



Standard Water

“SX” Series

Steam Heat Exchanger Humidifiers

Looking for an alternative to electrically generated humidification? Concerned about using chemically treated boiler steam for direct humidification? If so, PURE’s “SX” Series Steam Heat Exchanger Humidifiers are exactly what you’re looking for.

Indoor air quality issues concerning the use of boiler steam for direct humidification have resulted in a growing apprehension for the use of “steam injection” type humidifiers. The possible carryover of chemical additives and odor created within some boiler systems are being addressed in an effort to improve the indoor air quality for new and existing buildings. The alternative, electric humidifiers, can be prohibitive due to the higher energy costs associated with electrically generated steam, versus the typically lower energy cost of boiler steam. For these reasons, PURE has developed the “SX” Series Steam Exchanger Humidifier.

The “SX” Series Humidifiers utilize a stainless steel heat exchanger, which allows for boiler steam to be used as the heat source for producing steam from tap water. By isolating the boiler steam from the clean tap water, contamination by the boiler is completely eliminated. The steam produced by the “SX” Series Humidifier is free from chemical or mineral carryover, thus providing humidification for today’s stringent indoor air quality requirements. PURE’s highly efficient heat exchanger produces a greater capacity per unit size than competing designs, due to the rectangular transfer tube, as well as providing simplified maintenance. The unique side entry heat exchanger can be removed without removing the cover and injection tube system and provides a large clean-out opening which extends the full length of the humidifier. Furthermore, the heat exchanger incorporates easy-to-clean rectangular transfer tubes which are simpler to maintain than round tube designs.

PURE’s commitment to quality and ease of maintenance is further illustrated by the use of pressure clamps that secure the heat exchanger to the reservoir and eliminate the need for through-the-wall threaded fasteners. The humidifiers utilize a Tri-Probe electronic water level control system, and a flusher. The flusher removes water mineral buildup during each fill cycle, and doubles as a water overflow safety pipe. A standard accumulative timed drain cycle performs automatic draining and flushing, further reducing mineral buildup within the reservoir. Precise modulation of the humidifier output is maintained by a high quality control valve which modulates the steam flow into the heat exchanger.

Each humidifier is supplied with a control system mounted in a NEMA-12 enclosure. The control system provides constant monitoring of the water level and safety systems, as well as providing a control valve interlock which prevents operation should any of the safety circuits open.

When it comes to installation, you have a choice with the “SX” Series Steam Heat Exchanger. The humidifier can be freestanding with a simple (optional) flexible hose connecting the unit to the stainless steel injection tube inserted through the duct wall. You can also mount the unit on the wall with wall brackets, or floor-mounted with support legs (both optional). For mounting under a duct you simply need hangers and support brackets.

The versatility of the “SX” Series will allow you to design them into any system simply, efficiently and reliably.

Our results are comforting

Humidifier Capacity in Pounds per Hour (kg/hr)†

Model Number	Steam Pressure in psig (Kpa) at the control valve			
	5 psig (34.5)	10 psig (69.0)	13 psig (89.6)	15 psig (103.4)
SX-1R	32.0 (14.5)	76.0 (34.5)	100.0 (45.3)	122.0 (55.3)
SX-2R	52.0 (23.6)	108.0 (48.9)	140.0 (63.5)	169.0 (76.7)
SX-3R	102.0 (46.3)	228.0 (103.4)	292.0 (132.5)	348.0 (157.8)
SX-4R	192.0 (87.1)	484.0 (219.5)	655.0 (297.1)	753.0 (341.7)

† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity, and injection tube system will affect the rate of heat loss from the reservoir.

The capacities shown are based on a non-insulated humidifier reservoir tested in a 70°F environment.

Humidifier Piping

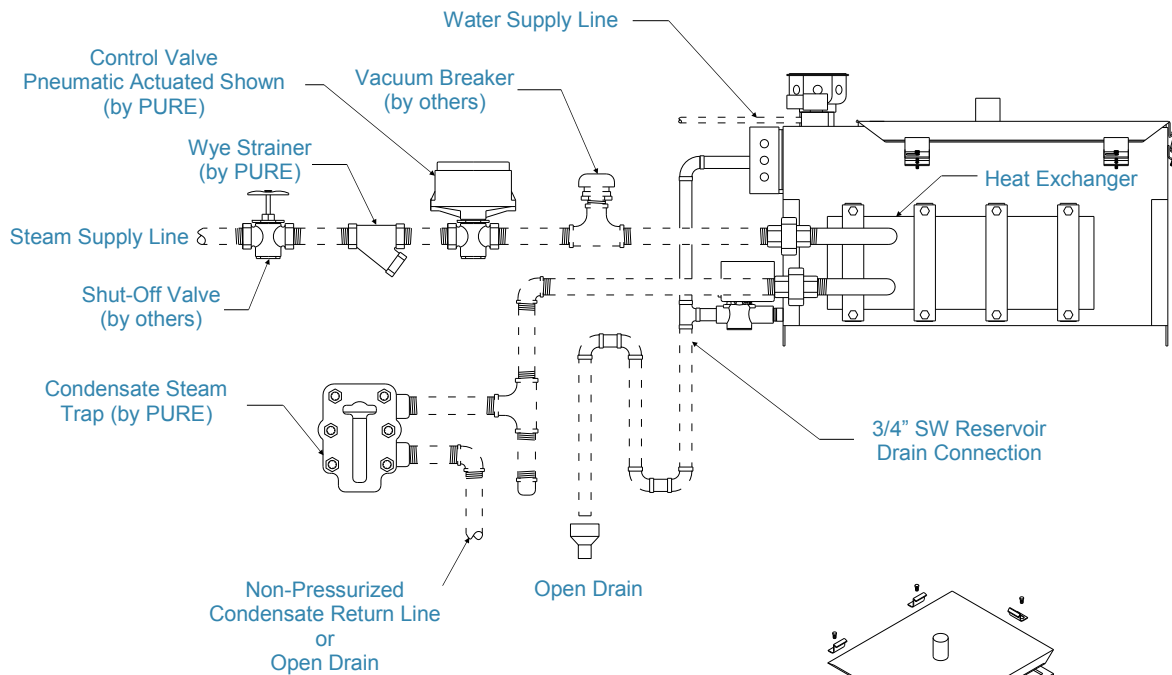


Figure 1

PIPING NOTES:

1. Do not install piping across the front of the heat exchanger.
2. Dashed line piping is by others.
3. Do not use PVC or plastic for any of the piping connections to the humidifier.
4. A shut-off valve must be installed in the steam supply line prior to the wye strainer (valve by others). Reference Figure 1.
5. Allow a minimum side clearance equal to the unit width dimension for removal of the heat exchanger (see page SX-3 for unit dimensions). Reference Figure 2 for illustration of heat exchanger removal.

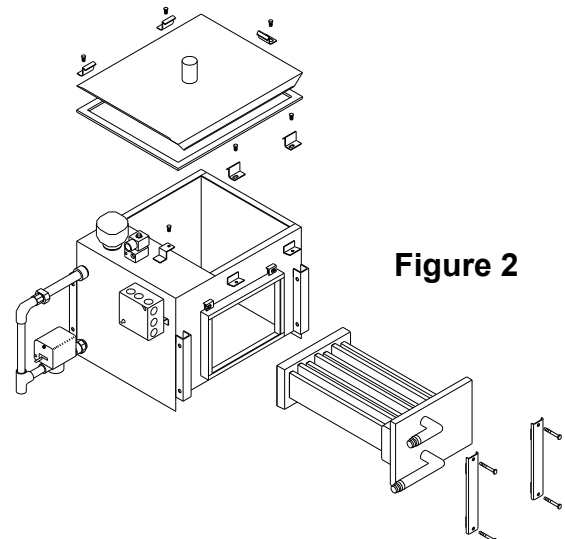
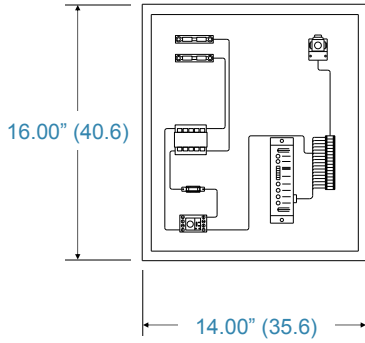


Figure 2

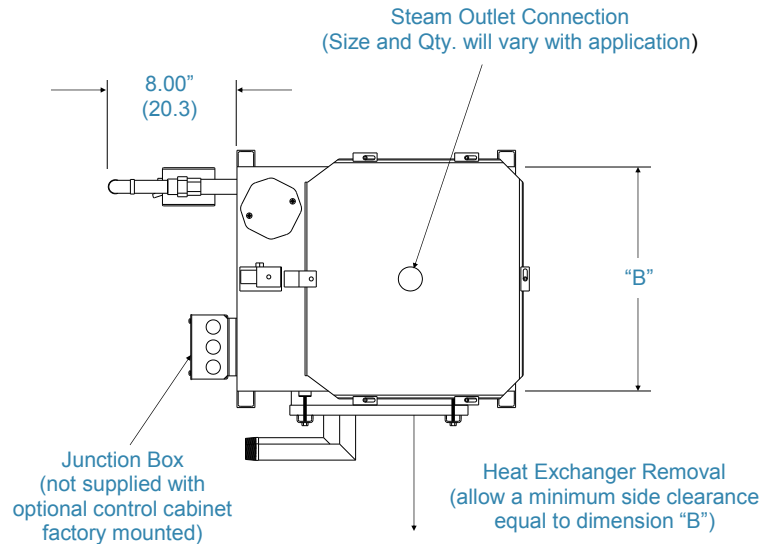
NEMA-12 Humidifier Control Cabinet

(reference control cabinet notes)

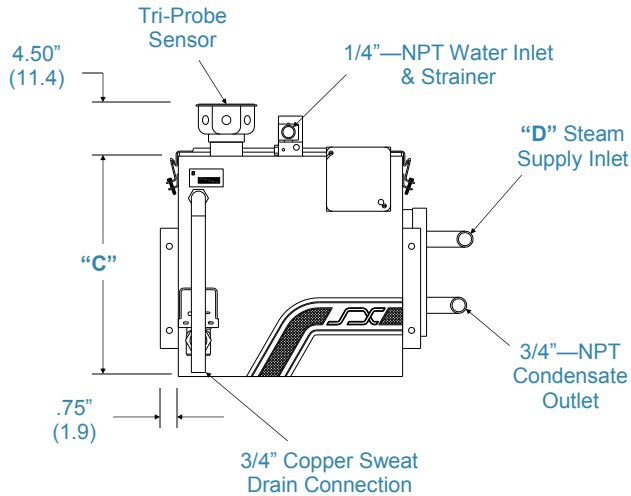


Cabinet Depth: 6.00" (15.2)

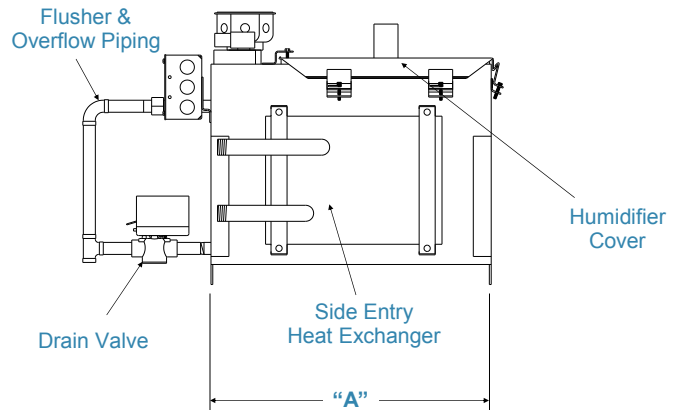
- 1) Door has been removed from the drawing for clarity
- 2) Control cabinet is shipped loose for field mounting unless optional factory mounting is specified
- 3) Control cabinet weight: 28 lbs (12.7 kg)



Top View



Front View



Right Side View

Unit Dimensions in Inches (cm) and Weight in Pounds (kg)*

Model Number	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Shipping Weight (kg)	Operating Weight (kg)
SX-1R	17.50" (44.5)	14.00" (35.6)	13.75" (34.9)	3/4" (NPT)	62 lbs (28.2)	139 lbs (63.2)
SX-2R	25.50" (64.8)	14.00" (35.6)	13.75" (34.9)	3/4" (NPT)	85 lbs (38.6)	203 lbs (92.2)
SX-3R	34.00" (86.4)	18.25" (46.4)	13.75" (34.9)	1-1/2" (NPT)	139 lbs (63.1)	272 lbs (123.4)
SX-4R	54.00" (137.2)	27.50" (69.9)	13.75" (34.9)	2" (NPT)	269 lbs (122.1)	742 lbs (336.9)

*When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight. Due to product improvement, catalog dimensions and specifications are subject to change without notice.

Humidifier Capacity in Pounds per Hour (kg/hr) †

Model Number	Steam Pressure in psig (Kpa) at the valve			
	5 psig (34.5)	10 psig (69.0)	13 psig (89.6)	15 psig (103.4)
SX-8R	370 (167.8)	840 (381.0)	1200 (544.3)	1350 (612.4)

† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity, and injection tube system will affect the rate of heat loss from the reservoir.

The capacities shown are based on a non-insulated humidifier reservoir tested in a 70°F environment.

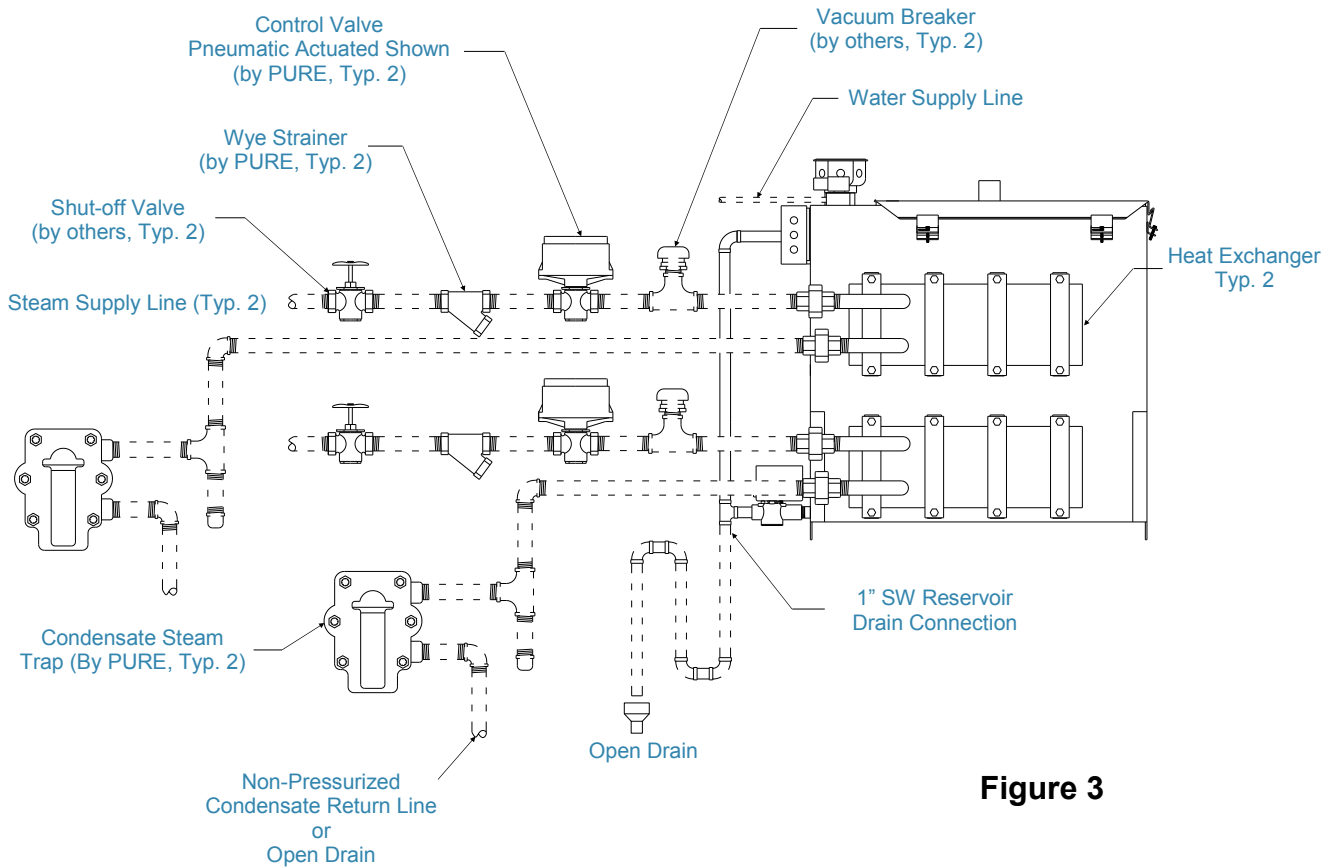


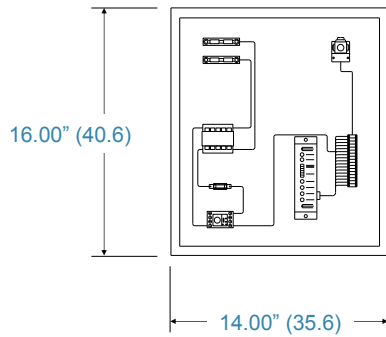
Figure 3

PIPING NOTES:

1. Do not install piping across the front of the heat exchanger.
2. Dashed line piping is by others.
3. Do not use PVC or plastic piping for any of the piping connections to the humidifier.
4. A shut-off valve must be installed in the steam supply line prior to the wye strainer (valve by others). Reference Figure 3.
5. Allow a minimum side clearance equal to the unit width dimension for removal of the heat exchanger (see page SX-5 for unit dimensions).

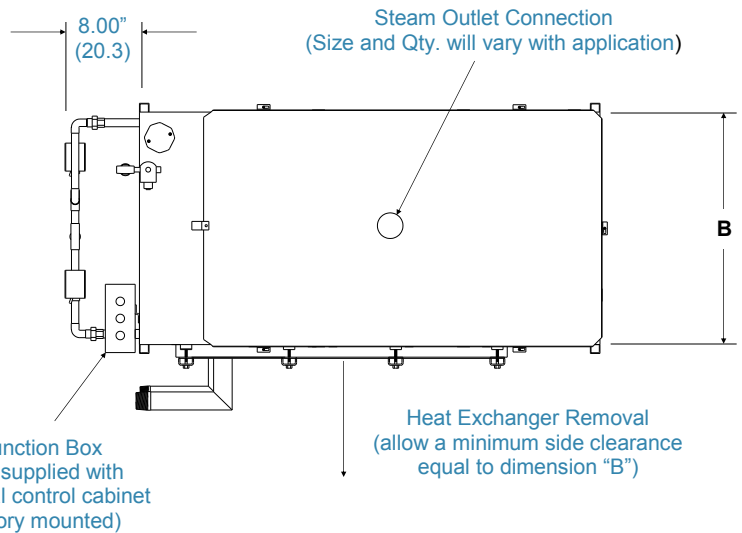
NEMA-12 Humidifier Control Cabinet

(reference control cabinet notes)

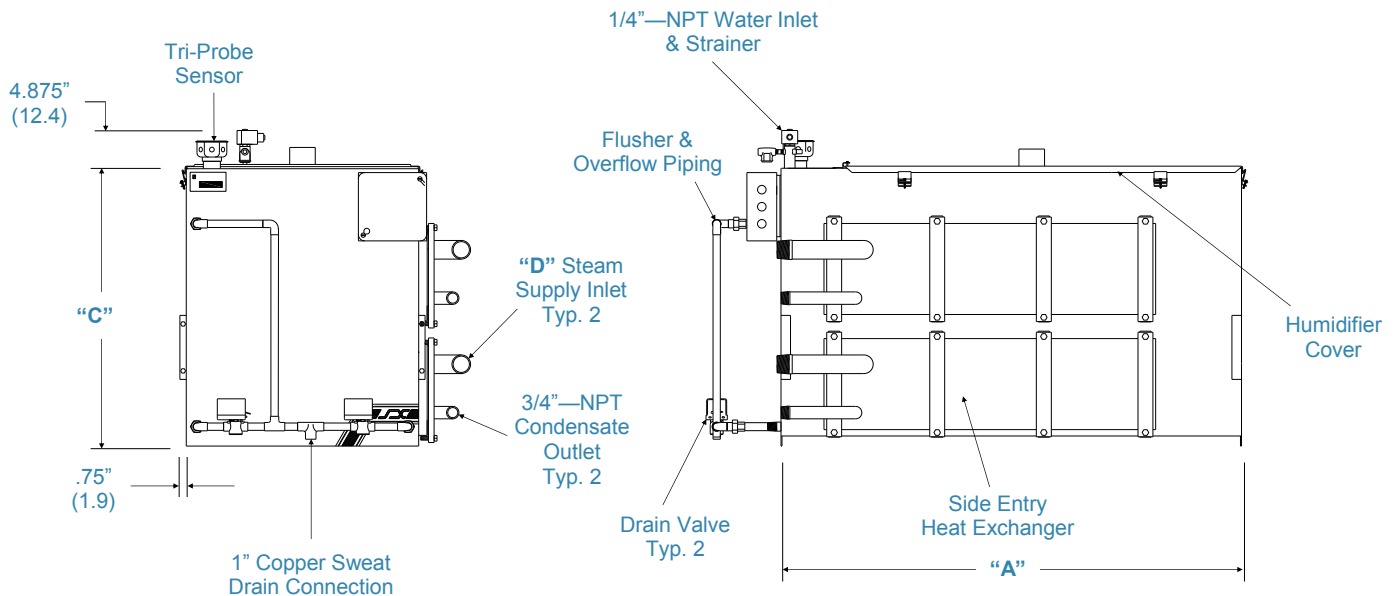


Cabinet Depth: 6.00" (15.2)

- 1) Door has been removed from the drawing for clarity
- 2) Control cabinet is shipped loose for field mounting unless optional factory mounting is specified
- 3) Control cabinet weight: 28 lbs (12.7 kg)



Top View



Front View

Right Side View

Unit Dimensions in Inches (cm) and Weight in lbs (kg)*

Model Number	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Shipping Weight (kg)	Operating Weight (kg)
SX-8R	54" (137.2)	27.25" (69.2)	32.5" (82.6)	2" (NPT)	697 lbs (316.2)	1480 lbs (671.3)

*When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight. Due to product improvement, catalog dimensions and specifications are subject to change without notice.

Humidifier Capacity in Pounds per Hour (kg/hr) †

Model Number	Steam Pressure in psig (Kpa) at the control valve			
	5 psig (34.5)	10 psig (69.0)	13 psig (89.6)	15 psig (103.4)
SX-12R	560(254.0)	1265 (573.8)	1810 (821.0)	2035 (923.1)

† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity, and injection tube system will affect the rate of heat loss from the reservoir.

The capacities shown are based on a non-insulated humidifier reservoir tested in a 70°F environment.

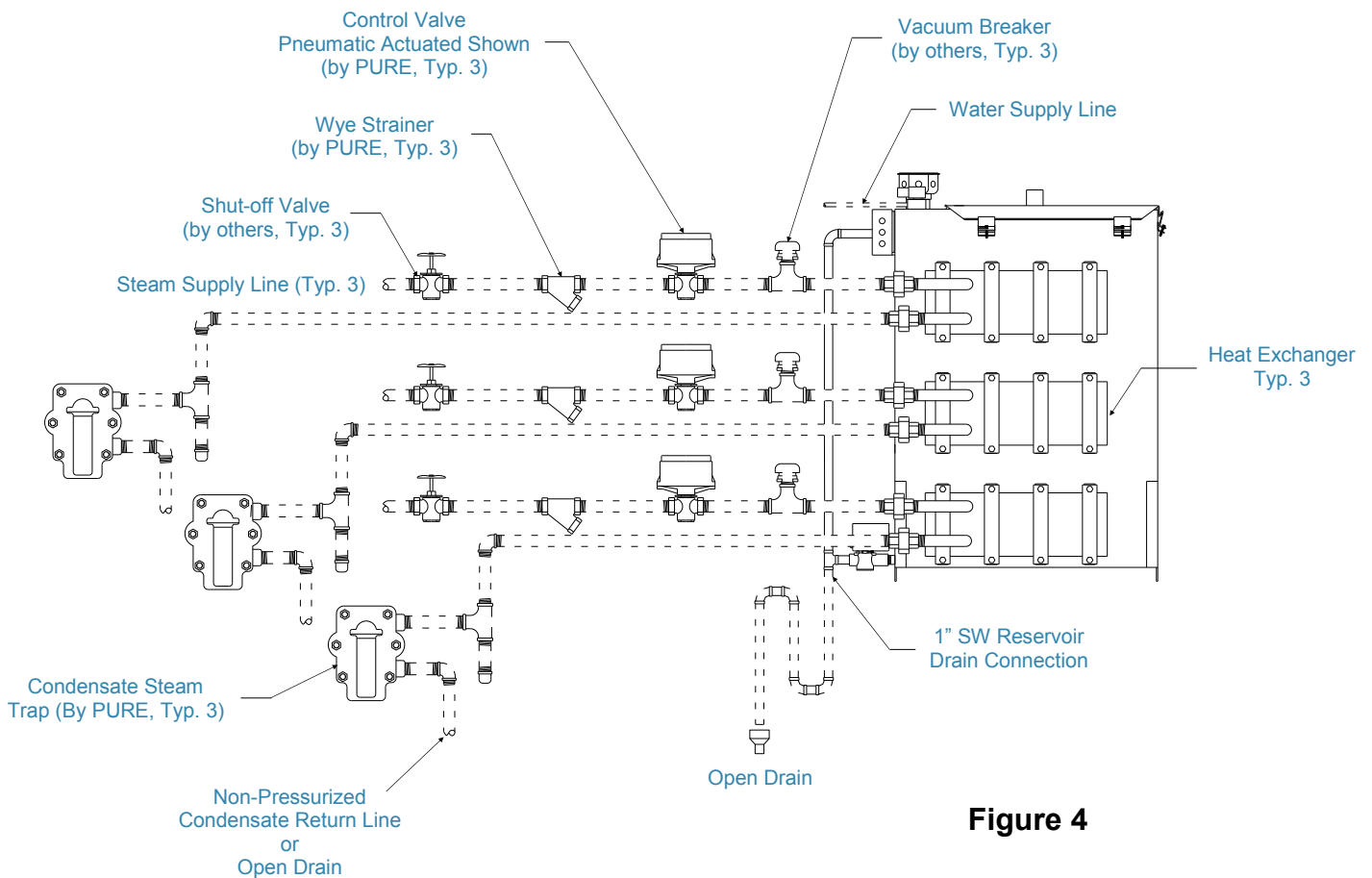
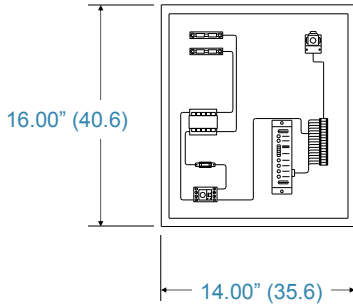


Figure 4

PIPING NOTES:

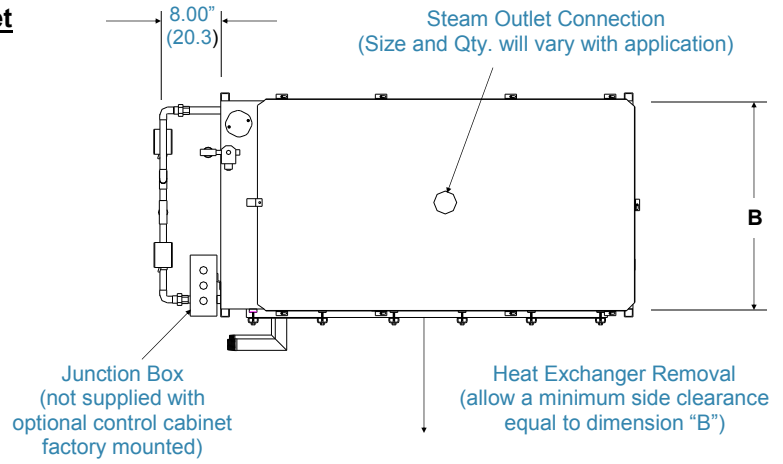
1. Do not install piping across the front of the heat exchanger.
2. Dashed line piping is by others.
3. Do not use PVC or plastic piping for any of the piping connections to the humidifier.
4. A shut-off valve must be installed in the steam supply line prior to the wye strainer (valve by others). Reference Figure 4.
5. Allow a minimum side clearance equal to the unit width dimension for removal of the heat exchanger (see page SX-7 for unit dimensions).

NEMA-12 Humidifier Control Cabinet
 (reference control cabinet notes)

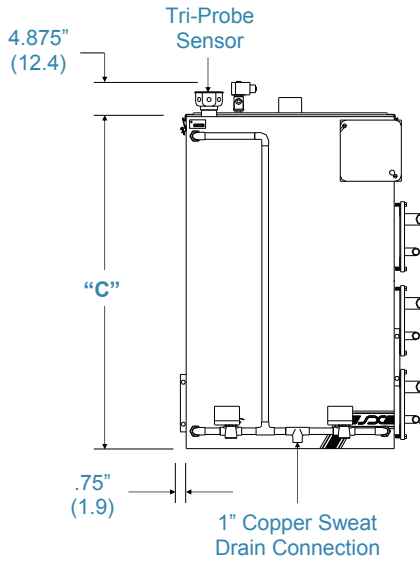


Cabinet Depth: 6.00" (15.2)

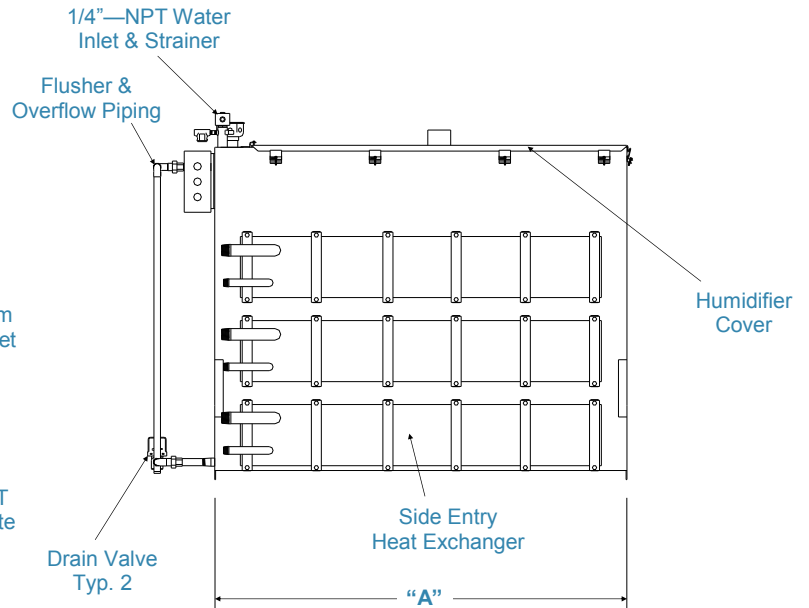
- 1) Door has been removed from the drawing for clarity
- 2) Control cabinet is shipped loose for field mounting unless optional factory mounting is specified
- 3) Control cabinet weight: 28 lbs (12.7 kg)



Top View



Front View



Right Side View

Unit Dimensions in Inches (cm) and Weight in Pounds (kg)*

Model Number	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Shipping Weight (kg)	Operating Weight (kg)
SX-12R	54" (137.2)	27.25" (69.2)	43.5" (110.5)	2" (NPT)	845 lbs (383.3)	1628 lbs (738.4)

*When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight. Due to product improvement, catalog dimensions and specifications are subject to change without notice.



Specification Sample
"SX" Series

Sheet No.

SX-8

Humidifier

1. The humidifier shall be steam-heated heat exchanger type as manufactured by PURE Humidifier Co. of Chaska, Minnesota.
2. The humidifier shall be tested and approved by ETL/ETL-C Testing Laboratories, Inc. (ETL# 472940).
3. The humidifier shall have an evaporating reservoir with a gasket sealed cover which is capable of operating at pressures of at least 19" (48 cm- W.C.) without steam or water leaks. The reservoir shall be made of type 304 stainless steel with welded joints.
4. The humidifier shall be designed to facilitate easy removal of the heat exchanger for periodic scale removal and inspection. The cover and heat exchanger shall be secured to the unit by the use of quick release clamps. The heat exchanger shall be removable from the side of the humidifier without disturbing the cover or injection tube system.
5. Humidifier shall be field-convertible from a steam heat exchanger style "SX" humidifier to an electric immersion heater style "ES" humidifier with a simple change of the side entry assembly.
6. The heat exchanger shall be constructed of type 304 stainless steel rectangular transfer tubes and headers for improved scale removal and cleaning.
7. An adjustable surface water flusher shall be included to drain away a portion of the water upon each refill cycle. This is to allow mineral deposits produced by earlier evaporation cycles to be removed. Flusher height should be adjustable for minimal water waste and efficient flushing.
8. A stainless steel body, solenoid operated water fill valve shall be factory-mounted on the top of the humidifier reservoir. A bottom fill system shall be utilized to prevent any collapse of the steam head during the fill cycle. The fill valve shall be located to allow a minimum water gap of 1½" (3.81 cm). The internal strainer shall remove any water born particulate matter before the humidifier fill valve. The water strainer shall have a removable screen to permit periodic inspection and cleaning.
9. The humidifier shall be provided with an ETL/ ETL-C listed JIC NEMA 12 control cabinet, shipped loose (optional factory mounting available). The control cabinet shall be made of 14-gauge steel with ANSI 61 gray polyester powder coating, continuous hinge and oil-resistant gasket. The panel shall include a factory wired subpanel with control valve interlock, Tri-Probe sensor, fused control circuit transformer, numbered terminal block, and main power fuse(s).
10. A solid state, plug-in type control module shall be factory mounted within the control panel and shall electronically control the automatic refilling, low water cut-off, high water cut-off, manual surface water flushing, and safety switch interlock functions. The module shall include automatic drain functions to drain the reservoir. The drain period will be field adjustable in 10 hour increments from 10 to 150 hours with the drain duration adjustable in 2 minute increments between 2 and 30 minutes. During the drain period, the humidifier chamber will drain and the fill valve will be energized to provide a thorough rinsing action. After the drain period is completed, the drain valve will close and the humidifier will refill to provide humidity on demand.

The control module shall incorporate LED lights to indicate safety switch interruption, power, fill, heat ready, and drain. The control module shall control all water level control functions through a Tri-Probe sensor mounted on the top-front of the humidifier reservoir. The Tri-Probe sensor with stainless steel shield shall electrically sense the water level within the reservoir.
11. The control system shall maintain humidification during the fill cycle to maintain a consistent relative humidity.



Options "SX" Series

Sheet No.

SX-9

Humidifier

Insulation. Unit shall be covered (except top cover) with $\frac{3}{4}$ " (1.9 cm) thick fiberglass duct insulation. Insulation material shall have aluminum foil facing.

Modulating Fill. For applications that require RH staying above a minimum threshold, a smaller fluctuation allows you to set the set point lower. Not only does this create a cost savings, but also saves on energy and water usage, making it a more economical option than the constant overflow method. Field-retrofitable on units that use our Tri-Probe water sensor. Must be used with INTAC[®] microprocessor option.

Mounting

Support Legs. Provide support legs made of $1\frac{1}{4}$ " x $1\frac{1}{4}$ " x $\frac{1}{4}$ " (3.2 cm) angle iron and painted with enamel gray paint. Distance from humidifier bottom to floor shall be 24" (61 cm).

Wall Brackets. Provide two wall brackets made of $1\frac{1}{4}$ " x $1\frac{1}{4}$ " x $\frac{1}{4}$ " (3.2 cm) angle iron and painted with enamel gray paint.

Injection Tubes

Injection Tube(s) and Flexible Hose. Each unit shall include one or more 10-foot (305 cm) sections of $1\frac{1}{2}$ " (3.8 cm) I.D. flexible hose and a $1\frac{1}{2}$ " (3.8 cm) O.D. stainless steel injection tube long enough to extend across the duct. Steam ports shall direct steam upward into the airflow. The reservoir cover shall have a matching connection so the flexible hose can be connected with two stainless steel hose clamps. A two-piece duct plate shall be provided to seal the duct opening.

Fast-Pac Tube Assembly. Tube assembly consists of a stainless steel supply/condensate header with a $\frac{3}{4}$ "-NPT drain connection and horizontal $1\frac{1}{2}$ " \varnothing stainless steel injection tubes.

Insty-Pac Tube Assembly. The tube assembly shall be designed for rapid dissipation of steam inside the ductwork. The assembly shall be provided with a supply/condensate header with a drain connection for the removal of the condensate. The tubes shall be mounted level. The tube design shall be a tube-within-a-tube design to minimize condensate loss. Tubes shall have punched orifices designed so that the use of inserts is not required to prevent condensation from escaping the tube. The tubes shall be welded directly to the header, or connected with flexible hose cuffs and clamps. The use of o-rings is not allowable. The assembly shall be able to have the header mounted inside or outside the air stream. Supply and condensate piping shall only be on one side of the duct/AHU.

High Efficiency Insulated Tubes. Thermoplastic wrap reduces condensate loss and unwanted heat gain during cooling mode.

Blower Pack. Blower Pack consists of a two-speed contained in an 18-gauge steel cabinet with a factory mounted and wired temperature interlock. One Blower Pack can be used per each 100 lbs/hr.

Control Cabinet

Control Cabinet Factory Mounting. Humidifier control cabinet shall be factory-mounted and wired to the left side of the humidifier.

NEMA 4 Control Cabinet. A NEMA 4 weather tight control cabinet shall be substituted for the standard NEMA 12 cabinet.

Control Panel Door Lock. Control cabinet shall be provided with a factory-installed key lock on the cabinet door.

Controls and Safety Devices

VAV Control. A dual input, single output humidistat shall be supplied to provide a single modulating output signal to the humidifier control cabinet. The humidistat shall allow the use of a modulating wall mount sensor and modulating duct high-limit sensor (optional) to control critical variable air volume (VAV) air handling systems. The system shall automatically determine which of the two modulating signals is dominant and slowly reduces the humidifier output capacity, thus preventing over-saturation of the VAV system.

Outdoor Air Temperature Setback. Provides automatic reduction of RH set point to prevent condensation on windows during extreme cold weather.

Seasonal "End of Use" Humidifier Drain. The humidifier will automatically drain the reservoir after a non-use time period which is field adjustable. Upon receiving a call for humidity, the system automatically refills the reservoir and allows the humidifier to operate in "Normal Mode".

INTAC[®] Microprocessor Controller. The controller shall be factory-mounted and wired on the electrical compartment door. The INTAC[®] shall provide 16-character vacuum fluorescent digital display of all functions, high/low humidity deviation alarms, time to service shall be capable of *flash memory upgrades* through EIA-485 terminal connections. Software updates shall be capable of being provided to customer via e-mail or Internet.

Communications Gateway. Allows Modbus to communicate with BACnet or LonWorks networks.. Gateway can be used concurrently as a cloud connected device for secure remote access for diagnostics, monitoring, alarming and configuration of humidifier in the field. Wi-Fi connectivity can be enabled if desired. Must be used with INTAC[®] microprocessor option.

Airflow Proving Switch. A diaphragm operated airflow proving switch with adjustable control range of .05" W.C. to 12.0" W.C. shall be provided for field installation. Switch rating shall be 2.5 amps at 120V.

Duct High-Limit. A high-limit humidistat shall be provided for duct installation. The high-limit shall be field set to prevent over saturation within the supply duct.

Miscellaneous Accessories

DCT-927 Drain Tempering Kit. Provides cold water mixing of the 212°F drain water.

Condensate Pump. Used to lift condensate from the humidifier or tube assembly.

Outdoor Enclosure. Galvanized steel enclosure with tank freeze protection, control panel mounted, support legs, insulated tank, ventilation and hinged access doors. Enclosure is ready to be curb-mounted with the humidifier pre-installed. Ships as one piece. Roof curb is not included.