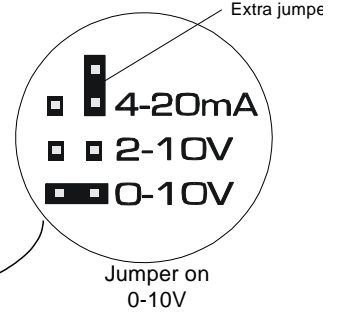
Humidity signal 0-10 Vdc



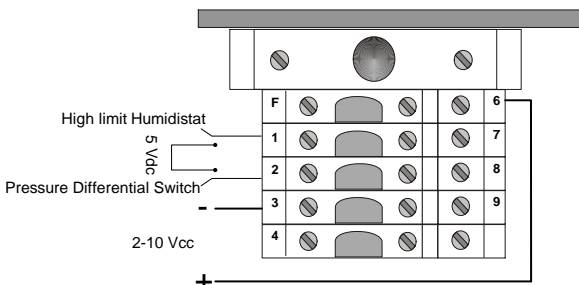
(Illus. 23)



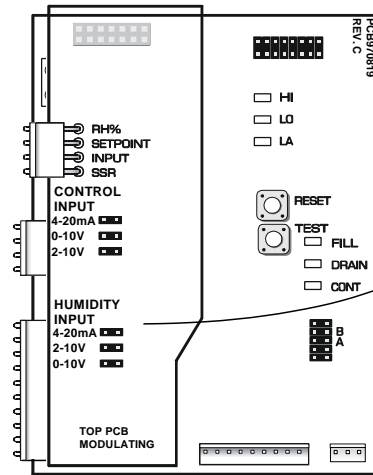
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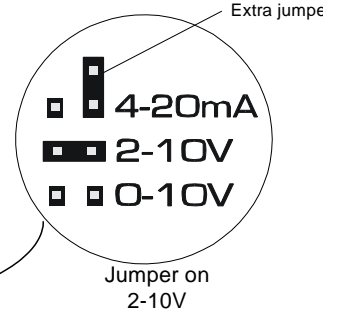
Humidity signal 2-10 Vdc



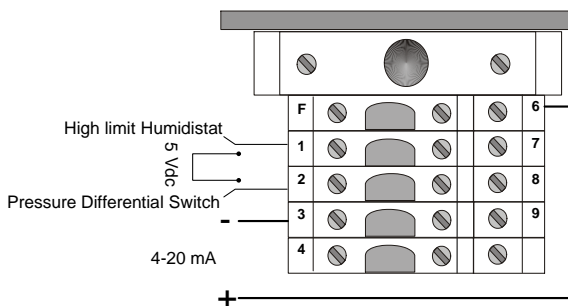
(Illus. 24)



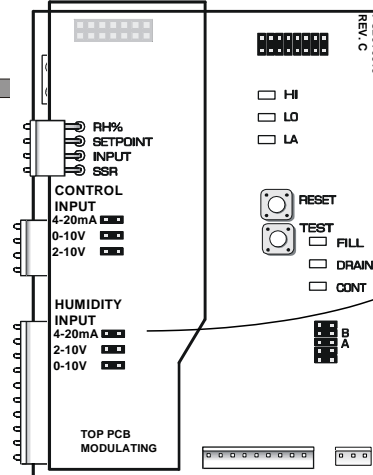
(Illus. 27)



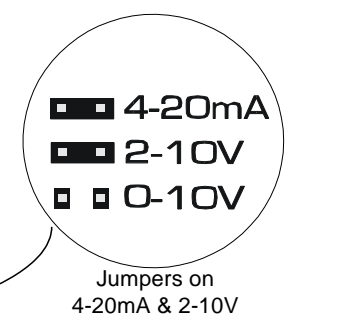
Humidity signal 4-20 mA



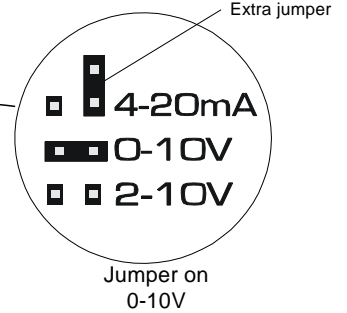
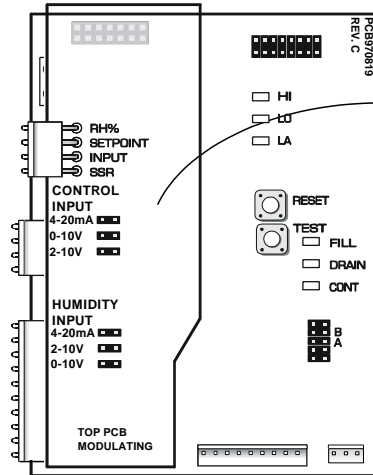
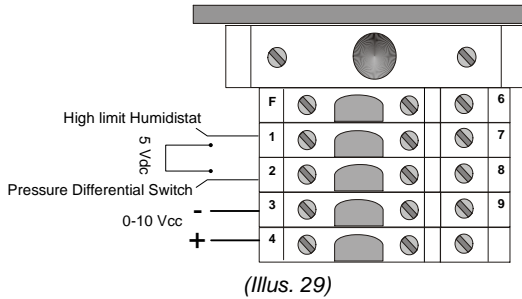
(Illus. 25)



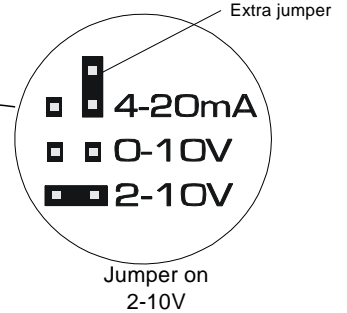
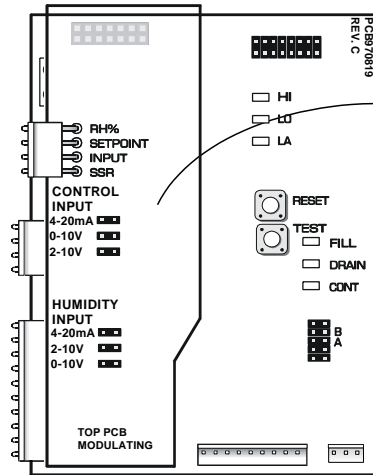
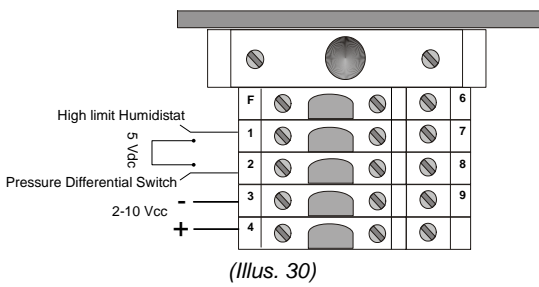
(Illus. 28)



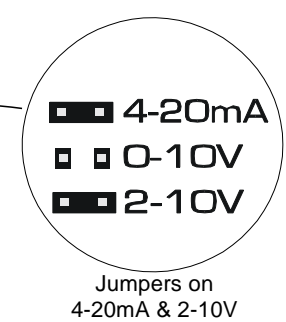
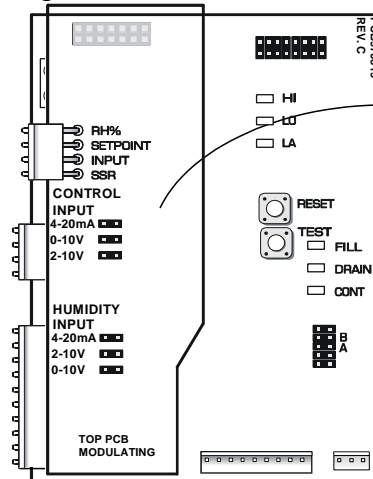
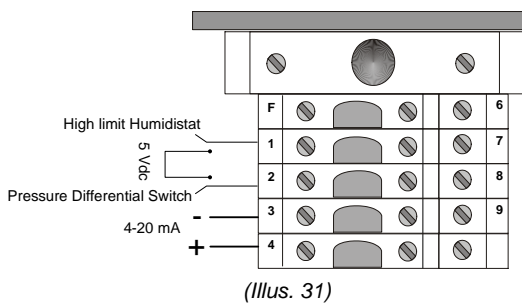
Control Signal set-up

Terminal Block
Modulating Printed Circuit Board
Control signal 0-10 Vdc


(Illus. 32)

Control signal 2-10 Vdc


(Illus. 33)

Control signal 4-20 mA


(Illus. 34)

Initial verification & Start up



Initial verification and start up – commissioning – must be carried out by suitable qualified personnel.

Clearance

1. Ensure that the humidifier cabinet is installed in a location where the humidifier can be serviced correctly.

Electrical

2. Check that the power supply (voltage) conforms to the appliance name plate on the humidifier side.
3. Confirm that 24Vac is present between tab 1&2 of Control terminal, located on the control connection PCB. Remove the front top cover to get to this PCB.

Water

4. Ensure that water is supplied to the humidifier. A shut-off valve must be placed outside the humidifier. Once the water shut-off valve is turned ON, ensure that there are no apparent leaks.
5. Confirm that Drain piping is properly connected with a pitch of least 6.5mm per 300mm horizontal run.

Steam

6. Check that steam distributors are properly installed into the ventilation duct.
7. Verify that the flexible steam hoses and rigid steam supply pipes are shorter length than 5m in total and properly sloped and have condensation S traps wherever required.

Controls

8. Ensure that an air flow switch is installed and properly connected to the humidifier.
9. Ensure that a High limit duct humidistat is installed, properly connected to the humidifier and set point is properly adjusted (recommended value: 80%).
10. Verify that a Room humidistat or returned air duct humidistat is installed, properly connected to the humidifier and set point is properly adjusted.
11. Turn Power ON at the disconnect switch.
12. Confirm the control signal is matching control signal jumper on Main PCB.

Start-up

13. Proceed to start-up the Humidifier, as follows:
- a) Open the front access door of the humidifier cabinet; make sure that manual drain valve is closed.
 - b) Verify that there is a humidity demand. Humidity demand is displayed on the humidifier LCD screen.
 - c) Start up the humidifier by putting rocker switch located on the humidifier control panel at the ON position
 - d) Water will start to flow in and slowly rise in the water level sight glass located on the side of the evaporation chamber. Observe for water leak along the water line.
 - e) Humidifier LCD screen will display the water level with 3 levels of information: Alarm level / Control level / High level
 - f) As soon as Control level is reached, contact will be activated and heater elements powered. From a cold start steam will be produced 3 to 5 minutes after contactors closing
 - g) Observe for water and steam leaks.

Safety test

14. Check the location of the air flow switch in the system and its operation by stopping the fan. With no air movement in the air duct, the humidifier will automatically stop.

Drain and Reset

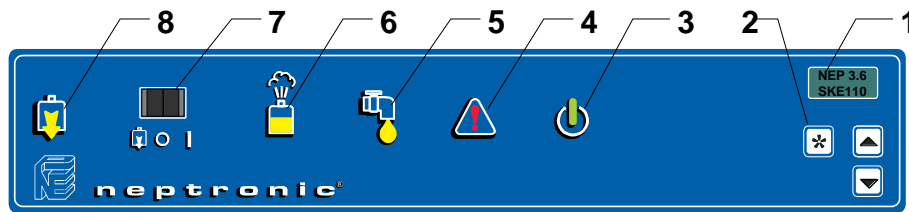
15. Turn the humidifier OFF, by putting rocker switch of the control panel to the 0 (middle) position
16. Execute a manual drain, by putting rocker switch of the control panel to the Drain position. A water jet directed on the water level sensor located in the water level sight glass will start and create bubbles around it.
17. Reset Air flow switch and humidistat(s) to the proper value, if needed.














End

18. Humidifier is ready for normal operation.

Commissioning – Operation description

Control Panel Description Control panel of Neptronic® SKE-XL Steam humidifier is equipped with a user friendly LCD display and extensive access to status, alarms, and set-up menus.



1	Alphanumeric Display: Indicates all operation parameters and the error messages.							
	Push button  ,  and 							
2		 button gives access into program mode.						
	 	Up and Down button: Used to increase or decrease the controlled parameters of the humidifier.						
3	"POWER" indicator							
		<table border="1"> <tr> <td>⊘</td> <td>The humidifier is powered by electricity and the switch is at the AUTO position.</td> </tr> <tr> <td>○</td> <td>The humidifier is disconnected from the power supply.</td> </tr> </table>	⊘	The humidifier is powered by electricity and the switch is at the AUTO position.	○	The humidifier is disconnected from the power supply.		
⊘	The humidifier is powered by electricity and the switch is at the AUTO position.							
○	The humidifier is disconnected from the power supply.							
4	"CHECK" indicator							
		<table border="1"> <tr> <td>⊘</td> <td>The "CHECK" indication is normally off. It will go on as a warning against abnormal conditions of operation. For details consult the Alphanumeric Display (see List of alarms section).</td> </tr> <tr> <td>⊘ <i>blinking</i></td> <td>Maintenance is required. The Running hours have exceeded the Service hours and the humidifier has to be serviced. To stop the CHECK indicator from flashing after servicing, see Step 05 in Programming mode section.</td> </tr> <tr> <td>○</td> <td>No abnormal conditions of operation.</td> </tr> </table>	⊘	The "CHECK" indication is normally off. It will go on as a warning against abnormal conditions of operation. For details consult the Alphanumeric Display (see List of alarms section).	⊘ <i>blinking</i>	Maintenance is required. The Running hours have exceeded the Service hours and the humidifier has to be serviced. To stop the CHECK indicator from flashing after servicing, see Step 05 in Programming mode section.	○	No abnormal conditions of operation.
	⊘	The "CHECK" indication is normally off. It will go on as a warning against abnormal conditions of operation. For details consult the Alphanumeric Display (see List of alarms section).						
⊘ <i>blinking</i>	Maintenance is required. The Running hours have exceeded the Service hours and the humidifier has to be serviced. To stop the CHECK indicator from flashing after servicing, see Step 05 in Programming mode section.							
○	No abnormal conditions of operation.							
"FILL" indicator								
5		<table border="1"> <tr> <td>⊘</td> <td>Indication that the water supply (fill) valve is open.</td> </tr> <tr> <td>○</td> <td>Indication that the water supply (fill) valve is closed.</td> </tr> </table>	⊘	Indication that the water supply (fill) valve is open.	○	Indication that the water supply (fill) valve is closed.		
	⊘	Indication that the water supply (fill) valve is open.						
○	Indication that the water supply (fill) valve is closed.							
6	"STEAM" indicator							
		<table border="1"> <tr> <td>⊘</td> <td>ON/OFF model, the STEAM indicator lights when the contactor is closed and steam is being generated.</td> </tr> <tr> <td>⊘ <i>blinking</i></td> <td>Modulating model, the STEAM indicator blinks ON and OFF in proportion to the percentage of steam output the humidifier is generating. (The proportion is displayed on the alphanumeric display (1)). When the output reaches 100%, the indicator stops flashing.</td> </tr> <tr> <td>○</td> <td>There is no steam being produced.</td> </tr> </table>	⊘	ON/OFF model, the STEAM indicator lights when the contactor is closed and steam is being generated.	⊘ <i>blinking</i>	Modulating model, the STEAM indicator blinks ON and OFF in proportion to the percentage of steam output the humidifier is generating. (The proportion is displayed on the alphanumeric display (1)). When the output reaches 100%, the indicator stops flashing.	○	There is no steam being produced.
	⊘	ON/OFF model, the STEAM indicator lights when the contactor is closed and steam is being generated.						
⊘ <i>blinking</i>	Modulating model, the STEAM indicator blinks ON and OFF in proportion to the percentage of steam output the humidifier is generating. (The proportion is displayed on the alphanumeric display (1)). When the output reaches 100%, the indicator stops flashing.							
○	There is no steam being produced.							
Switch "AUTO/OFF/DRAIN"								
7		<table border="1"> <tr> <td>AUTO</td> <td>Position AUTO (I): Humidifier will generate steam based on demand from the humidistat.</td> </tr> <tr> <td>OFF</td> <td>Position OFF (O): Humidifier will shut off.</td> </tr> <tr> <td>DRAIN</td> <td>Position DRAIN: Humidifier will stop operating and the evaporation chamber will drain the water out. This will be done at regular service.</td> </tr> </table>	AUTO	Position AUTO (I): Humidifier will generate steam based on demand from the humidistat.	OFF	Position OFF (O): Humidifier will shut off.	DRAIN	Position DRAIN: Humidifier will stop operating and the evaporation chamber will drain the water out. This will be done at regular service.
	AUTO	Position AUTO (I): Humidifier will generate steam based on demand from the humidistat.						
	OFF	Position OFF (O): Humidifier will shut off.						
DRAIN	Position DRAIN: Humidifier will stop operating and the evaporation chamber will drain the water out. This will be done at regular service.							
Indicator "DRAIN"								
8		<table border="1"> <tr> <td>⊘</td> <td>Drain valve is opened, whether as a result of an automatic drain cycle or because the front panel switch is manually set to DRAIN.</td> </tr> <tr> <td>○</td> <td>Drain valve is closed.</td> </tr> </table>	⊘	Drain valve is opened, whether as a result of an automatic drain cycle or because the front panel switch is manually set to DRAIN.	○	Drain valve is closed.		
	⊘	Drain valve is opened, whether as a result of an automatic drain cycle or because the front panel switch is manually set to DRAIN.						
○	Drain valve is closed.							

Operation display

Description display modes

"OFF" Mode

When the rocker switch is in the "OFF" position, the display shows the model of the humidifier and the program version number.



(Illus. 35)

Scroll Mode

When the rocker switch is in the auto position, the display scrolls the following information every 6 seconds:


Display	Description	Comment
RH 25% DCT 68%	Display Space and Duct Relative Humidity readings.	Only on modulating humidifiers (suffix M). If no High limit Duct sensor is installed second line is left blank
kg/hr 13	Quantity of steam produced by the humidifier	I.e.: The actual output of the humidifier at that moment is 13 kg/hr.
ALARM LEVEL	Low water level.	Below this water level, the humidifier shuts off and the water supply valve is activated until sufficient level is reached.
CONTROL LEVEL	Water level is controlled	The water supply valve is activated below this level.
HIGH LEVEL	Water at maximum level.	The water supply valve is automatically deactivated.

List of alarms










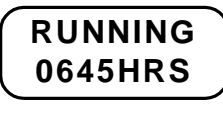



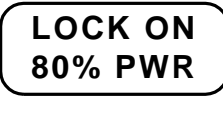
When the following conditions occur, the diagnostic messages override the scrolling information:

<i>Display</i>	<i>Description</i>	<i>Comment</i>
NO DEMAND	No demand	Modulating humidifier: No analog signal to the humidifier. On/Off humidifier: Humidity level has exceeded the set point of the humidistat or humidity level has exceeded the set point on the high limit humidistat or airflow is not detected by the air pressure switch.
SAFETY OPEN	Safety open	Humidity level has exceeded the set point on the high limit humidistat or airflow is not detected by the air pressure switch (modulating humidifier only).
DRAIN CYCLE	Drain cycle	The humidifier is in the automatic drain mode.
CONTACT DELAY	Contact delay	15 second delay for the power contactor to be activated.
OVER HEATED	Overheated	The temperature inside the container has exceeded the boiling temperature. The humidifier has automatically shut off.
PROBE DEFECTED	Defective probe	The water level sensor is not operational. The humidifier has automatically shut off.
NO LEVEL	No water	Water has not reached the level probe. This message appears when turning on the humidifier if the evaporation chamber is empty.
FOAMING CYCLE	Drain foam	AFEC (Anti Foam Energy Conservation) detects foam. The humidifier drains for a few minutes and returns to normal operation.
DRN/PROB BLOCK	Drain or probe block	The DRAIN indicator is on but the water level does not decrease, the humidifier has automatically shut off.
Verify RH Sens	Verify RH sensor	Signal from either SHR10 or SHC80 used as space sensor is lower than 0.49 Vdc to terminal # 6 of humidifier. There might be a connection problem or a defective sensor.
Verify DCT Sens	Verify Duct sensor	Signal from SHC80 used as Hi limit duct sensor is lower than 0.49 Vdc to terminal # 4 of humidifier. There might be a connection problem or a defective sensor.

Programming mode


To enter into programming mode, please push  button at any time, to advance the program function to the next programming step in the menu push the same button twice.

Unless other instructions, you can make a selection by using  &  buttons on control panel.

Step	Display	Description	Comment
01		Set point RH origin Out: Output set point to HRO20 Int: Internal. Value : from 00 to 100% Default: Out 30%	To enable set point to humidifier display <ul style="list-style-type: none"> Press the  button to reach step 5, the RUNNING message will appear. Press and hold the TEST button located on Main Pc board inside electrical compartment for 10 seconds. Release the TEST button then press the RESET button on the same main pc board. Set point is now displayed on the humidifier display. If Output is selected, the set point is sent from the humidifier to the humidistat HRO20. If SHR10 or SHC80 is connected with humidifier, please select Internal, this will allow you to set up RH set point directly from Humidifier. To switch between Output and Internal Set point: Press and hold the TEST button located on Main Pc board inside electrical compartment until the change of the value.
02 optional		Set point VAV allows Hi limit Duct humidity control OFF: Duct humidity control disable. 65%: High limit Duct humidity set point value. Default: OFF	If Set point VAV is disabling, no humidity signal from the VAV Duct will be considered. If a Set point VAV value is set, the humidity output will be controlled by both space and High limit duct humidity signal. To allow Set point VAV value: Press and hold the TEST button located on Main Pc board inside electrical compartment until OFF is disappeared. You can then select the VAV Set point value desired by using  &  buttons on control panel. <i>Note: This Step will appear only if Internal has been selected at step 01</i>
03 optional		Prop Band allows the set up of proportional band. From 3 to 9% Default: 3%	Proportional band can be set from 3% to 9% of the humidity set points values (Space and High limit duct). Select the appropriate value by using  &  buttons on control panel. <i>Note: This Step will appear only if Internal has been selected at step 01</i>
04		Drain frequency. From 1 to 24 hours Default: 4 Hrs	Choose the initiation of a drain cycle for 1 to 24 hours. In general, harder the water is, more often the drain cycle must be. Drain cycle setting does not affect the AFEC system.
05		Number of running hours Information only, no possible set up.	The humidifier has operated 645 hours since the last service. After service, press simultaneously  &  buttons for 15 seconds to reset the number of hours of operation to zero. This procedure will stop the CHECK indicator from flashing.
06		Hour span between servicing. From 400 to 1500 hours. Default: 1000 Hrs	You can set the number of hours of operation before the humidifier will call for service (blinking of CHECK light every 4 seconds) from 400 to 1500 hours. In general, harder the water is, lower the number of hours of operation before service must be.
07		Output Span. From 00 to 100%. Default: 100%	This option is available only on modulating model. i.e.: In this case, the humidifier will deliver 80% of its maximum rated output when at full demand.

Note: Any changes made in the Program Mode are saved into a non-volatile memory.

When the humidifier is anywhere in the Menu Driven Program Mode, the normal operation of the humidifier is halted.

To resume normal operation, exit the menu program mode by pressing the  button until the alphanumeric display is clear. (This happens after step 7)

Control PC Board

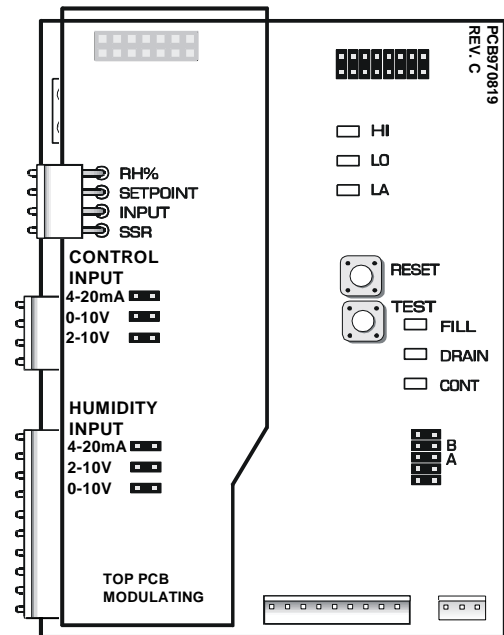
Main Printed circuit board designated is common to all SKE-XL series humidifier, ON/OFF or modulating; this pc board is equipped with an advanced microprocessor which controls all the humidifier functions.

The Printed circuit board which is directly connected onto the main pc board is installed only on modulating model (suffix M).

Staging PC Board (HEC002SK) is controlling the 2 on/off stages (Contactor 2 and Contactor3)

Main p.c. board

- There are 3 water level L.E.D.'s in the upper right hand side. They indicate the relative water height as sensed by the water level sensor.
 - If HI is illuminated: water supply valve shuts off,
 - If LO is off: An evaporation chamber filling is ordered, water supply valve opens.
 - If LA is off: No water is detected by the water level sensor, the power to the elements is shot off.
- The 3 status L.E.D.'s at the center left side operate as follows:
 - FILL indicates that the water supply valve is feeding water.
 - DRAIN indicates the drain valve empties the container.
 - CONT indicates that power is supplied to the elements and the humidifier is producing steam.
- TEST button must be used when commissioning the humidifier; this will initiate a pre-programmed start-up cycle. The start-up cycle cleans the supply water and the evaporation chamber (see Initial verification & Start up section). This button enable also the set point control of the humidistat to humidifier display (see Programming mode section) (this is available only on Modulating model).
- RESET button enable the bypass of start up sequence.



(Illus. 36)

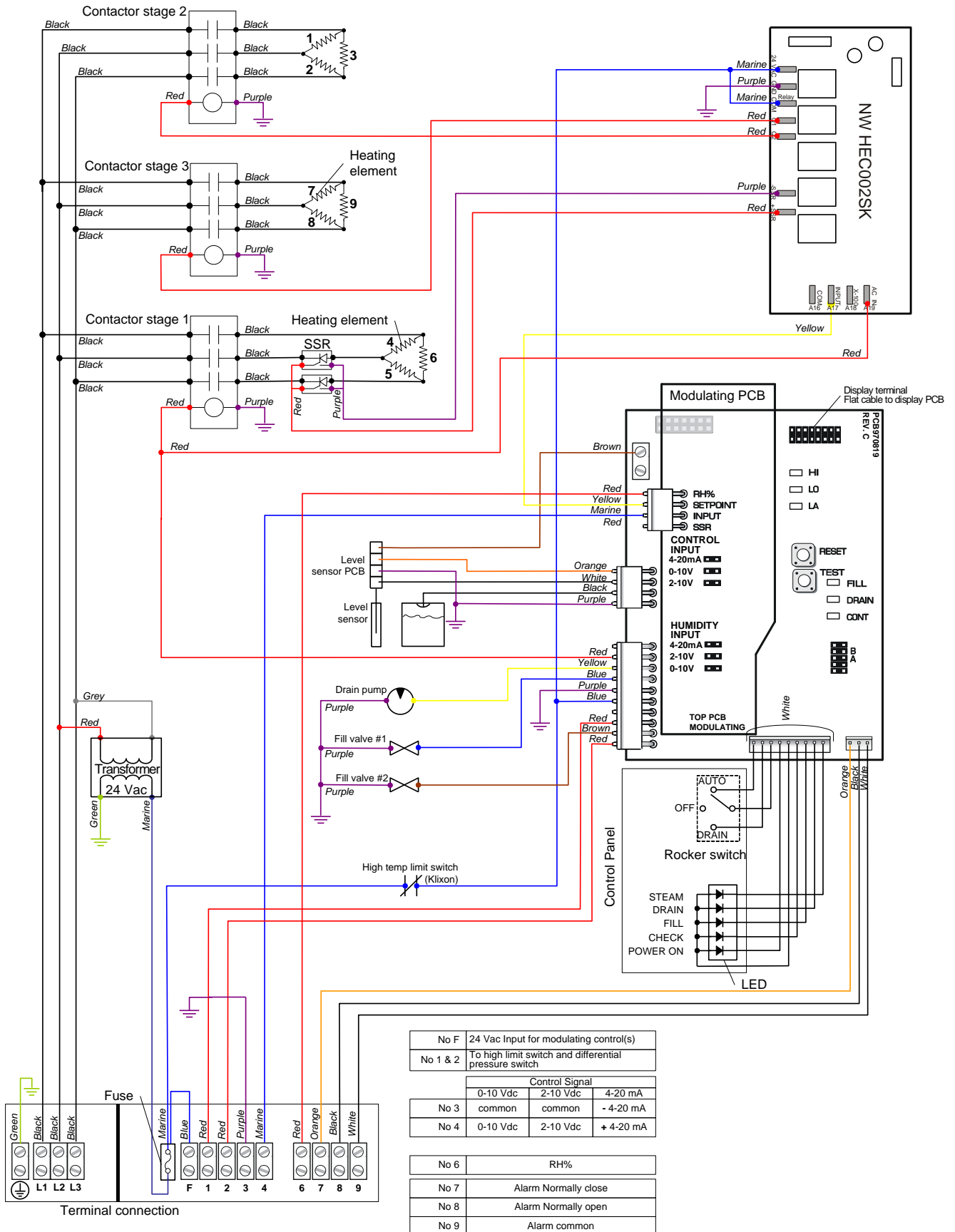
Modulating p.c. board

- The 3 jumpers at the center of the p.c. board (Control Input) are used for proper selection of the incoming control signal. See section Control signal set-up
- The 3 jumpers at the bottom of the p.c. board (Humidity Input) are used for proper selection of the incoming humidity signal. See section Humidity signal set up.

Staging p.c. board

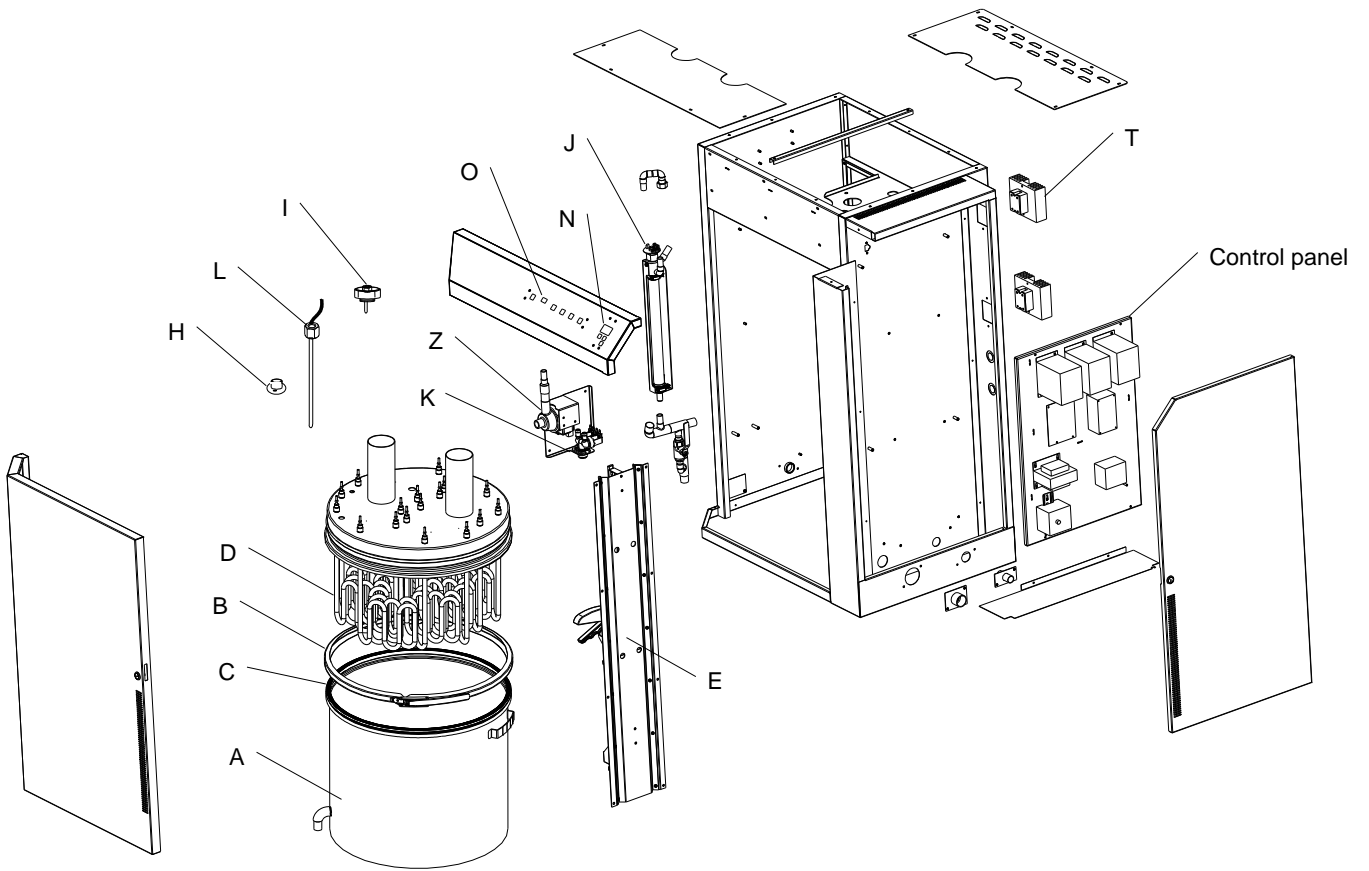
This PCB does not require any set-up, it is connected to the contactor 2 and contactor 3 controlling the 2 on/off stages.

Wiring diagram





Exploded View



(Illus. 37)

Bill of Materials

General

Item	Description	Model	Part number
A	Evaporation chamber tank	All models	SP 4253
B	Band clamp	All models	SP 4254-M
C	Tank gasket	All models	SW 4255
D	Heating element	<i>See Heating Element, Contactor, and Transformer table.</i>	
E	Lifting mechanism	All models	SW G1010-ASSY
F	Gasket for element (not shown)	All models	SP 1005
G	S/S hexagonal nut for element (not shown)	All models	SP 2330
H	High temperature switch	All models	SP 3035
I	Foam sensor	All models	SW GAFECPROBE-ASSY
J	Water level sensor sub assembly	All models	SW SKXLWATLEVSR1
K	Water supply valve	All models	SP 6007
L	Water temperature sensor	All models	SW GWATTEMP-ASSY
N	SK300 LCD display	All models	NW SK300DISPL-ASSY
O	On/Off/Drain switch	All models	SW SKSWITCH-ASSY
Control Panel	Main pc board	All models	NW SKEXL-TEST
	Modulating pc board	All models	NW SK300MODULSS
	Sequence pc board	All models	NW HEC0002SK
	Contactor	<i>See Heating Element, Contactor, and Transformer table.</i>	
	40Amp fuse		
	Fuse holder		
	Transformer		
T	Solid state relay with heat sink	All models	DW SSR90Y1 (2x)
Z	Drain pump	All models	SP G4101

Heating Element, Contactor, and Transformer

Model	Voltage	Heating Elements	Contactor	Transformer
SKE90	400V/3~	SW 5983 (9x)	SP 3100 (3x)	SP 3385
SKE100	400V/3~	SW 5955 (3x), SW 5983 (6x)	SP 3084 (3x)	SP 3385
SKE110	400V/3~	SW 5955 (6x), SW 5983 (3x)	SP 3084 (3x)	SP 3385
SKE120	400V/3~	SW 5988 (9x)	SP 3084 (3x)	SP 3385



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