



neptronic®

Steam to Steam Humidifier

SKS Series



Installation Instructions and User Manual

READ AND SAVE THESE INSTRUCTIONS

SKS-IOM-181002

Safety

**STEAM OR
HOT WATER
(HTHW) SUPPLY**

All work concerned with Steam or High Temperature Hot Water (HTHW) supply installation **MUST** only be performed by skilled and qualified technical personnel. The customer is always responsible for ensuring the suitability of the technical personnel.



Please observe the local regulations concerning the provision of steam and/or hot water installations.

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 favours the growth of Legionella (68 to 113°F [20-45°C]).
- Avoid water stagnation.
- Clean and disinfect the humidification system.
- Carry out a risk assessment of the water system supplying the humidifier by a competent person, to ensure the water supply is of an acceptable quality

CORRECT USE

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

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 SKS CABINET WITH DOOR TO ELECTRICAL PANEL OPEN AS LIVE ELECTRICAL PARTS MAY BE GAINED.

WATER

Neptronic[®] systems are designed to be used with mains, reverse osmosis, de mineralized 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 70 psig (480 kPa) or pressure limits laid out in the specification and installation must comply with local regulations.

WARRANTY

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

Foreword

This installation and operation manual has been developed to facilitate the installation and the operation of the SKS series humidifier. The strict application of these instructions will ensure the conformity of the installation and operation to the manufacturer's recommendations.

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

The application of these instructions does not ensure at any time conformity with the rules in force of the country of destination.

This product has been declared conform to applicable Canadian, American and European standards.

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***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.

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Other related documents:

1. Start-up check list
2. Wiring diagram
3. If humidifier is equipped with BACnet® option:
BACnet® communication module user guide.



Technical Specifications

SKS
Nomenclature

Model		Maximum capacities				Heat Exchanger type	Voltage code
SKS	-	0	0	0	0	- SLP	A

Available maximum capacities in lb/h or kg/h at maximum pressure/temperature

A=120	<i>Available voltages (Vac)</i>
B=208	
C=240	

Code	Material & pressure range of heat exchanger
SLP	Stainless Low Pressure
SCLP	Stainless Coated Low Press.
SPLP	Stainless Plated Low Press.
CLP	Copper Low Pressure
CCLP	Copper Coated Low Pressure
CPLP	Copper Plated Low Pressure
CHP	Copper High pressure
CCHP	Copper Coated High pressure
CPHP	Copper Plated High pressure

Output Steam Capacities
Stainless Steel Heat Exchanger

Model*	Nb of Heat Exc.	Output steam capacity (lb/h) [kg/h] for Supply steam pressure ⁽²⁾					Steam outlet Qty & Ø (in) [mm]
		5 PSI [34.5kPa]	8 PSI [55.1kPa]	10 PSI [68.9kPa]	12 PSI [82.7kPa]	15PSI [103.4kPa]	
SKS-100-SLP	1	33 [15]	53 [24]	67 [30]	80 [36]	100 [45]	(1x) 3" [76]
SKS-130-SLP	1	43 [19]	69 [31]	87 [39]	104 [47]	130 [59]	(1x) 3" [76]
SKS-190-SLP	1	63 [28]	101 [46]	127 [57]	152 [69]	190 [86]	(1x) 3" [76]
SKS-290-SLP	1	97 [44]	155 [70]	193 [87]	232 [105]	290 [132]	(1x) 4" [100]
SKS-390-SLP	1	130 [59]	208 [94]	260 [118]	312 [142]	390 [177]	(1x) 4" [100]
SKS-500-SLP	1	167 [76]	267 [121]	333 [151]	400 [182]	500 [230]	(1x) 5" [125]
SKS-690-SLP	1	230 [104]	368 [167]	460 [209]	552 [251]	690 [314]	(1x) 5" [125]
SKS-950-SLP	1	317 [144]	507 [230]	633 [287]	760 [345]	950 [432]	(2x) 4" [100]
SKS-1250-SLP	2	417 [189]	667 [303]	833 [378]	1000 [454]	1250 [568]	(2x) 5" [125]

Copper Heat Exchanger

Model*	Nb of Heat Exc.	Output steam capacity (lb/h) [kg/h] for Supply steam pressure ⁽²⁾					Steam outlet Qty & Ø (in) [mm]
		5 PSI [34.5kPa]	8 PSI [55.1kPa]	10 PSI [68.9kPa]	12 PSI [82.7kPa]	15PSI [103.4kPa]	
SKS-65-CLP	1	22 [10]	35 [16]	44 [20]	53 [24]	65 [29]	(1x) 3" [76]
SKS-110-CLP	1	37 [17]	59 [27]	73 [33]	88 [40]	110 [50]	(1x) 3" [76]
SKS-220-CLP	2	73 [33]	117 [53]	147 [67]	176 [80]	220 [100]	(1x) 4" [100]

Notes:

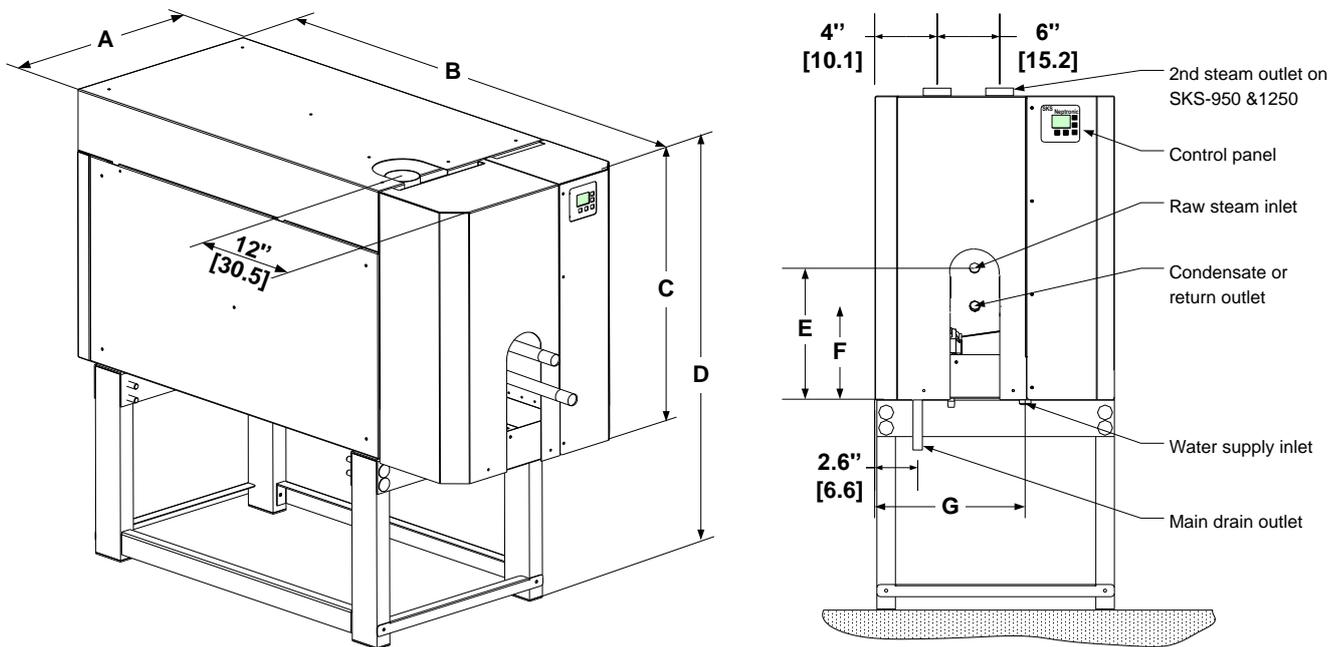
(*) Any in-between capacity model is available upon request to factory.

1 - Power supply can be 120Vac 1.5A, 208Vac 0.75A or 240/ 250Vac 0.75A, 50Hz or 60Hz,.

2 - Raw steam pressure at actual point of connection to humidifier.

3 - Maximum static duct pressure is 5" w.c [1.250 kPa]. For higher static duct pressures please consult Neptronic or its authorized distributor.

Dimensions & Weights



(Fig. 1)
 dimensions in bracket are in cm

Model	Dimensions (in) [cm]								Weight (lb) [kg]		
	A	B	C	D	E	F	G	2 nd heat exchanger		Empty	In Operation
								E2	F2		
SKS-100-SLP	19.7 [50.0]	45.8 [116.3]	26.2 [66.5]	44.1 [112.0]	10.6 [26.9]	7.6 [19.3]	10.9 [27.7]	-	-	265 [120]	487 [221]
SKS-130-SLP	19.7 [50.0]	45.8 [116.3]	26.2 [66.5]	44.1 [112.0]	10.6 [26.9]	7.6 [19.3]	10.9 [27.7]	-	-	270 [122]	484 [220]
SKS-190-SLP	22.8 [57.9]	45.8 [116.3]	29.4 [74.7]	47.3 [120.1]	11.0 [27.9]	7.9 [20.1]	14.0 [35.6]	-	-	310 [141]	578 [263]
SKS-290-SLP	22.8 [57.9]	47.2 [120.0]	29.4 [74.7]	47.3 [120.1]	11.0 [27.9]	7.9 [20.1]	14.0 [35.6]	-	-	315 [143]	616 [280]
SKS-390-SLP	27.5 [69.9]	58.8 [149.3]	27.3 [69.3]	45.2 [114.8]	11.7 [29.7]	8.0 [20.3]	17.6 [44.7]	-	-	395 [179]	828 [376]
SKS-500-SLP	27.5 [69.9]	58.8 [149.3]	27.3 [69.3]	45.2 [114.8]	11.7 [29.7]	8.0 [20.3]	17.6 [44.7]	-	-	400 [182]	822 [373]
SKS-690-SLP	31.0 [78.7]	58.8 [149.3]	33.2 [84.3]	51.1 [129.8]	12.2 [31.0]	8.5 [21.6]	20.1 [51.1]	-	-	470 [213]	1102 [501]
SKS-950-SLP	31.0 [78.7]	58.8 [149.3]	33.2 [84.3]	51.1 [129.8]	12.2 [31.0]	8.5 [21.6]	20.1 [51.1]	-	-	475 [215]	1168 [531]
SKS-1250-SLP	30.0 [76.2]	58.8 [149.3]	42.3 [107.2]	60.3 [153.2]	23.9 [60.7]	20.0 [50.8]	20.0 [50.8]	12.3 [31.2]	8.6 [21.8]	570 [259]	1574 [715]

Model	Dimensions (in) [cm]								Weight (lb) [kg]		
	A	B	C	D	E	F	G	2 nd heat exchanger		Empty	In Operation
								E2	F2		
SKS-65-CLP	22.8 [57.9]	45.8 [116.3]	29.4 [74.7]	47.3 [120.1]	11.0 [27.9]	8.6 [21.8]	13.0 [33.0]	-	-	310 [141]	578 [263]
SKS-110-CLP	27.5 [69.9]	58.8 [149.3]	27.3 [69.3]	45.2 [114.8]	11.7 [29.7]	7.5 [19.0]	13.0 [33.0]	-	-	395 [179]	828 [376]
SKS-220-CLP	31.0 [78.7]	58.8 [149.3]	33.2 [84.3]	51.1 [129.8]	13.2 [33.5]	7.6 [19.3]	23.7 [60.2]	13.0 [33.0]	18.5 [45.7]	470 [213]	1102 [501]

Handling & Unpacking



Handling and Lifting

Lifting or handling **MUST** 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.

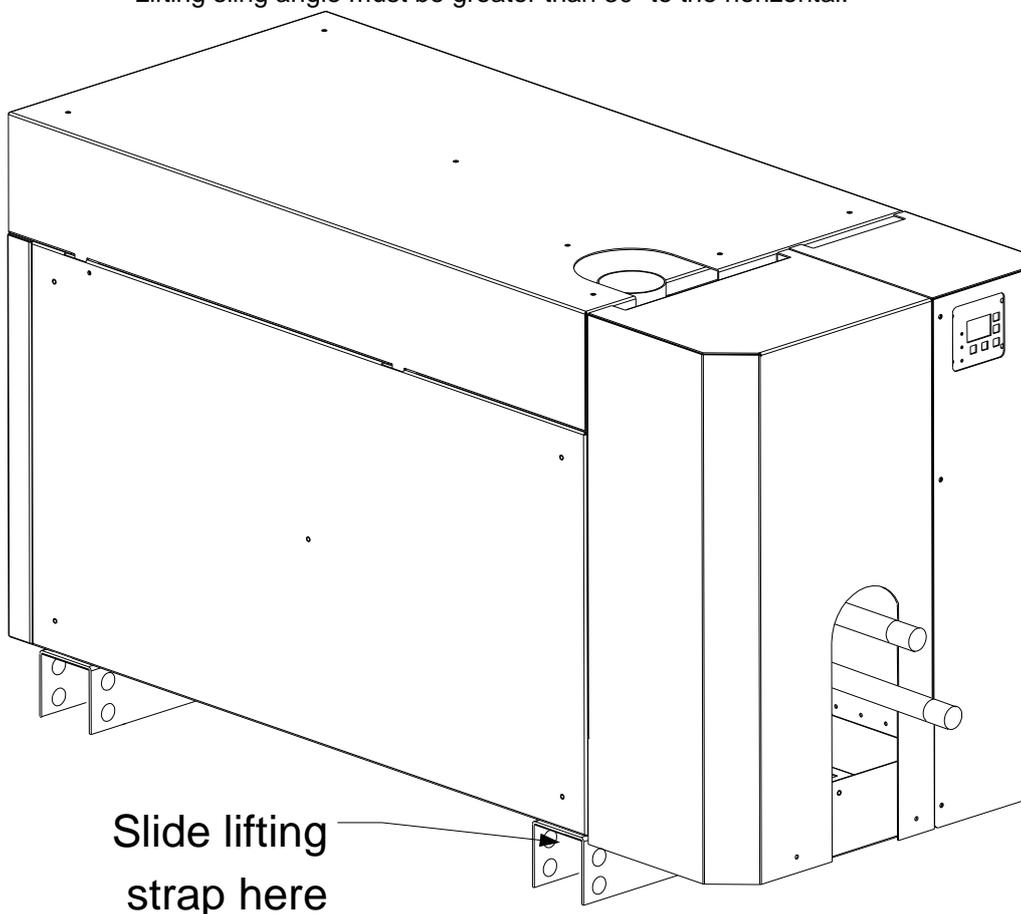
Refer to Dimensions & Weight section for system dry weights.

The SKS Humidifier **MUST** always be handled and lifted with care and must remain within its original packaging for as long as possible prior to installation

The SKS Humidifier package may be carried using a fork lift from the underside. Caution must be exercised to ensure balanced load before lifting.

Lifting of SKS Humidifier **MUST** always be carried out using the appropriate Neptronic Lifting bracket.

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



(Fig. 2)

Unpacking SKS Humidifier is shipped on a wooden crate.

Ensure packing wooden crate and skid is removed prior to commissioning.

List of Accessories Supplied

Two adjustable steam hose collars to connect on the steam output of the humidifier.

One Ø3/8" (10mm) compression fitting for water supply inlet.

One strainer (option).

One actuated control valve (AM060 actuator with globe valve) (option).

One Float and thermostatic steam trap for the condensate return (option).

Installation Overview



All installation work must comply with local regulations.

All work concerned with the installation of the SKS Humidifier **MUST** only be performed by skilled and qualified technical personnel (e.g. electricians, plumbers or technicians with appropriate training).
The customer is responsible for ensuring their suitability.

For the installation of the SKS 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 Pipes Positioning & Installation

Stage 3: Raw Steam Supply Connection

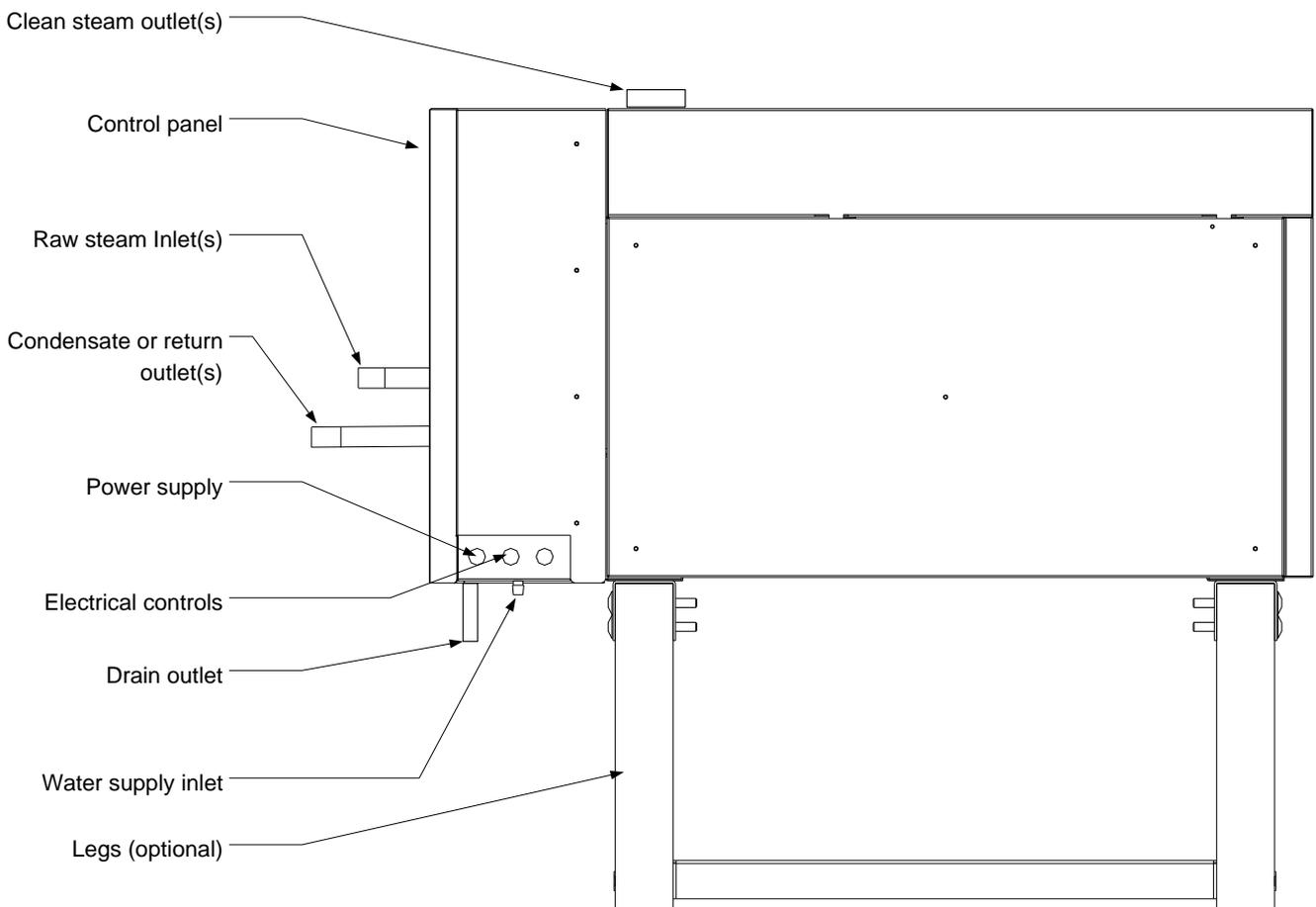
Stage 4: Water Supply Installation

Stage 5: Water Drain Connection

Stage 6: Electrical Supply Installation

Stage 7: Electrical Control Connections

Stage 8: BACnet® Interface Set-up (optional)



(Fig. 3)

Stage 1 – Unit Positioning and Mounting

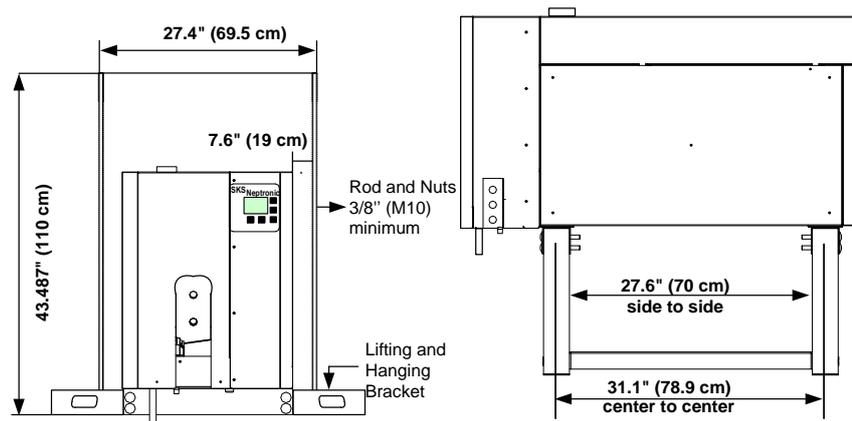
Positioning the Humidifier

- SKS 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 16 feet (5 meters). For longer distances use insulated hard piping.
- For insulated hard piping: the total steam line length must not exceed 50 feet (15 m). For longer steam line runs, consult factory.
- SKS humidifier must be installed with provision for the Steam supply piping connections and Steam condensate trap installation.
- The humidifier must be located in an area that is fully accessible for inspection and servicing. Observe the minimum access distances as shown in figure 5.
- SKS humidifier can be provided with adjustable legs (optional) in order to ensure proper level when 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. Ensure that the humidifier is properly attached through its legs using anchors to the floor.
- SKS-100 & 130-SLP and SKS 065 & 110-CLP Models can be ceiling hung by using the appropriate Lifting and hanging bracket.
- SKS humidifier must be levelled, in order to ensure proper return of condensate through heat exchanger.

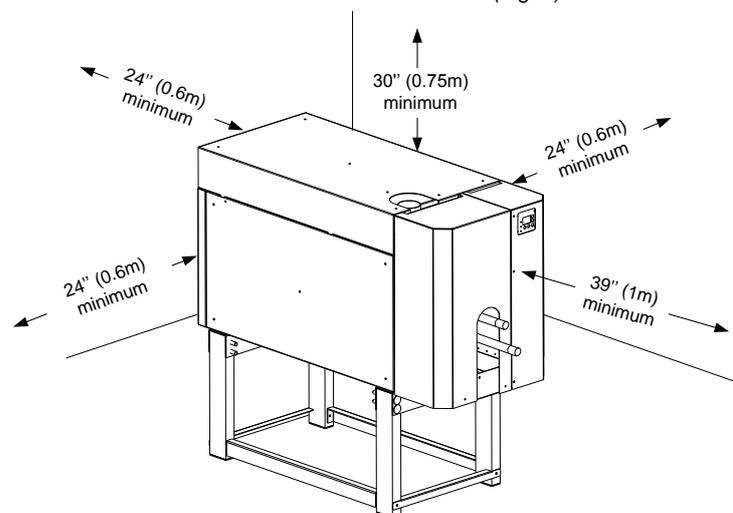
Ambient Condition

The humidifier location must have an ambient temperature of less than 86°F [30°C].

Minimum Clearances SKS-100 & 130 SLP SKS 065 & 110- CLP



Other Models



Minimum clearances are:

- Top, 30" [75 cm] minimum
- Both sides, 24" [60cm] minimum
- Front, 39" [100 cm] minimum

(Fig. 5)

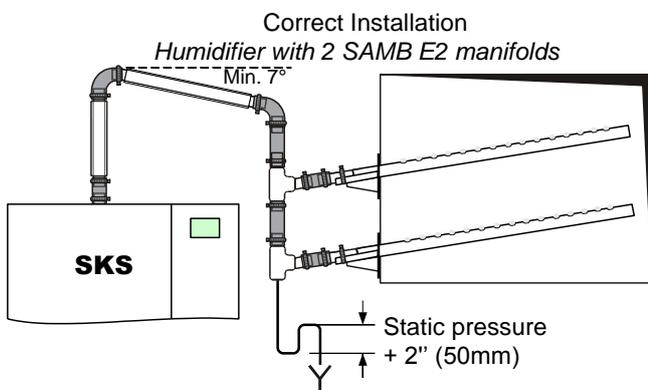
Note: Above minimum clearances are indicated for inspection and servicing access. SKS Humidifier is designed for a 0 clearance to combustible material.

Stage 2 – Steam Distribution Pipes Positioning & Installation

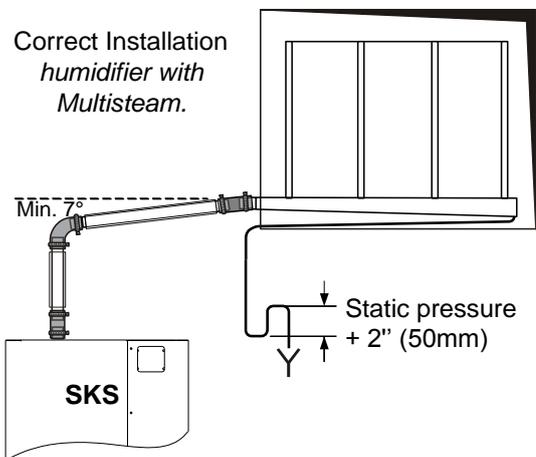
Fundamental Design Concepts



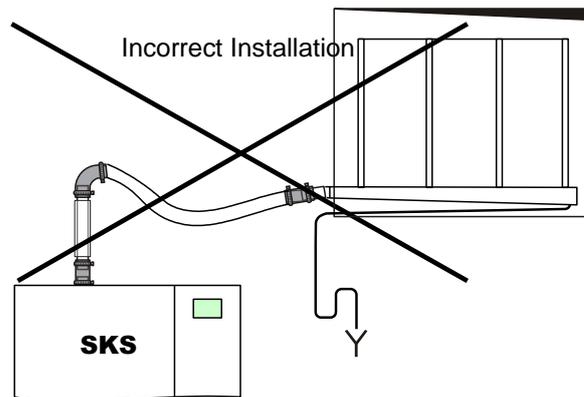
1. Maximum steam velocity in a pipe must not exceed 39 feet/hr [12m/s] velocity.
2. Minimum steam pipe gradient must be 7° i.e. 5" [125mm] rise in 40" [1m] run.
3. The lowest point of any steam hose or rigid pipe must be the humidifier. A steam separator (S trap) must be installed higher than the static pressure of the system by at least 2" [50mm].
4. Total length of the flexible steam hose must not exceed 16 feet (5 m) or insulated rigid piping must not exceed 50 feet (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.



(Fig. 6a)



(Fig. 6b)



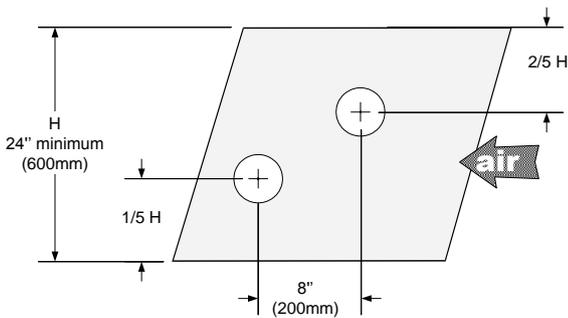
(Fig. 7)

6. Connection pipe sizes between SKS and steam distributor in the duct must be :
 - 3" (76mm) up to 264lb/h [120kg/h]
 - 4 ¼" (108mm) up to 528lb/h [240kg/h]
 - 5 ¼" (133mm) up to 560lb/h [255kg/h]
7. All Humidifier below 220lb/h [100kg/h] capacity must use standard Neptronic® S.A.M.E2 Steam distribution pipes, Multi-Steam can be offered if shorter absorption distances are required.
8. All Humidifiers above 220lb/h [100kg/h] capacity must use Multi-Steam.
9. All Humidifiers above 528lb/h [240kg/h] must use 2 Multi-Steam units per Air Handling Unit (AHU) or air Duct with an equal duty split to each Multi-Steam

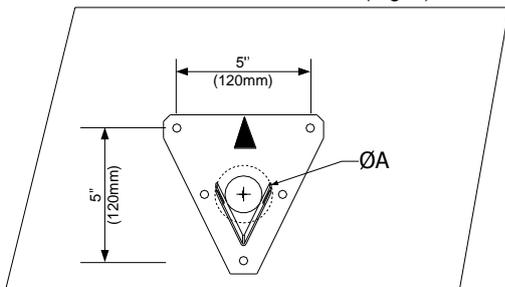
Stage 2 – Steam Distribution Pipes Positioning & Installation

Selection of Steam Distribution Manifolds

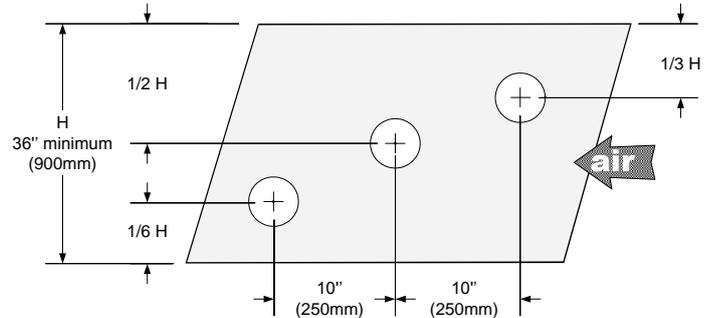
1. The minimum steam manifold length that can be used with the SKS series humidifier is 35" [900mm]. Any manifold below this dimension will have insufficient outlet spigots to allow proper steam distribution.
2. If duct size is below 35" [900mm] width it will be necessary to either fit multiple pipes or Multi-Steam.



Horizontal duct – 2 manifolds (Fig. 8)



detail of manifold mounting bracket (Fig. 10)



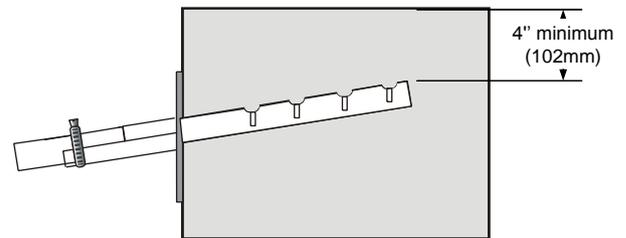
Horizontal duct – 3 manifolds (Fig. 9)

Steam manifold must be mounted and secured through the side of the air handling unit or duct. Provision must be made for safe accessibility, ideally with an observation light and window. Check that the construction of the duct wall is suitable enough to support the steam pipe for the duration of the installation life. Dimension of hole size in the duct must be as per table below:

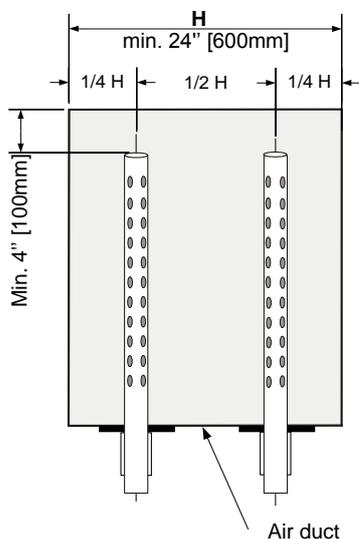
Steam manifold Ø	Hole size ØA
2 1/8" (54mm)	3" (76mm)



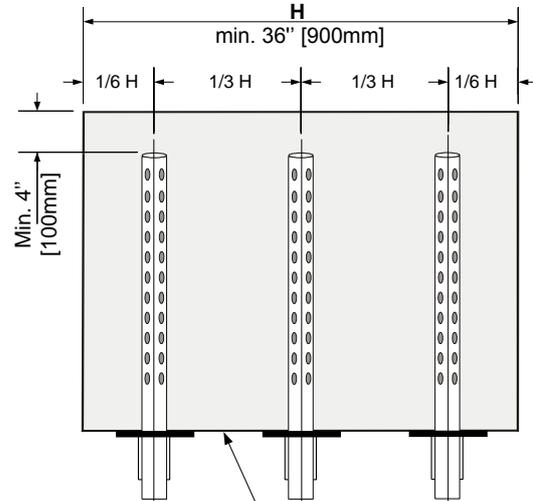
WARNING: Risk of condensing. Ensure that the minimum distance of the end of the manifold is at least 4" (102mm) from the top of the duct.



Minimum distance (Fig. 11)



Vertical duct – 2 manifolds (Fig. 12)



Vertical duct – 3 manifolds (Fig. 13)

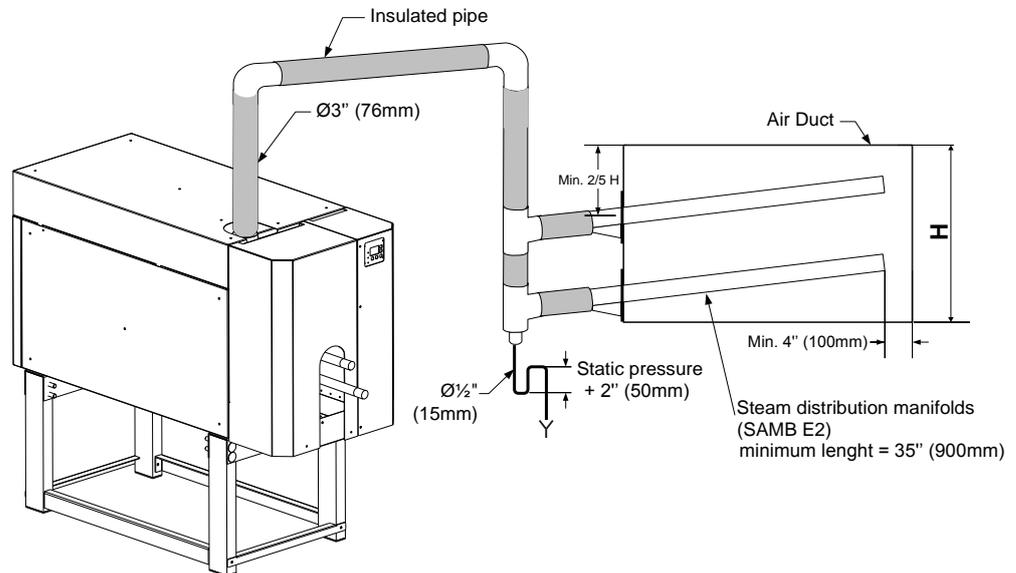
Stage 2 – Steam Distribution Pipes Positioning & Installation

Steam Pipe Work to Duct Connections with S.A.M.E2

SKS-100-SLP

SKS-65-CLP

SKS-110-CLP



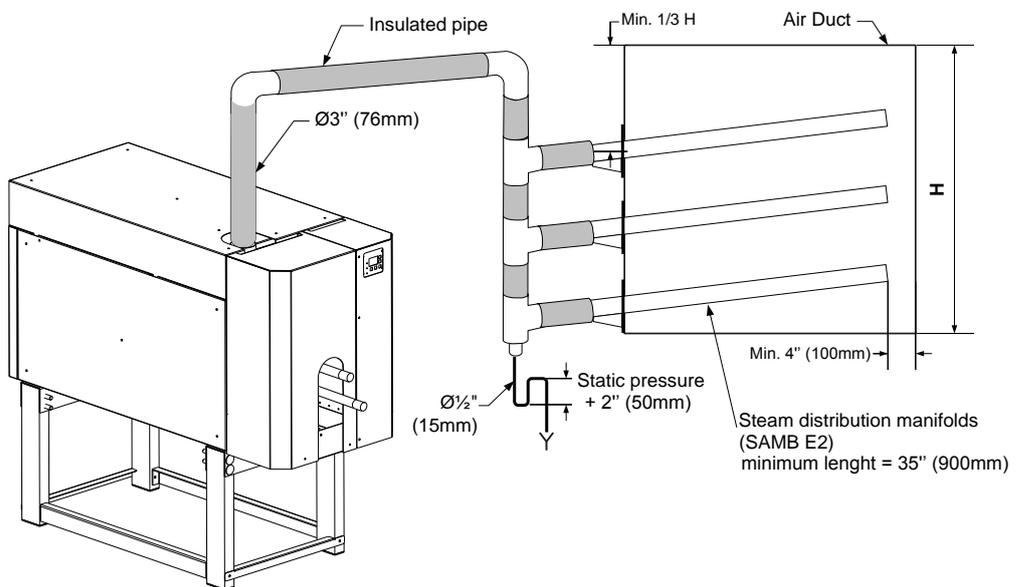
(Fig. 14)

Single Ø3" (76mm) feed pipe must be connected to two (2) S.A.M.E2 Steam manifolds with a suitable reduction at the lowest point to allow a Ø½" (15mm) condensate drain from the main steam supply.

SKS-130-SLP

SKS-190-SLP

SKS-220-CLP



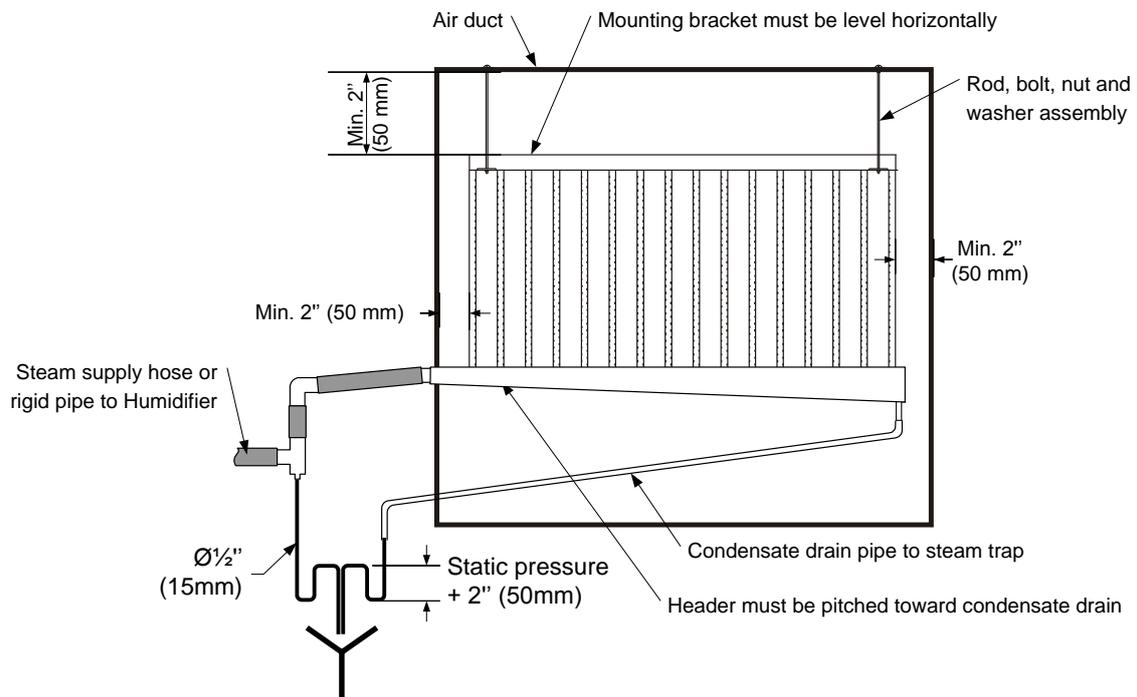
(Fig. 15)

Single Ø3" (76mm) feed pipe must be connected to 3 S.A.M.E2 Steam manifolds with a suitable reduction at the lowest point to allow a Ø½" (15mm) condensate drain from the main steam supply.

Stage 2 – Steam Distribution Pipes Positioning & Installation

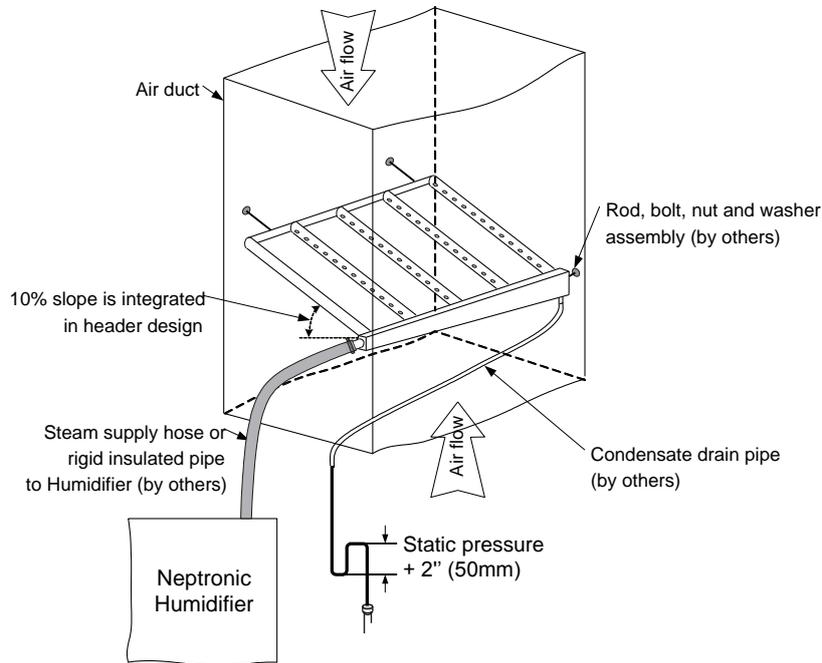
Selection of Multi-Steam

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 528lb/h [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 (Fig. 16)

Stage 2 – Steam Distribution Pipes Positioning & Installation

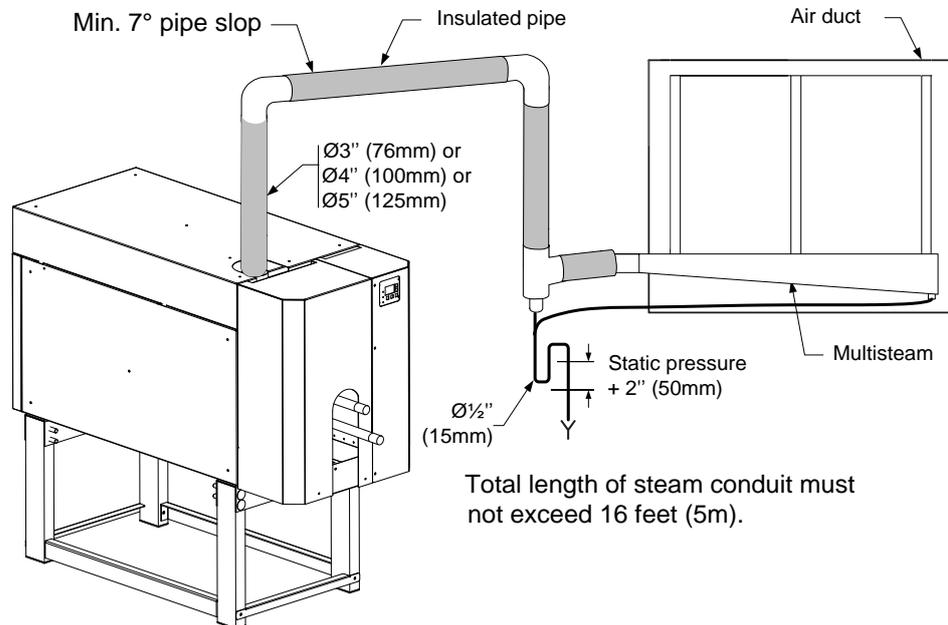


Vertical duct (Fig. 17)

Steam pipe work to Duct connections

SKS-100-SLP
to
SKS-690-SLP

SKS-65-CLP
to
SKS-220-CLP

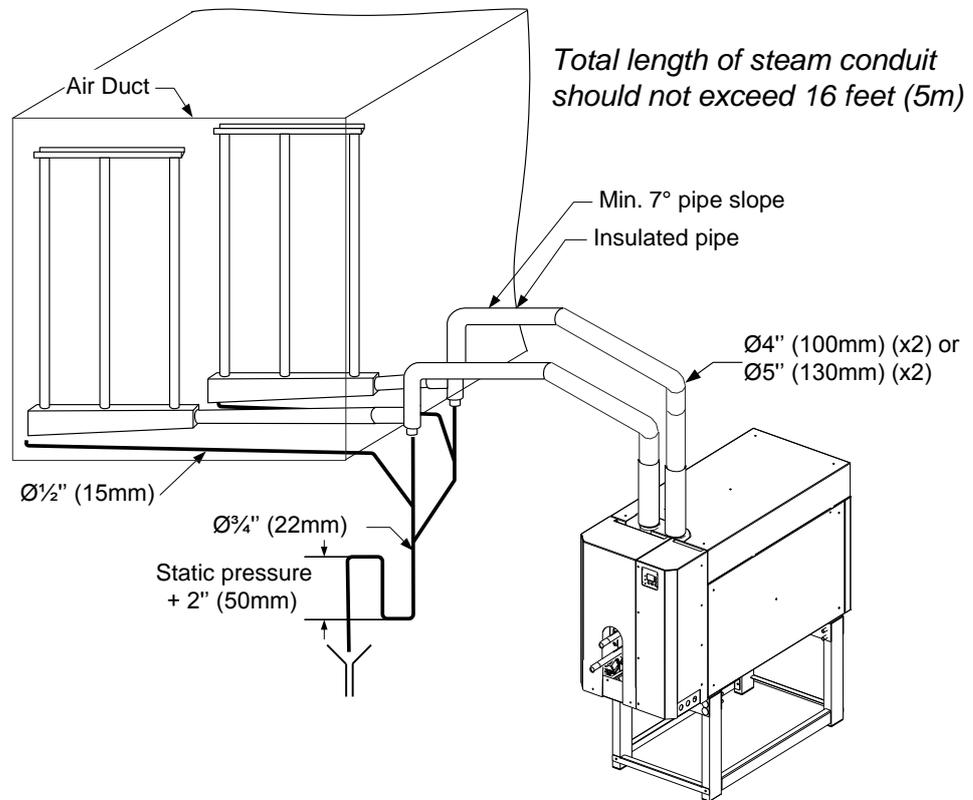


(Fig. 18)

A single Ø3" [76mm] or Ø4" [100mm] or Ø5" [125mm] feed pipe must be connected to a single Multi-Steam with a suitable reduction at the lowest point to allow a Ø1/2" [15mm] condensate drain from the main steam supply.

Stage 2 – Steam Distribution Pipes Positioning & Installation

SKS-950-SLP
SKS-1250-SLP



(Fig. 19)

Two Ø4" [100mm] or Ø5" [125mm] steam outlets must be connected to two Multi-Steam with a suitable reduction at the lowest point to allow a Ø1/2" [15mm] condensate drain from the main steam supply.

If the two Ø1/2" [15mm] condensate pipes are connected, the common condensate drain must be Ø3/4" [20mm].

Stage 3 – Pipework for HTHW / Raw Steam



Union Dimensions & Installation

HTHW / Raw steam supply piping must conform to local codes and regulations.

Risk of Distortion and Failure. HTHW / Raw steam piping installation must be supported so that no strain are imposed on the Humidifier steam inlet flange and control valve.

Pipes must be inspected for dirt and chips after threading and reaming the end of pipes.

After installation, field piping and Humidifier Steam piping must be checked for leak.

All leaks **MUST** be sealed prior to commissioning the Humidifier.

<i>Model</i>	<i>HTHW / Raw steam inlet</i>	<i>Condensate return outlet</i>
SKS-100/130-SLP SKS-065/110-CLP	Ø¾" [20mm]	Ø¾" [20mm]
SKS-220-CLP	Ø¾" [20mm] (2x)	Ø¾" [20mm] (2x)
SKS-190/290-SLP	Ø1" [25mm]	Ø¾" [20mm]
SKS-390-SLP	Ø1-1/4" [32mm]	Ø¾" [20mm]
SKS-500/690-SLP	Ø1-1/4" [32mm]	Ø1-1/4" [32mm]
SKS-950-SLP	Ø1-1/2" [40mm]	Ø1-1/2" [40mm]
SKS-1250-SLP	Ø1-1/4" [32mm] (x2)	Ø1-1/4" [32mm] (x2)

SKS-1250-SLP and **SKS-220-CLP** are equipped with two (2) heat exchangers and therefore has 2 raw steam inlets and two (2) condensate return outlets.

Typical Raw Steam Installation



HTHW / Raw steam supply piping must conform to local codes and regulations.

Risk of Distortion and Failure. Steam piping installation must be supported so that no strain are imposed on the Humidifier steam inlet flange and control valve.

Pipes must be inspected for dirt and chips after threading and reaming the end of pipes.

A strainer as well as an isolating valve must be installed upstream to the control valve on the raw steam supply pipe.

Two vacuum breakers (not supplied) must be installed at the highest practical points. Installation must be done only in the vertical upright position.

Brass coupling must be used between the heat exchanger stainless steel pipes and steam inlet / condensate outlet piping.

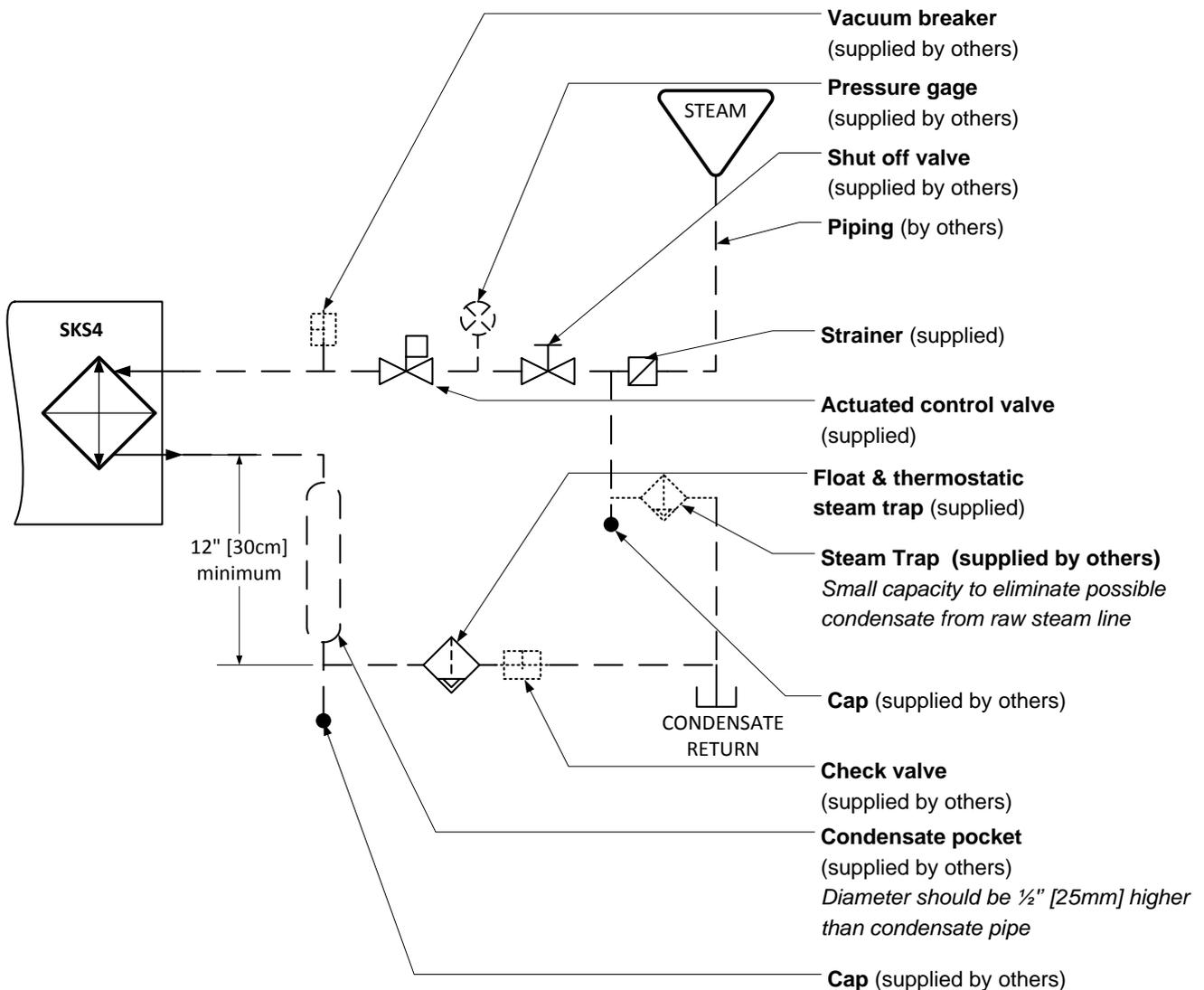
The condensate must be evacuated efficiently. Therefore, a condensate pocket and stream trap must be installed to ensure proper condensate elimination.

Do not use thermostatic or Thermodynamic traps for condensate from heat exchanger.

Steam Supply Size

Size of the steam supply pipe and control valve must be calculated considering **3lb [1.35kg] of raw steam for each lb (kg) of clean steam** produced and distributed into AHU.

Stage 3 – Pipework for HTHW / Raw Steam



(Fig. 20)

Raw Steam Supply & Condensate Installation

Connect the raw steam inlet to an adequate steam supply with actuated control valve, strainer and isolating valve.

One control valve is required for each raw steam inlet.

Control valve must be fitted with a mechanism and be electrically wired so that the valve returns to the closed position when no air flow is detected in the AHU.

In case of two (2) condensate outlets, each individual condensate outlet requires an individual steam trap. Do not "group trap".

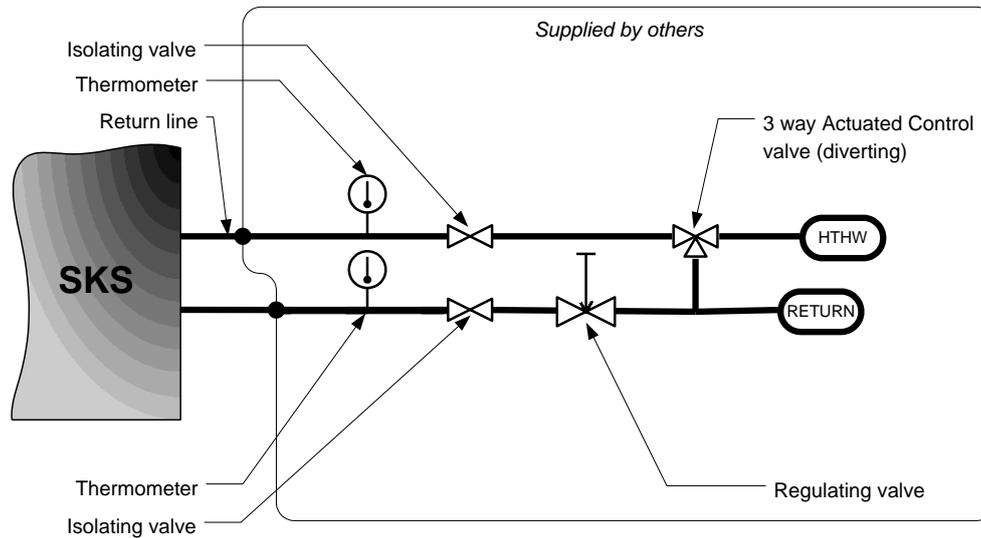
Float and thermostatic type steam traps are recommended for the condensate from the heat exchanger and must be fitted no less than 12" (30cm) below the condensate outlets, with condensate pocket fitted before the trap.

Thermostatic type steam traps are recommended as the small capacity trap to eliminate condensate from the raw steam line.

Stage 3 – Pipework for HTHW / Raw Steam

Typical HTHW Installation

HTHW Supply Size The size of the HTHW supply pipe and the control valve must be calculated considering **1.07HP (0.8kW) of HTHW for each lb (kg) of clean steam** produced and distributed into the AHU.



(Fig. 21)

HTHW Supply & Condensate Installation Connect the HTHW inlet(s) to an adequate HTHW supply with 3 way diverting control valve, isolating valves, regulating valve and thermometers. Only one (1) control valve is required irrespective of the number of HTHW inlets.

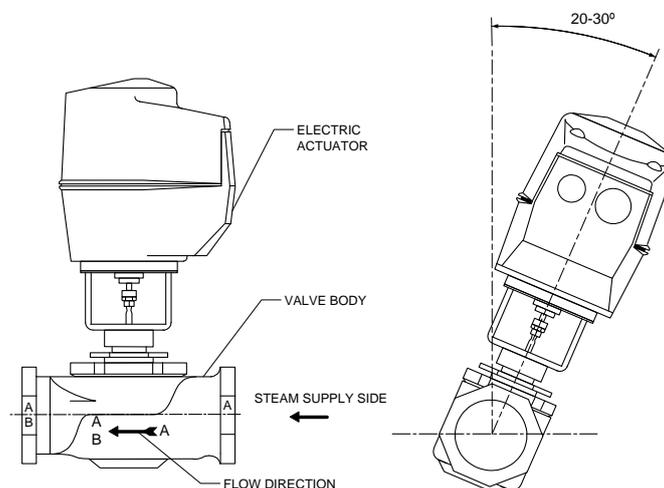
The control valve must be fitted with a mechanism and be electrically wired so that the valve returns to the closed position when no air flow is detected in the AHU.

The return outlet(s) must be connected to the HTHW with an isolating valve.

Thermometers must be installed on the HTHW supply line and the return line close to the humidifier.

Positioning the Control Valve

Install the actuated valve (AM060 actuator with globe valve) between 20 to 30 degrees from vertical in order to reduce the convection heat to the actuator.



(Fig. 22)

Stage 4 – 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® SKS Humidifier is designed to be used with potable, reverse osmosis, deionised and de-mineralized water.

Maximum water supply pressure: 10 to 70 psig [70 to 480kPa]

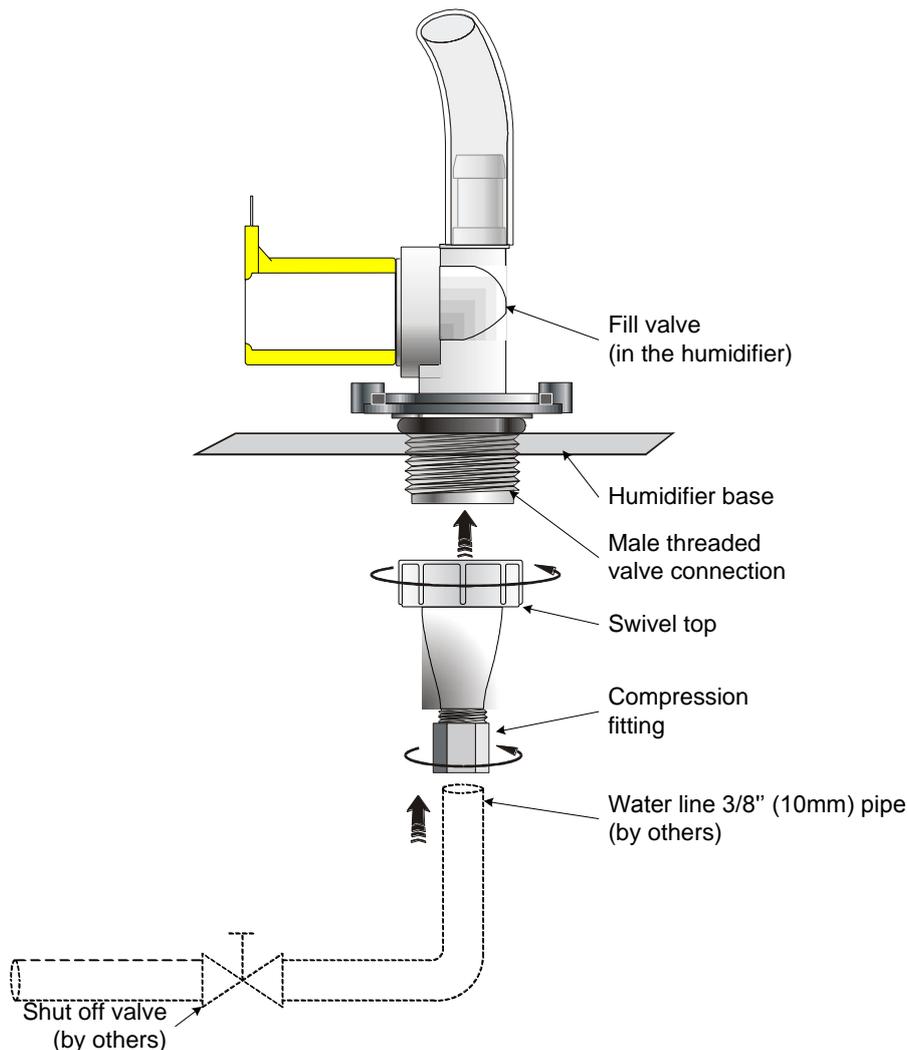
Minimum water temperature: 49°F [+4°C]

Maximum water temperature: 104°F [+40°C]

<i>Model</i>	<i>Water inlet Connection size</i>
SKS-XXXX	Ø3/8" (10mm) compression fitting (supplied)

Water Supply Line Installation

To facilitate servicing, a shut off valve (not supplied) must be installed in the water line, within 40" [1m] of the humidifier.



(Fig. 23)

Stage 5 – Water Drain Connection



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

Water Drain Specification

Water Drain temperature: +140°F [+60°C]

<i>Model</i>	<i>Water Drain Outlet Connection size</i>
SKS-XXXX	Ø3/4" [20mm]

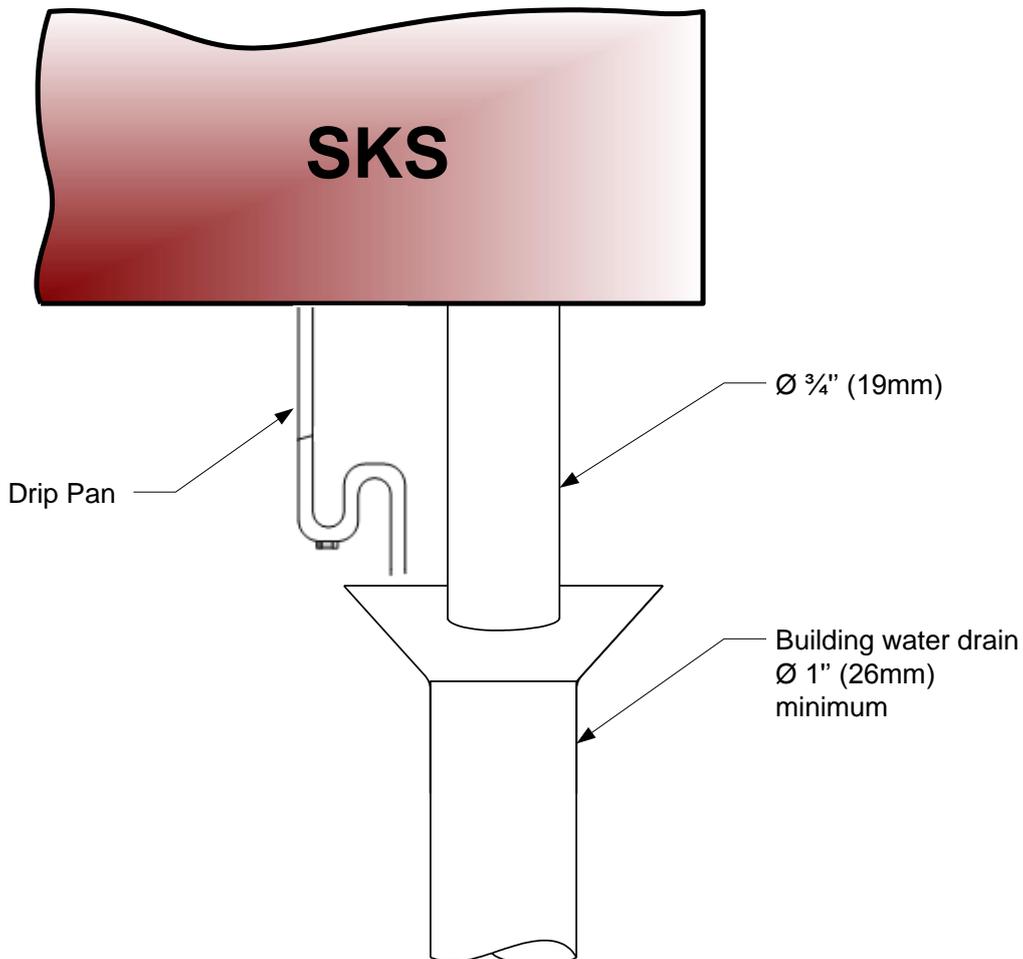
Water Drain Installation

Water drain outlet connection must be connected to drain pipe of sufficient size. It is recommended to use Ø3/4" [20mm] minimum standard copper hydraulic pipes.

Water main drain and drip pan must be kept separate to the open drain. Do not connect the main drain and the drip pan before the open drain.

Minimum water drain pipe gradient must be ¼" (6.5mm) per foot (300mm) horizontal run.

No drain trap is required on the main drain.



(Fig. 24)

Stage 6 – Electrical Supply and Installation

Electrical Power Supply

The SKS Humidifier requires the following single phase supply.

Model	Voltage	Current
SKS-XXXX-120	120Vac – 1ph	1.50A
SKS-XXXX-208	208Vac – 1ph	0.75A
SKS-XXXX-240	240Vac – 1ph	0.75A



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. Disconnect switch must be installed typically within one meter of the humidifier.

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

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

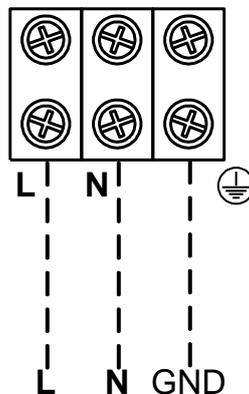
Please observe local codes and regulations concerning the provision of electrical installations.

WARNING. Risk of electric shock. Ensure that the electrical supply is isolated before commencing any installation.

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.
- Humidifier cabinet has an uninterrupted or unbroken electrical ground. Do not use Raw steam or HTHW piping as an electrical ground.

Power supply terminal block



(Fig. 25)

Stage 7 – Electrical Control Connections

Fundamentals About 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 airflow switch.

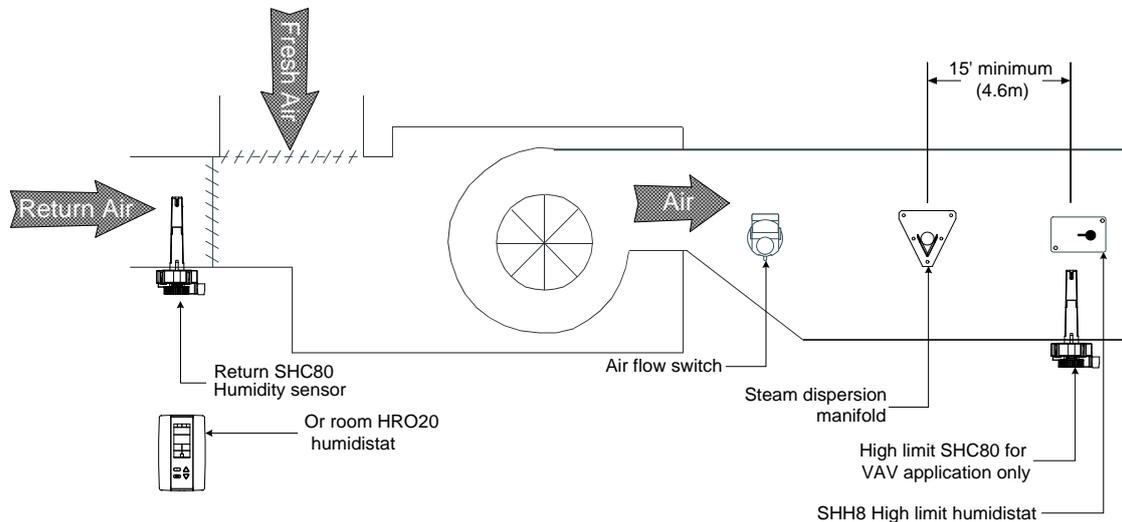
Placement of these devices is critical to proper operation of the overall system.

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 15 ft (4.6 m), downstream of the steam dispersion manifold(s) to prevent over humidification of the duct that could result in condensation.



(Fig. 26)

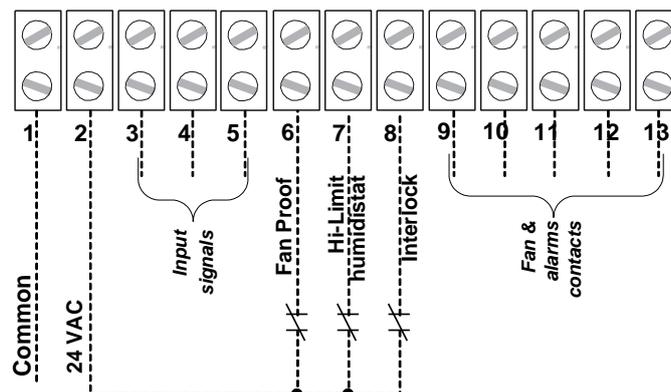
Electrical Control Connections

Neptronic® SKS Humidifier has a modulating control system and requires an analogue control signal (0-10Vdc, 2-10Vdc, 0-20mA or 4-20mA).

Humidifier Interlocks

Neptronic® SKS Humidifier has three interlock entries:

- P.D. Switch (airflow) contact must be wired on terminal 6
- High limit humidistat contact must be wired on terminal 7
- A third interlock switch can be wired on terminal 8.



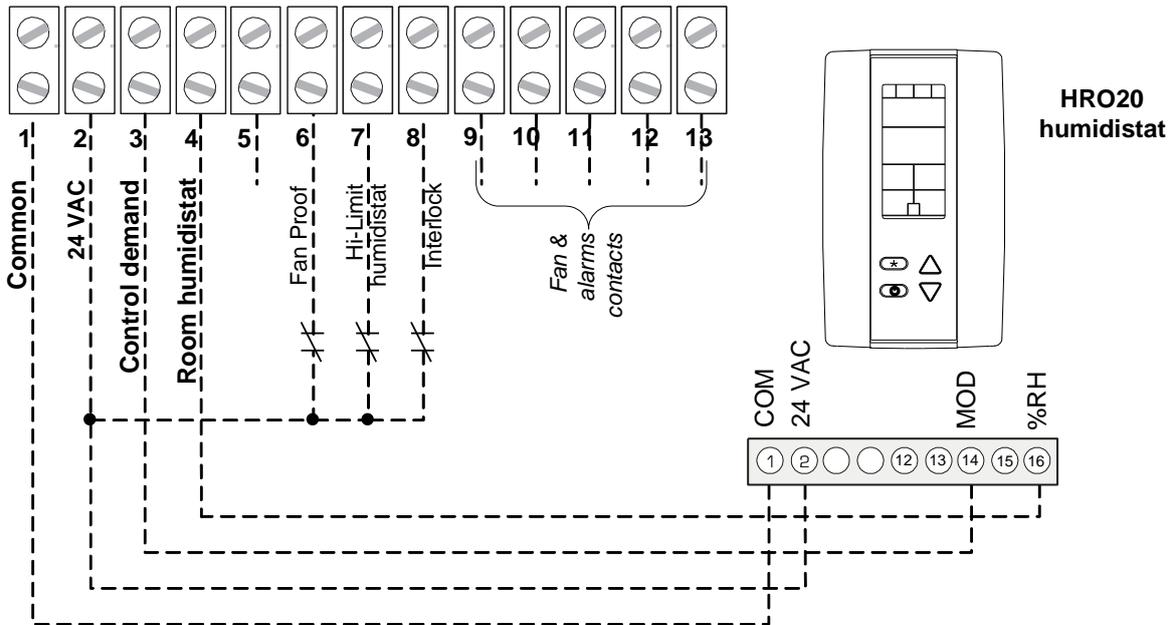
(Fig. 27)

Stage 7 – Electrical Control Connections

Humidifier Control (External Mode)

Neptronic® SKS modulating Steam Humidifier can be installed in conjunction with Neptronic® **HRO20** humidity controller, see below wiring diagram (fig. 26). In this case humidity set point will be controlled by **HRO20** humidity controller; humidifier will have to be set in external mode.

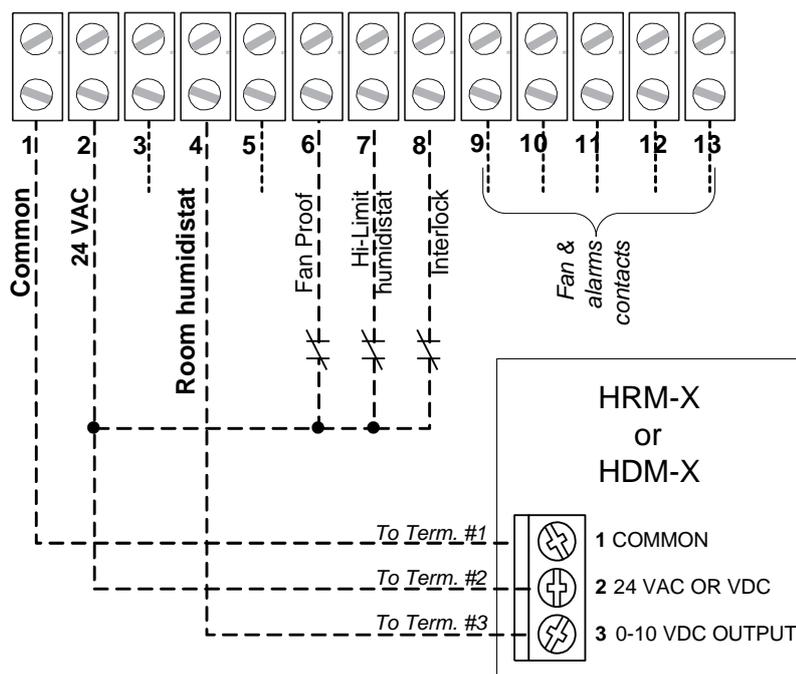
In this external mode SKS can accept any modulating control signal (0-10Vdc, 2-10Vdc, 0-20mA or 4-20mA) wired to terminal 3.



(Fig. 28)

Humidifier Control (Internal Mode)

Neptronic® SKS modulating Steam Humidifier can be installed in conjunction with Neptronic® **HRM-X** or **HDM-X** remote humidity sensor. In this case humidity set point will be controlled by **SKS** humidifier; humidifier will be set in internal mode. See below wiring diagram.



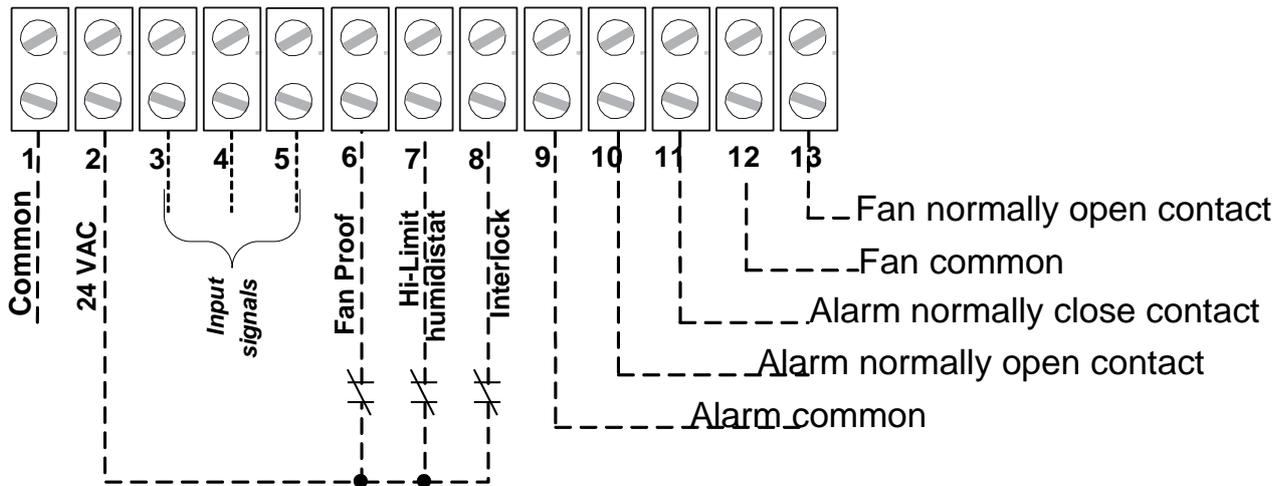
(Fig. 29)

Stage 7 – Electrical Control Connections

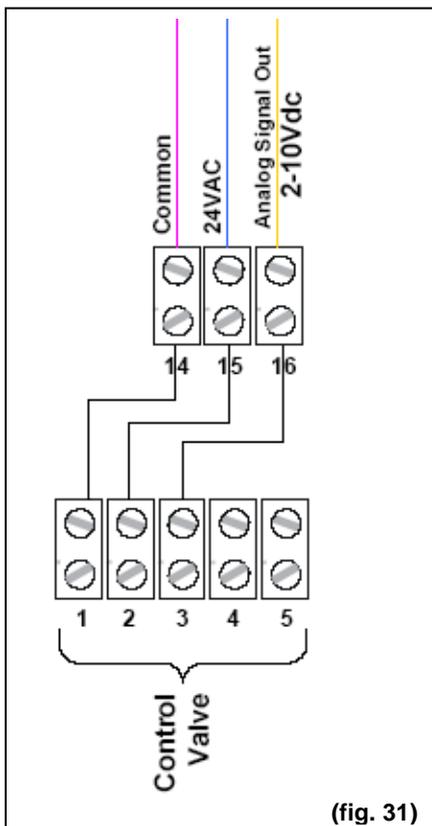
Dry Contacts Two series of volt free contacts are provided :

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

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



(Fig. 30)



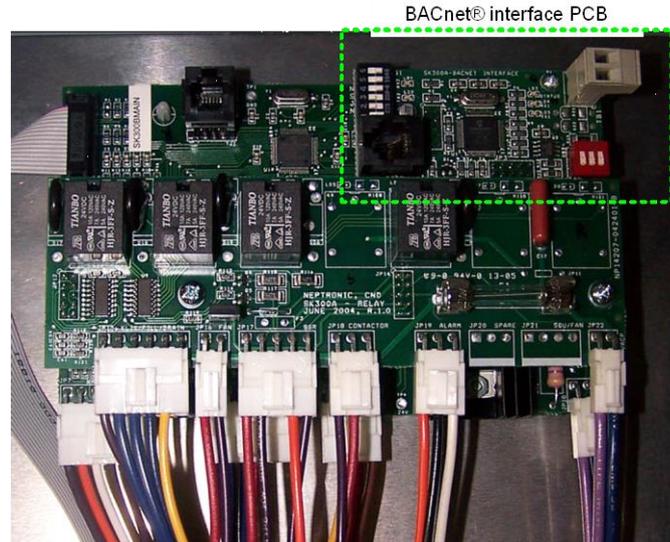
(fig. 31)

Steam Actuated Valve

- For SKS 100 to SKS 950 (1 control valve), connect the humidifier to the valve (AM060 actuator with globe valve) as per figure 29.
- For SKS 1250 (2 control valves), split the control signal from ports 14 to 16 and connect the humidifier to the control valves (AM060 actuators with globe valves).

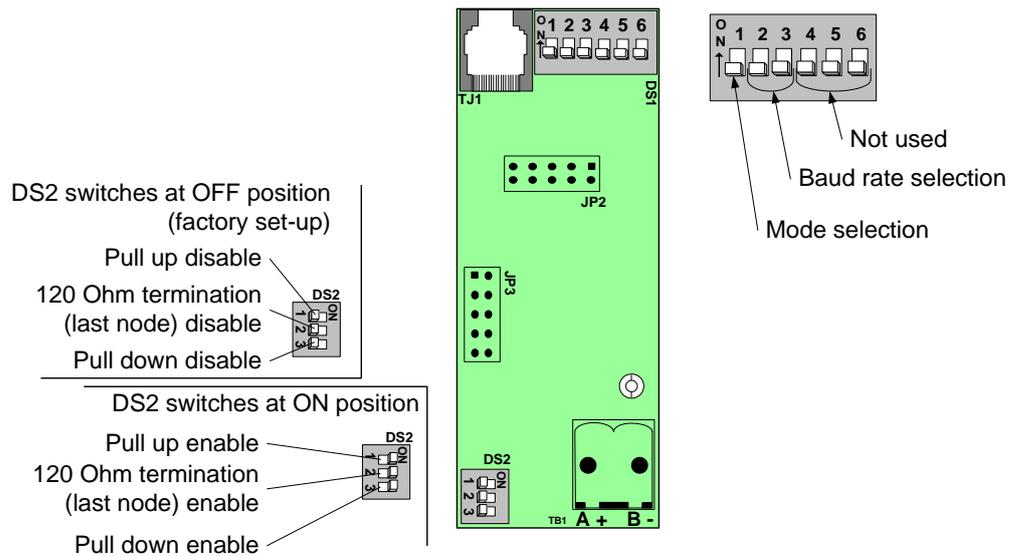
Stage 8 – BACnet® Interface Set-up

Locating Bacnet® Interface PCB BACnet® interface PCB is located in the electrical compartment it is directly attached and connected to the Main PCB.



(Fig. 32)

Dip Switch Setting for RS-485 BACnet® Port and Baud Rate



(Fig. 33)

DS1-1 : Mode selection	
OFF	Mode Operational (factory set-up)
ON	Mode Configuration

DS1-2&3 : Baud rate selection		
Baud rate	Switch #2	Switch #3
9600	OFF	OFF
19200	ON	OFF
38400	OFF	ON
76800 (factory set-up)	ON	ON

See also the supplied BACnet® communication module user guide.

Initial Verification



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

Clearance

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

Electrical Supply

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. To get to this PCB remove the front top cover.

Water Supply

4. Ensure that water is supplied to the humidifier. A shut-off valve must be 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 at least ¼” (6.5mm) per foot (300mm).

Humidification Clean 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 in total length than 16 feet (5m) and properly sloped and have condensation P traps wherever required.

Raw Steam or HTHW Supply

8. Confirm that Raw steam or HTHW is supplied to the humidifier and the shut-off valve located outside the humidifier is closed. Once the shut-off valve is turned ON, check for leaks or hissing sound.
9. In case of raw steam supply, verify type and size of condensate return steam trap. Steam trap must be of Float type and of sufficient dimension, according to capacity.

Controls

10. Ensure that the control valve is properly connected to the output control signal of humidifier.
11. Ensure that a High limit duct humidistat is installed, properly connected to the humidifier and set point properly adjusted.
12. Verify that Room humidistat or returned air duct humidistat is installed, properly connected to the humidifier and set point properly adjusted
13. Turn Power ON at the disconnect switch
14. Confirm the control set-up of the humidifier (step 7 of programming mode). The humidifier is factory set with EXTERNAL control set-up, which means that the humidity demand is controlled by the room or duct humidistat.
15. Ensure that the type of signal (0-10Vdc, 2-10Vdc or 4-20mA) of the humidistat correspond to the type set in the humidifier control set-up menu, step 7 of programming mode
-



Start-Up

-
- | | |
|------------------------|---|
| Start-up | <ol style="list-style-type: none"> 1. Proceed to the start-up of the Humidifier, as follow: <input type="checkbox"/> <ol style="list-style-type: none"> a) Open the front access door of the humidifier cabinet; make sure that manual drain valve is closed. <input type="checkbox"/> b) Start up the humidifier by pushing  (ON/OFF) button located on the humidifier control panel. <input type="checkbox"/> c) After 5 seconds, water will start to fill.
The water level will slowly rise in the water level sight glass located on the side of the evaporation chamber. <input type="checkbox"/> d) Verify that there is a humidity demand.
Humidity demand is displayed on the humidifier LCD screen. <input type="checkbox"/> e) Humidifier LCD screen will display the water level in percentage (%).
When display is indicating water level at 100%, the water level in the water level sight glass will be in front of the mark stamped on the bracket. <input type="checkbox"/> f) If there is a humidity demand, the control valve will open
From a cold water start, the humidifier will require 5 to 10 minutes to produce steam. <input type="checkbox"/>
Humidifier LCD display is indicating water temperature. g) During normal operation while steam is produced, the water temperature will be 100°C. The water level percentage must not indicate less than 95%. <input type="checkbox"/> h) Observe for water and steam leaks. <input type="checkbox"/> |
| Safety Test | <ol style="list-style-type: none"> 2. Check the location of the air flow switch in the system and its operation by stopping the fan. <input type="checkbox"/>
With no air movement in the air duct, the humidifier will automatically close the control valve(s). <input type="checkbox"/> |
| Drain and Reset | <ol style="list-style-type: none"> 3. Turn the humidifier OFF, by pushing  (ON/OFF) push button of the control panel. <input type="checkbox"/> 4. Execute a manual drain, by pushing the  (DRAIN) push button of the control panel. <input type="checkbox"/>
A water jet directed on the water level sensor located in the water level sight glass will start and create bubbles around it. 5. Reset Air flow switch and humidistat(s) to the proper value, if needed. <input type="checkbox"/> |
| End | <ol style="list-style-type: none"> 6. Humidifier is ready for normal operation. <input type="checkbox"/> |
-

Commissioning – Operation Description

Control Panel Description

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



(Fig. 34)



"POWER" push button and indicator

⊃○⊂	The humidifier is powered by electricity and the switch is at the ON position, ready to operate and produce steam upon demand
○	The humidifier is at OFF position



"DRAIN" Push button and Indicator

⊃○⊂	Drain is ordered, whether as a result of an automatic drain cycle or because the front panel push button has been pressed
○	Drain valve is closed.



"ALARM" indicator

⊃○⊂	The "CHECK" indication is normally off. It will go ON as a warning against abnormal conditions of operation. For details see the LCD Display
⊃○⊂ <i>blinking</i>	Maintenance is required. The Running hours have exceeded the Service hours.
○	No abnormal conditions of operation.



"FILL" indicator

⊃○⊂	Indication that the water supply (fill) valve is open.
○	Indication that the water supply (fill) valve is closed.



"FAN" indicator

⊃○⊂	Indication that the Fan is ON
○	Indication that the Fan is OFF



"STEAM" indicator

⊃○⊂	STEAM indicator lights when there is 100% steam output
⊃○⊂ <i>blinking</i>	STEAM indicator blinks ON and OFF in proportion to the percentage of steam output the humidifier is generating.
○	There is no steam being produced.

Access to Programming Mode

To access menu, press on the  button, LCD will display first step. You can scroll down to next step by pressing the  button

Change Value

Within a selected step, press on  or  buttons to change values (when required)

Operation Mode

OFF Mode When humidifier is at "OFF" position, the display shows the model of the unit and the program version number.

SKS XXXX
NEP r1.0

By pushing the  button on control panel, you can access to the serial number of the humidifier.

ON Mode When humidifier is ON, the display scrolls the following information every 6 seconds:

<i>Display</i>	<i>Description</i>	<i>Comment</i>
HUMIDITY 45.2%	Percent of relative humidity	Only if room or duct humidistat is connected to humidifier
DEMAND 92%	Percent of demand	Control signal input demand from 0-100%
OUTPUT 100%	Percent of output of the humidifier	Capacity output of the humidifier.
WATR LVL 92%	Water level in percent to the objective	100% correspond to optimum water level in evaporation chamber.
WATR TMP 65C	Water temperature in Celcius	Water temperature inside the evaporation chamber.

Alarm Messages

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

<i>Display</i>	<i>Description</i>	<i>Comment</i>
AIR FLOW OPEN	Air flow proof	The airflow is not detected by the air pressure switch (modulating unit only).
HI LIMIT CUT-OUT	High limit cut out	Humidity level has exceeded the set point on the high limit humidistat.
DRAIN CYCLE	Drain cycle	The unit is in the automatic drain mode
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
CLEANING REQUIRED	Cleaning required	The humidifier has reached the number of hours of operation and requires cleaning of the evaporation chamber with no interruption of the operation of the humidifier.
SERVICE UNIT NOW	Service unit now	The humidifier has reached the number of hours of operation and requires service. The operation of the humidifier is interrupted.
FOAMING CYCLE	Drain foam	AFEC (Anti Foam Energy Conservation) detects foam. The unit drains for a few minutes and returns to normal operation.
DRN/PROB BLOCK	Drain or probe block	The unit drains but the water level does not decrease, the humidifier has automatically shut off.
PCB FUSE OPEN	PCB Fuse open	Internal 24vac is shorted.
24 VAC SHORTED	24 VAC Shorted	External 24vac (for humidity) controller is shorted or over loaded.
24 VDC SHORTED	24 VDC Shorted	Internal 24vdc (probe or fan) is shorted.
REFILL TIME OUT	Refill time out	Time to fill the evaporation chamber exceeded the preset time in the microprocessor.
WATR TMP DEFECTED	Water temperature defective	The water temperature sensor is not present or defective.
INTERLCK OPEN	Interlock Open	Interlock safety is open. Humidifier is stopped.

Programming Mode

To access menu, press on the ***** button, LCD will display first step. You can scroll down to next step by pressing the ***** button. Within a selected step, press on **▲** or **▼** buttons to change values (when required)

Seq	Display	Description	Values
01	CONTROL EXTERNAL	Selection of Control mode. If External is selected, the control demand will be received by the control input; if Com Port is selected, the control demand will be received by the communication port (BACnet option).	Internal or External or Com Port Default: External
01A	SP SOURC INTERNAL	Selection of the Set Point Source (Control Internal only). Selection of source for room humidity set point.	Internal or External or Com Port Default: Internal
01B	SETPOINT 40% RH	Selection of room relative humidity set point. (SP Source Internal only)	Percentage From 10 to 90%
01C	DUCT SRC DISABLE	Hi limit control mode. Selection of the source for the duct high limit relative humidity (Control Internal only).	Disable or External or Com Port Default: Disable
01D	DUCT SP 80% RH	Selection of high limit relative humidity set point. (Duct Source External only).	Percentage From 10 to 90%
02	DRAIN 8 HRS	Setting of automatic drain cycle of evaporation chamber. <i>Note: In general, the harder the water is, the more often the drain cycle must be. Drain cycle setting does not affect the AFEC system.</i>	From 1 to 24 hours Increment: 1 hour Default: 4 hours.
03	RUNNING 0645HRS	Number of running hours reading and reset To reset this counter: After service has been done, press simultaneously on ▲ & ▼ buttons for 30 seconds to reset the number of hours of operation to zero.	N/A
04	SERVICE 1000HRS	Hour span between services. <i>Note: In general, the harder the water is, the lower the number of hours of operation are before servicing is required.</i>	From 400 to 1500 hours. Increment: 100 Default: 1000 hours.
05	LOCK ON 80% PWR	Selection of humidifier capacity reduction. <i>i.e.: In this case, the humidifier will deliver 80% of its maximum rated output when at full demand.</i>	From 00 to 100%. Increment: 1% Default: 100%
06	RESET ALRM NO	Reset of alarm To reset an alarm, press simultaneously on ▲ & ▼ buttons.	Yes or No Default: No
07	CTRL INP 2-10 VDC	Control signal input selection.	0-10VDC, 2-10VDC, 0-20mA or 4-20mA Default : 2-10VDC
08	HUM. INP 2-10 VDC	Humidity signal input selection.	0-10VDC, 2-10VDC, 0-20mA or 4-20mA Default : 2-10VDC
09	DUCT INP 2-10 VDC	Duct Humidity signal input selection.	0-10VDC, 2-10VDC, 0-20mA or 4-20mA Default : 2-10VDC
10	SKS XXXX NEP r1.0	Revision level of the program installed	N/A

Note:

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

User Adjustment & Diagnostic Mode

To enter to User adjustment & diagnostic menu: Press simultaneously  &  buttons.

Seq	Display	Type	Description	Value
01	Amb Tmp 40 C	Reading	Electrical compartment Ambient Temperature reading	N/A
02	WTR TOFF 100 C	User adjustment	Water temperature offset user adjustment	Range: from -10°C to +10°C Default: 0
03	WTR FREQ 8000 Hz	Reading	Water level frequency reading	N/A
04	WTR LOFF 100 %	User adjustment	Water level offset user adjustment	Range: from -10% to +10% Default: 0%
05	FOAM PRB 207	Reading	Foaming probe value reading	N/A
06	DrnTm Out 5 MIN	User adjustment	Drain time user adjustment	Range: from 4 to 16 min Default: see below table
07	No Demnd 72 HRS	User adjustment	Delay to drain out the humidifier from its remaining water when there is no demand, in order to prevent bacteria growth	Range: from 1 to 250 Hrs Default: 72Hrs
08	Ctl. Band 5.0 %	User adjustment	Selection of PID control band value. This option is available in internal mode only.	Range: from 1 to 20% Default: 5.0%
09	PropGain K _P =100	User adjustment	Selection of proportional gain values. This option is available in internal mode only.	Range: from 0 to 100 Default: 100
10	IntgGain K _i =100	User adjustment	Selection of integral gain values. This option is available in internal mode only.	Range: from 0 to 100 Default: 100
11	DiffGain K _d =100	User adjustment	Selection of differential gain values. This option is available in internal mode only.	Range: from 0 to 100 Default: 100
12	Hold Tmp OFF	User adjustment	Holding temperature of the evaporation chamber for fast response to demand	Range: from 15 to 90°C or OFF Default: OFF
13	Anti-Frz OFF	User adjustment	Anti-freezing temperature for the evaporation chamber for humidifier to be installed in weather proof enclosure.	Range: from 4 to 10°C or OFF Default: OFF
14	ALARM Beep ON	User adjustment	Alarm beep, to be selected ON or OFF	Range: ON or OFF Default: OFF
15	T Unit CELSIUS	User adjustment	Temperature unit scale Celsius or Fahrenheit	Range: Celsius or Fahrenheit Default: Celsius
16	CONTRAST 25	User adjustment	LCD Display contrast level	Range: from 0 to 40 Default: 25 (legible LCD)

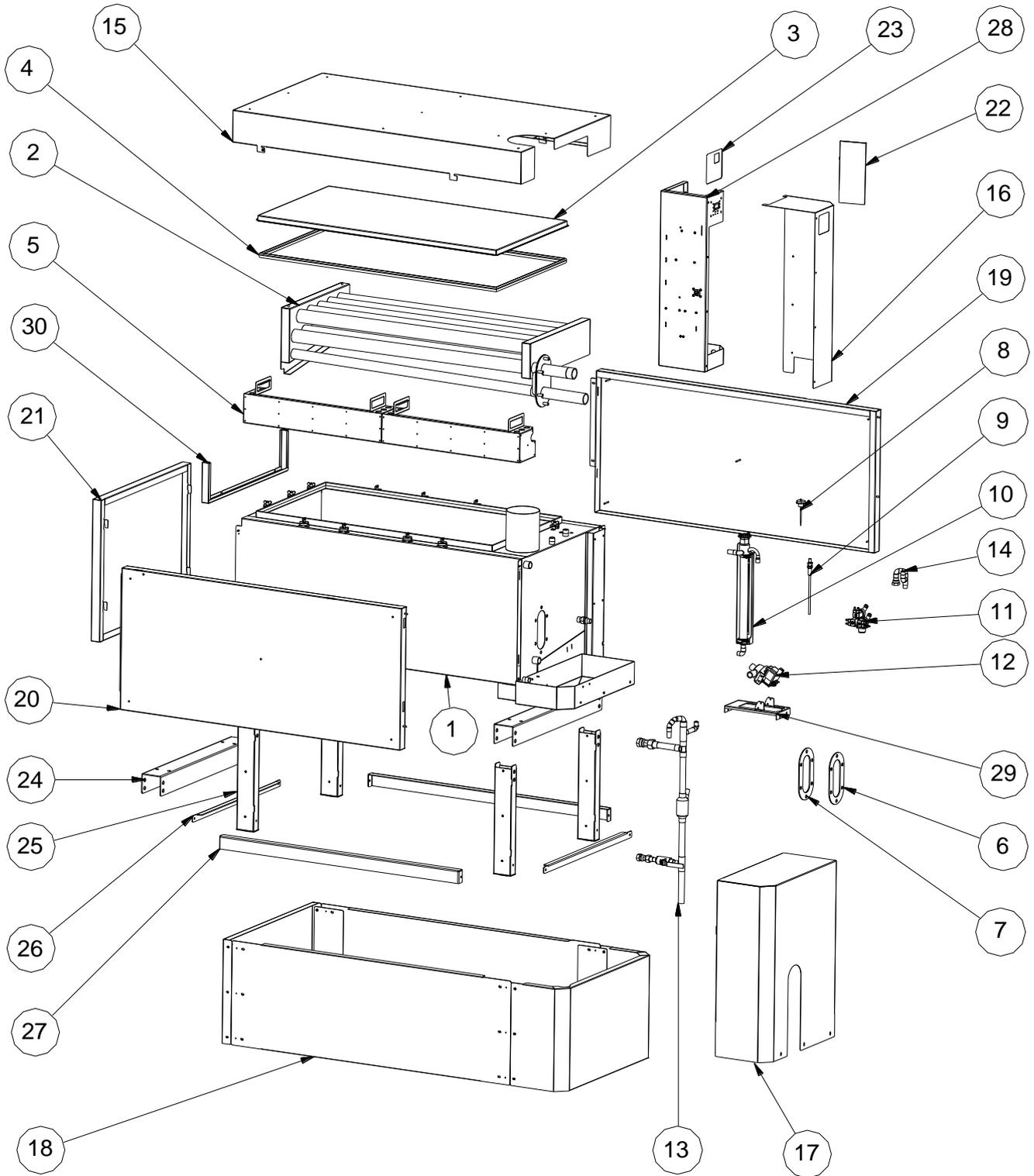
17	SKS XXXX NEP r1.0	Reading	Model of humidifier and revision number of program installed.	N/A
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Default values of Drain Time out by model (step #06):

Model	Drain Time out default value
SKS-100/130-SLP	4.5 min
SKS-190-SLP	5.5 min
SKS-290-SLP	6.0 min
SKS-390/500-SLP	8 min
SKS-690-SLP	12.5 min
SKS-950-SLP	14 min
SKS-1250-SLP	21 min
SKS-065-CLP	6 min
SKS-110-CLP	10 min
SKS-220-CLP	16 min



Exploded View



(Fig. 35)



Item	Description	Model	Qty	Part number
1	Base & Water tank	See table 2	1	SPS 1Y
2	Heat exchanger	See table 2		SPS 2Y
3	Water tank cover	See table 2	1	SPS 400X
4	Water tank gasket	See table 2	1	SPS 6X00
5	Scale basket	SKS-100/130/190/290-SLP/SKS-065-CLP	2	SPS 4001
		SKS-390/500/690/950/1250-SLP SKS-110/220-CLP		SPS 4002
6	Heat exchanger flange washer (external)	See table 2		SPS 2Y-8
7	Heat exchanger flange gasket	See table 2		SPS 6Y
8	AFEC Probe (foam detection)	All	1	SWS 7001
9	Water temperature probe	All	1	SW GWATTEMP- ASSY
10	Water level sensor	All	1	SW GWATLEVSR1
11	Water inlet valve	All	1	SP 6008
12	Drain pump	All	1	SPG 4101
13	Drain Cooler pipe assembly	See table 2	1	SWS 7X
14	Water inlet pipe assembly	All	1	SWS 7003
15	Top panel	See table 2	1	SPS 3Y-6
16	Electrical box panel	See table 2	1	SPS 3X-8
17	Front panel	See table 2	1	SPS 3Y-7
18	Leg skirt assembly	See table 2	1	SWS SKIRTX
19	Side panel Right	See table 2	1	SPS 3X-3
20	Side panel Left	See table 2	1	SPS 3X-4
21	Back panel	See table 2	1	SPS 3X-5
22	Main PCB	All	1	NW SK300BMAIN- TES
23	Display PCB	All	1	NW SKSDISPLAYSS
24	U channel	See table 2	2	SPS 3X-1
25	Leg	All	4	SPS 4009
26	Leg reinforcement - short	All	2	SPS 4010
27	Leg reinforcement - long	SKS-100/130/190/290-SLP SKS-065-CLP	2	SPS 4011
		SKS-390/500/690/950/1250-SLP SKS-110/220-CLP		SPS 4012
28	Electrical box	See table 2	1	SPS 1X11
29	Drain pump bracket	All	1	SPS 4109
30	Heat exchanger bracket	See table 2		SPS 2Y-7

Table 2

Model	Nb of Heat Exc.	X cabinet family	Y Heat exchanger type
SKS-100-SLP	1	1	0100
SKS-130-SLP	1	1	0130
SKS-190-SLP	1	2	0190
SKS-290-SLP	1	2	0290
SKS-390-SLP	1	3	0390
SKS-500-SLP	1	3	0500
SKS-690-SLP	1	4	0690
SKS-950-SLP	1	4	0950
SKS-1250-SLP	2	5	1250
SKS-065-CLP	1	2	0200
SKS-110-CLP	1	3	0333
SKS-220-CLP	2	4	0667



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