



READ AND SAVE THESE INSTRUCTIONS

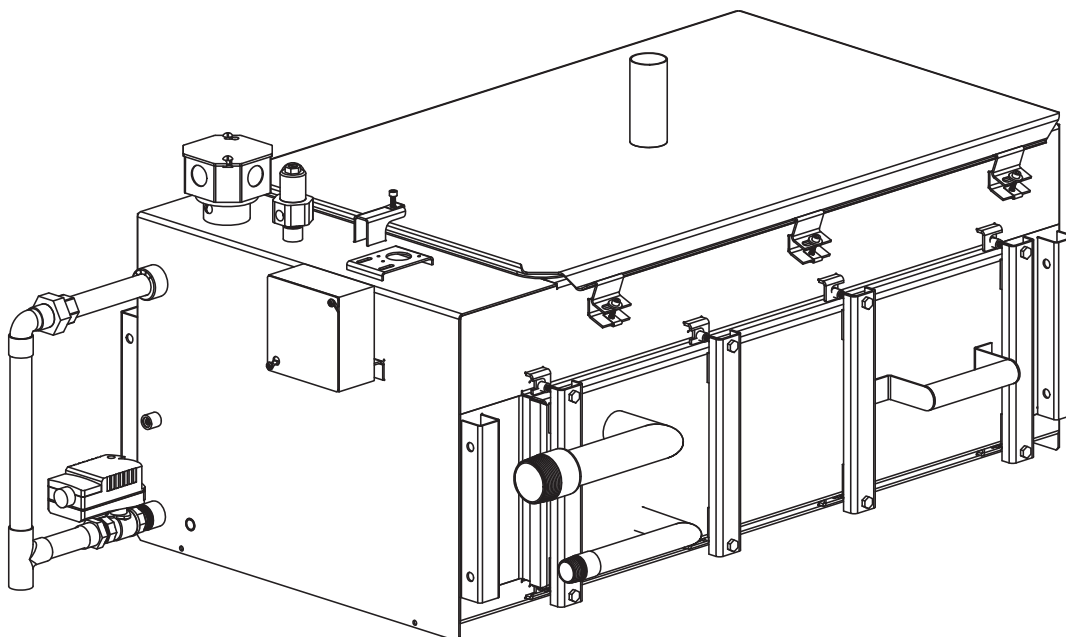
Standard Water

SX Series

Steam Heat Exchanger Humidifier

Installation Instructions

Operation and Maintenance Manual



Our results are comforting

PURE HUMIDIFIER® and INTAC® are registered trademarks of PURE Humidifier Co.

Form No: SXOM-6-2023



To the User of PURE Humidifier Co.'s SX Humidifiers

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co.'s SX Series humidifiers are models of simplicity to install, operate and maintain. However, they must be maintained to provide maximum operating efficiency.

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

The SX Series Humidifier utilizes a Tri-Probe conductive type water control system, which is designed for use with standard (hard or soft) tap water. Use of demineralized, deionized or reverse osmosis water will cause a failure of the water level control system and void the warranty.

High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty. Do not use hydrochloric acid descalers or bleach to clean the tank. We offer an easy-to-use, non-toxic descaling solution to help keep your units clean and operating with maximum efficiency. Please contact your local PURE Humidifier representative for more information about our PURE Clean descaling solution.

PURE Humidifier Co.'s SXDDR Series should be installed on applications that require demineralized, deionized or reverse osmosis water.

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

Do not adjust any components inside humidifier control box without consulting the factory

For indoor installation only unless supplied with an outdoor enclosure.



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WARNINGS

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

WARNINGS

SERVICING

Disconnect main power before servicing or maintaining humidifier.

The humidifier system including the humidifier tank, steam supply piping, condensate piping and steam distribution grid can be extremely hot and can cause burns if touched.

Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

ELECTRICAL

Electrical work should be done by qualified electrical contractors and must be in compliance with local, state, federal, and governing codes.

PLUMBING

Plumbing and pressurized steam work should be done by qualified installers and must be in compliance with local, state, federal, and governing codes.

Drain and overflow water can be 212°F (100°C). If you are not using a DCT-927 Drain Tempering Kit, allow the water to cool before draining tank.

INSTALLATION

This humidifier produces steam at atmospheric pressure. Do not install any components between humidifier tank and steam distribution grid which can block or restrict steam flow.

Do not mount on hot surfaces.

Do not mount on vibrating surfaces.

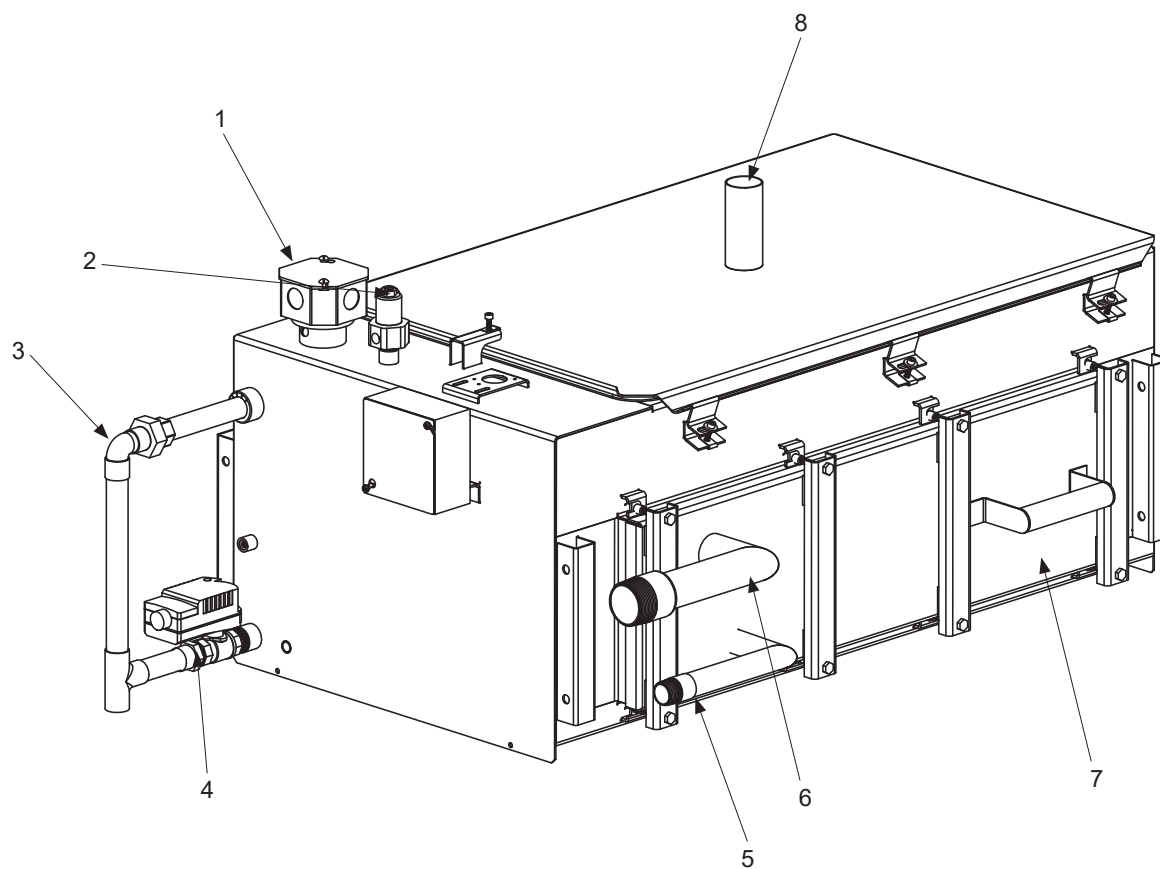
High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

Use of mineralized (hard or soft) tap water will cause fill valve failure and void the warranty. PURE Humidifier Co.'s SX Series should be installed on applications that require tap water.

Do not adjust any components inside humidifier control box without consulting the factory.

For indoor use only unless supplied with an Outdoor Enclosure.

Features



Features

- | | |
|-----------------------------------|---|
| 1. Tri-Probe Sensor | 5. Heat Exchanger/Plant Steam Condensate Outlet |
| 2. 1/4" NPT Fill Inlet Connection | 6. Pressurized Boiler Steam Inlet |
| 3. Overflow Piping | 7. Heat Exchanger |
| 4. Automatic Drain Valve | 8. Humidifier Steam Outlet Connection |



Capacities, Weights & Water Volumes

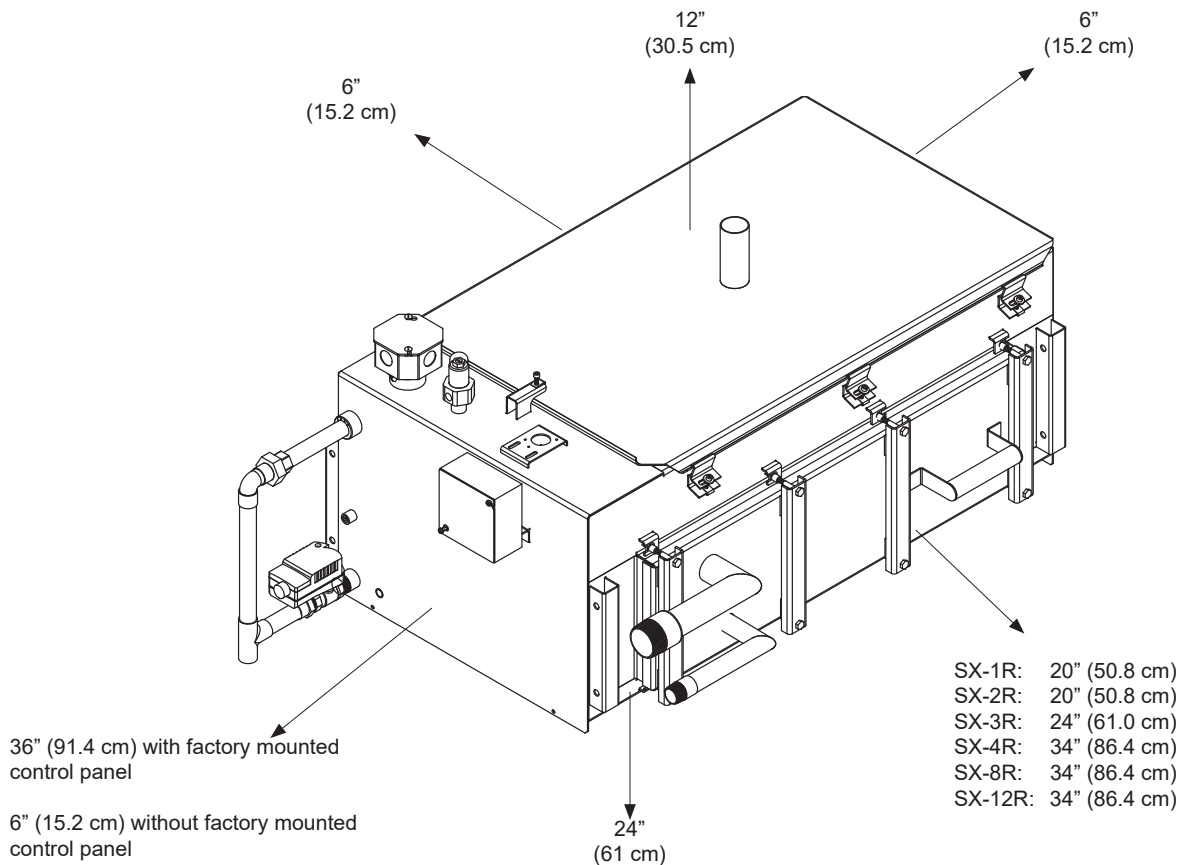
Humidifier Capacity †								
Model	Steam Pressure at the Humidifier Control Valve							
	5 psig	34.5 kPa	10 psig	69 kPa	13 psig	90 kPa	15 psig	103 kPa
	lbs/hr	kg/hr	lbs/hr	kg/hr	lbs/hr	kg/hr	lbs/hr	kg/hr
SX-1R	32	14.5	76	34.5	100	45.3	122	55.3
SX-2R	52	23.6	108	48.9	140	63.5	169	76.7
SX-3R	102	46.3	228	103.4	292	132.5	348	157.8
SX-4R	192	87.1	484	219.5	655	297.1	753	341.7
SX-8R	370	167.8	840	381.0	1200	544.3	1350	612.4
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.								

Humidifier Weights †				
Model	Shipping Weight		Operating Weight	
	lbs	kg	lbs	kg
SX-1R	32	14.5	76	34.5
SX-2R	52	23.6	108	48.9
SX-3R	102	46.3	228	103.4
SX-4R	192	87.1	484	219.5
SX-8R	370	167.8	840	381.0
SX-12R	560	254.0	1265	573.8
†When calculating the total dry weight of the humidifier, the control cabinet weight (28 lbs/12.7kg) must be added to the reservoir weight.				

Reservoir Water Volume		
Model	Gallons	Liters
SX-1R	9.3	35.2
SX-2R	13.2	50.0
SX-3R	23.5	89.0
SX-4R	52.4	198.4
SX-8R	115.8	438.4
SX-12R	203.8	771.5



Clearances & Mounting Considerations



Mounting Location Considerations

Install in a location where the ambient air temperature is between 40°F - 100°F (4.4°C - 37.8°C) and relative humidity between 0% - 90% and non-condensing.

Install in a location where there is easy access to a water supply, electrical supply, and open sanitary drain.

Install as close as possible to the steam distribution grid.

Clearances shown are minimum recommendations only. Please consult local and national codes for final installation location.

Do not install where humidifier operational noise will be a nuisance.

Allow enough room for proper water seal depths.

Do not install above any critical processes, equipment, or locations in case of a water leak.

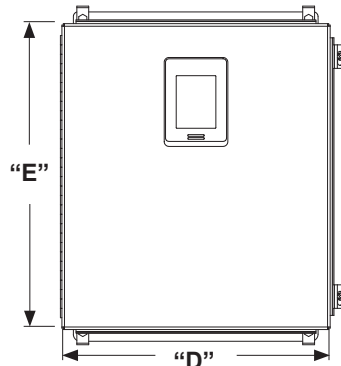
Do not install near variable frequency drives, electromagnetic equipment, or motors.



Dimensions SX-1R through SX-4R

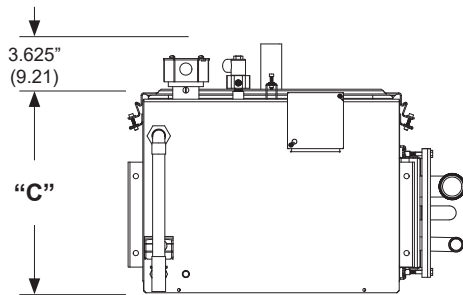
NEMA-12 Humidifier Control Cabinet

(reference control cabinet notes)

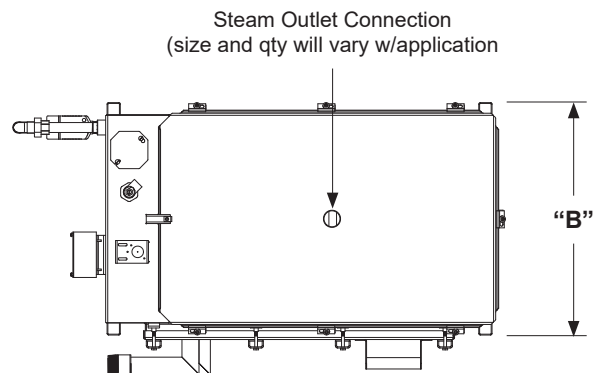


Cabinet Depth: 6.00" (15.2)

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)
4. 1 Amp @ 120VAC Control circuit: 24 VAC



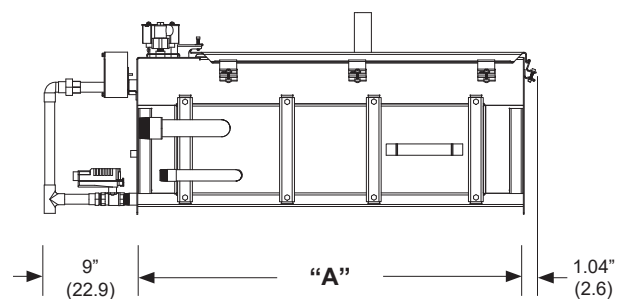
Front View



Heat Exchanger Removal
(see Clearances &
Mounting Considerations
page for clearance
dimension)

SX-1R:	3.53" (8.9)
SX-2R:	3.53" (8.9)
SX-3R:	3.56" (9.0)
SX-4R:	5.44" (13.8)

Top View



Right Side View

Unit Dimensions								
Model	Dim. "A"		Dim. "B"		Dim. "C"		Dim. "D"	Strainer
	inches	cm	inches	cm	inches	cm		
SX-1R	17.68"	44.9	16.21"	41.2	13.84"	35.2	3/4" NPT	3/4" NPT
SX-2R	25.68"	65.2	16.21"	41.2	13.84"	35.2	3/4" NPT	3/4" NPT
SX-3R	34.18"	86.8	20.46"	52.0	13.84"	35.2	1-1/2" NPT	1-1/2" NPT
SX-4R	54.12"	137.5	29.46"	74.8	13.84"	35.2	2" NPT	2" NPT

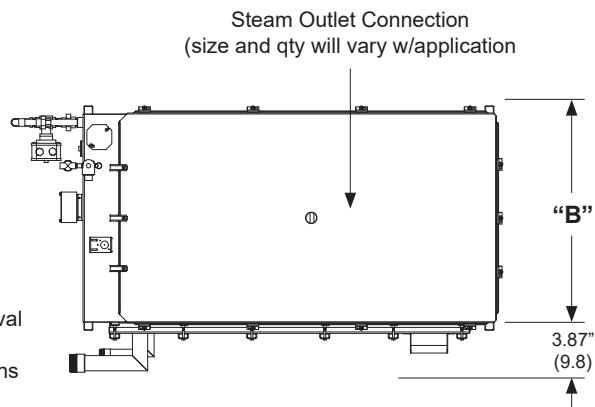
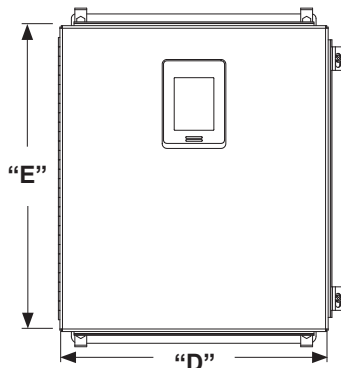
*When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight.
Due to product improvement, catalog dimensions and specifications are subject to change without notice.



Dimensions SX-8R

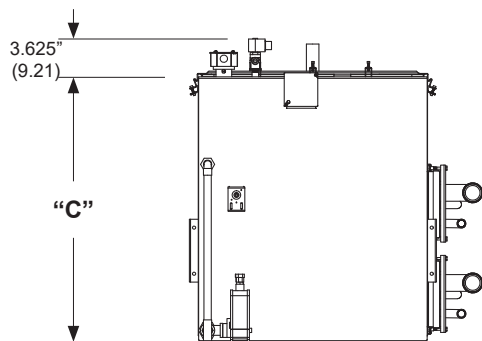
NEMA-12 Humidifier Control Cabinet

(reference control cabinet notes)

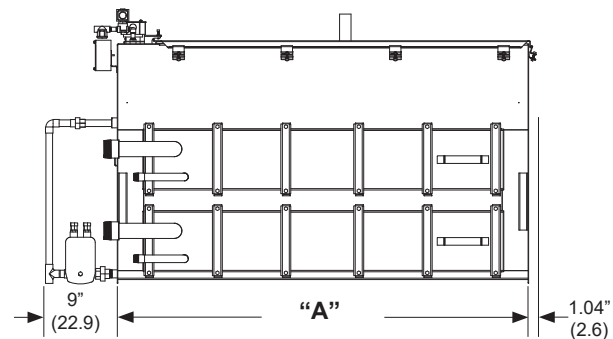


Cabinet Depth: 6.00" (15.2)

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)
4. 1 Amp @ 120VAC Control circuit: 24 VAC



Front View



Right Side View

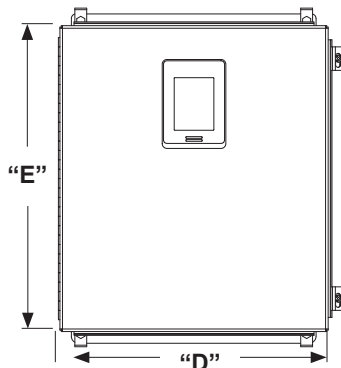
Unit Dimensions								
Model	Dim. "A"		Dim. "B"		Dim. "C"		Dim. "D"	Strainer
	inches	cm	inches	cm	inches	cm		
SX-8R	54.12"	137.5	29.46"	74.8	31.53"	80.1	2" NPT	2" NPT
*When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight. Due to product improvement, catalog dimensions and specifications are subject to change without notice.								



Dimensions SX-12R

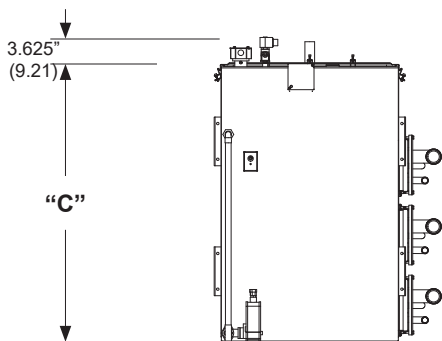
NEMA-12 Humidifier Control Cabinet

(reference control cabinet notes)

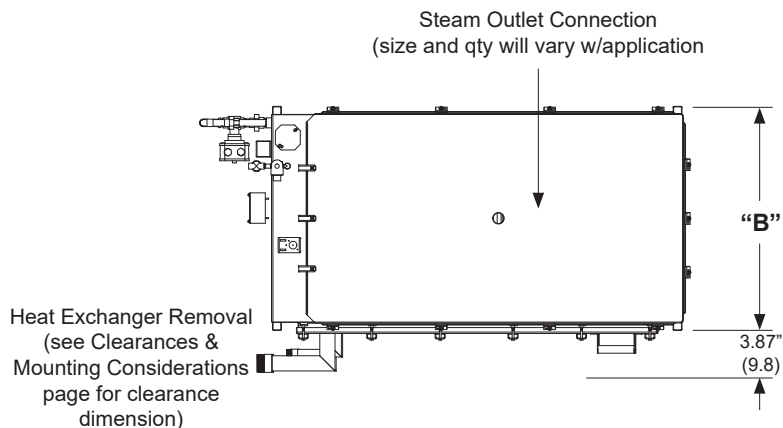


Cabinet Depth: 6.00" (15.2)

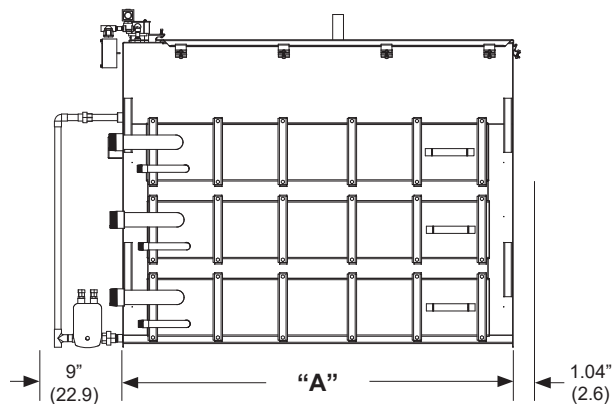
1. Door has been removed from the drawing for clarity.
2. Control cabinet is shipped loose for field mounting unless optional factory mounting is specified.
3. Control cabinet weight: 28 lbs (12.7 kg)
4. 1 Amp @ 120VAC Control circuit: 24 VAC



Front View



Top View



Right Side View

Unit Dimensions								
Model	Dim. "A"		Dim. "B"		Dim. "C"		Dim. "D"	Strainer
	inches	cm	inches	cm	inches	cm		
SX-12R	54.12"	137.5	29.46"	74.8	42.28"	107.4	2" NPT	2" NPT
*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.								



Installation & Location

Important: Remove all shipping brackets and materials before operating the humidifier. Humidifier flue gases must be vented to the outside atmosphere. Power supply disconnect switch must be in the off position while making wiring connections to prevent electrical shock and equipment damage. All units must be wired in strict accordance with wiring diagram furnished with this unit. Turn off all gas while installing the supply gas piping and field installed manual gas shut-off valve for the humidifier.

Location

The location selected must provide for electrical service, cold or hot water supply, and sanitary drain.

When selecting a location, try to keep the humidifier within 10 feet (305 cm) of the duct to avoid unnecessary heat losses and condensation within the steam supply line.

Visible "fog" will saturate and condense when it contacts objects such as turning vanes, filters, fans, elbows or take-offs. The warmer the air, the more easily it will dissipate the visible steam. The most active and warmest portion of the duct will provide better mixing of the steam and air. The injection tube should be mounted a minimum of 2 feet (61 cm) downstream from an elbow or other turbulent air flow area.

Avoid mounting single style injection tube(s) closer than 8-10 feet (244-305 cm) upstream of objects that could become saturated and condense the steam (reference the paragraph above). If the duct layout does not provide a straight unobstructed run of 8-10 feet (244-305 cm), a multiple injection tube system should be considered to reduce the visible steam travel distance.

For Fast-Pac and Insty-Pac multiple tube assemblies please consult factory for job specific non-wetting distances.

Reference Fast-Pac or Insty-Pac O&Ms for full installation details.

CAUTION: Do not humidify upstream of filters. Consult factory.

CAUTION: Smoke detectors should not be located downstream of injection tube assemblies.

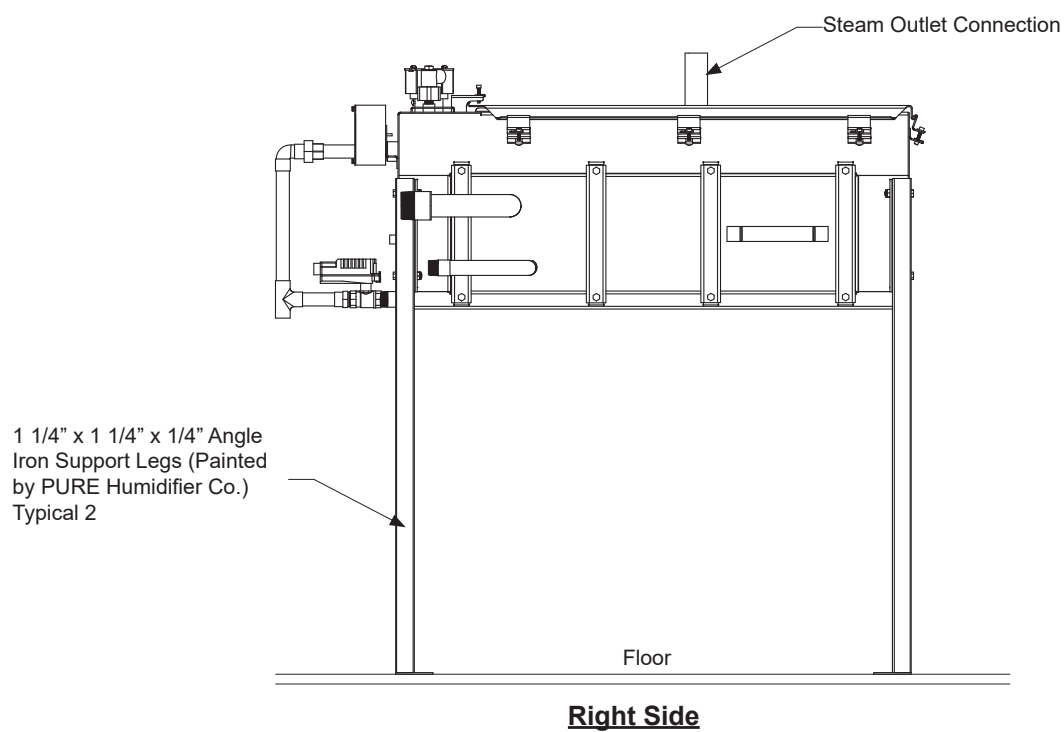
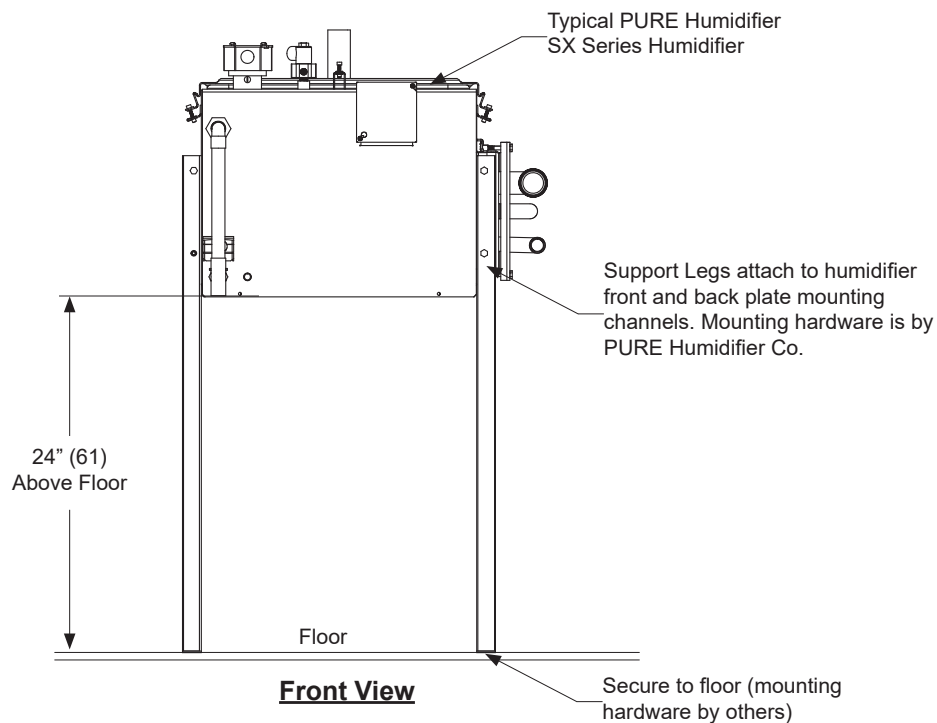
Location of Controls

It is important to avoid mounting any controls within the visible steam. The controls should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the humidifier injection tube. Due to the temperature rise that exists within the visible steam dissipation area, thermostats should not be mounted near the injection tube.

High-limit humidistats should be installed before any duct obstruction to make sure the humidifier is interrupted before saturation can occur on the object. The high-limit should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

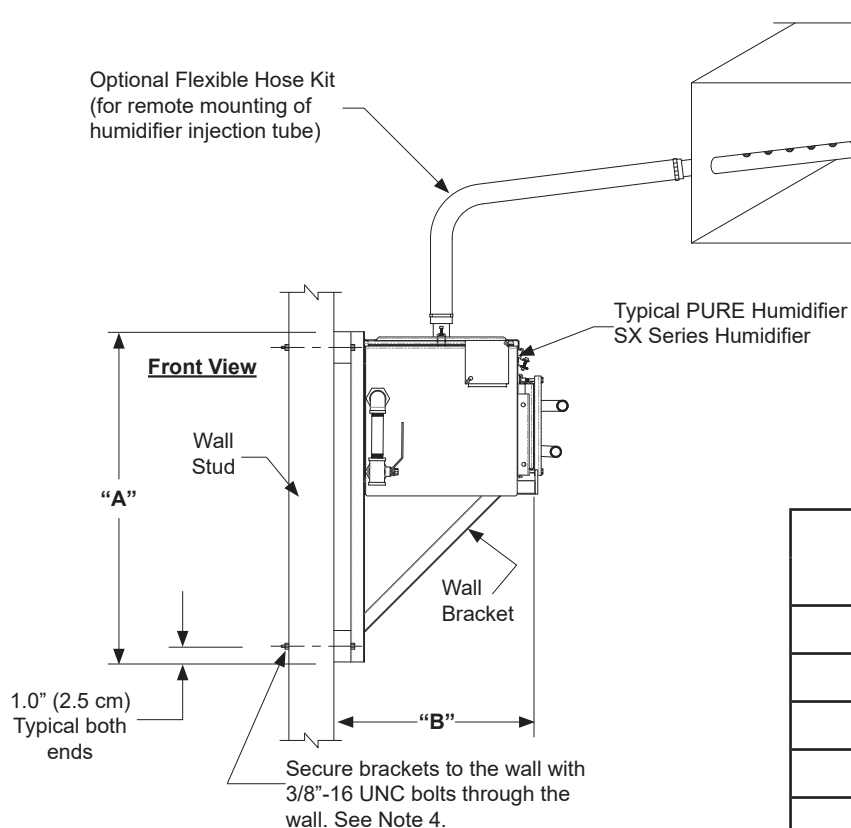


Mounting Applications Support Legs





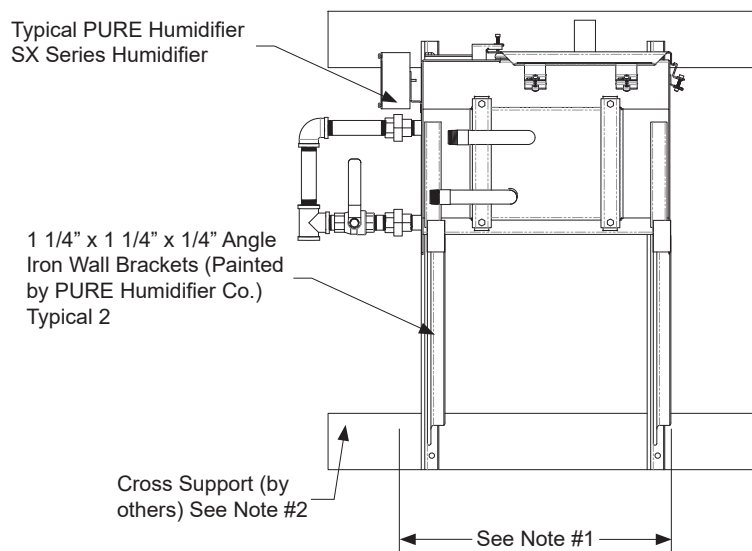
Mounting Applications Wall Brackets



Model	Dim. "A"		Dim. "B"	
	inches	cm	inches	cm
SX-1R	30.50	77.5	16.75	42.6
SX-2R	30.50	77.5	16.75	42.6
SX-3R	34.75	88.3	21.00	53.3
SX-4R	Not recommended, see Note 4			
SX-8R	Not recommended, see Note 4			
SX-12R	Not recommended, see Note 4			

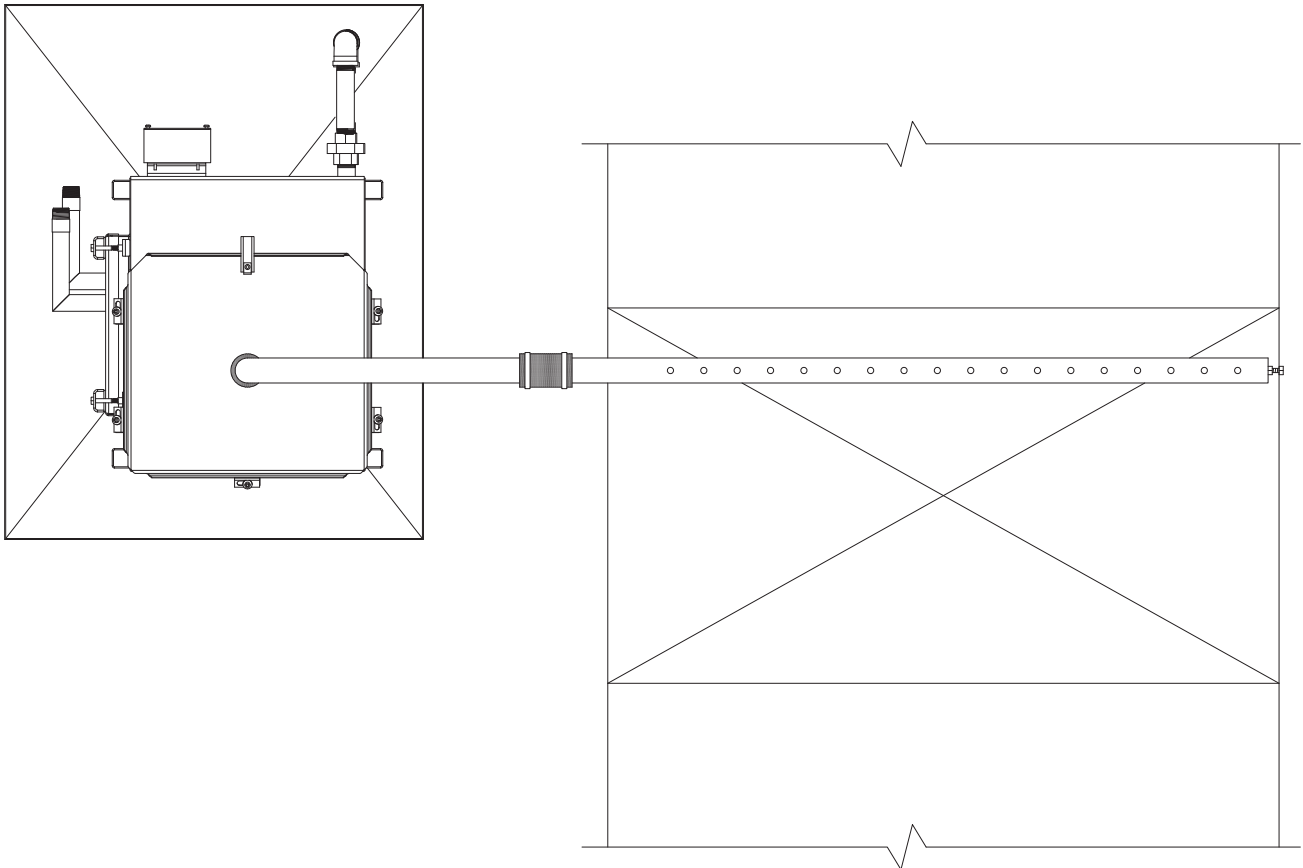
NOTES:

1. Secure brackets to wall support studs. Attachment bolts must be secured through the wall stud.
2. On the SX-1R & SX-2R, a cross support (by others) may be required to span between the wall studs.
3. Reference the humidifier schedule to verify which injection tube system is to be provided.
4. Due to the operating weight, PURE Humidifier Co. does not recommend wall mounting of the models: SX-4R through SX-12R.



Drain Pan Mounting

A drain pan is an additional safety feature which may be required to be supplied in the field. In a proper humidifier installation, a drain pan is not required. However, if the humidifier and injection tube are located in an area that contains valuable equipment or is a water sensitive area, PURE Humidifier Co. recommends the addition of a drain pan under the humidifier and under the injection tube. The drain pan should extend past all edges of the humidifier and if installed in the duct, it should extend a minimum of 3 feet (91 cm) downstream from the injection tube. The pan should be of a size which is capable of draining at a rate of 3 gpm for units with a capacity of up to 200 lbs/hr, and 5 gpm for units with a capacity over 200 lbs/hr. The pan should be drained to a sanitary drain.





Water Supply & Drain Piping

ALL DRAIN AND CONDENSATE PIPING MUST BE INSTALLED IN ACCORDANCE TO LOCAL PLUMBING CODES.

HIGH CHLORIDE CONTENT IN FEED WATER CAN CAUSE CHLORIDE STRESS CRACKING AND CHLORIDE PITTING IN STAINLESS COMPONENTS. CHLORIDE STRESS CORROSION CRACKING (CSCC) AND CHLORIDE PITTING OF STAINLESS STEEL COMPONENTS IS NOT COVERED BY WARRANTY.

Water Supply Piping

Supply pressure: 35-95 psi optimal

This style of humidifier utilizes a Tri-Probe conductive type water control system which is designed for use with standard (hard or softened) tap water. Use of demineralized, deionized or reverse osmosis water will cause failure of the water level control system and void the humidifier warranty.

Install stainless pipe on make-up water line within 5 feet of humidifier fill valve connection. If plastic pipe is used beyond this point a check valve is required to prevent steam from entering the plastic section in the event that the water treatment system runs out of water.

Cold or hot standard tap water can be supplied to the humidifier. A minimum water pressure of 35 psi (2.4 Bar) should be maintained to provide the proper water level within the humidifier. If the water pressure is above 95 psi (6.6 Bar), the valve may not shut off. The humidifier has a factory built-in 1.5" (4 cm) air gap between the water inlet and the overflow. Local codes should be checked to see if the addition of a vacuum-breaking device is required.

Drain Piping

A water seal as shown in the piping illustration should be installed to prevent steam from escaping through the drain line. The water seal should be of sufficient height to overcome the pressure developed in the humidifier (reference water seal height table) and the duct static pressure.

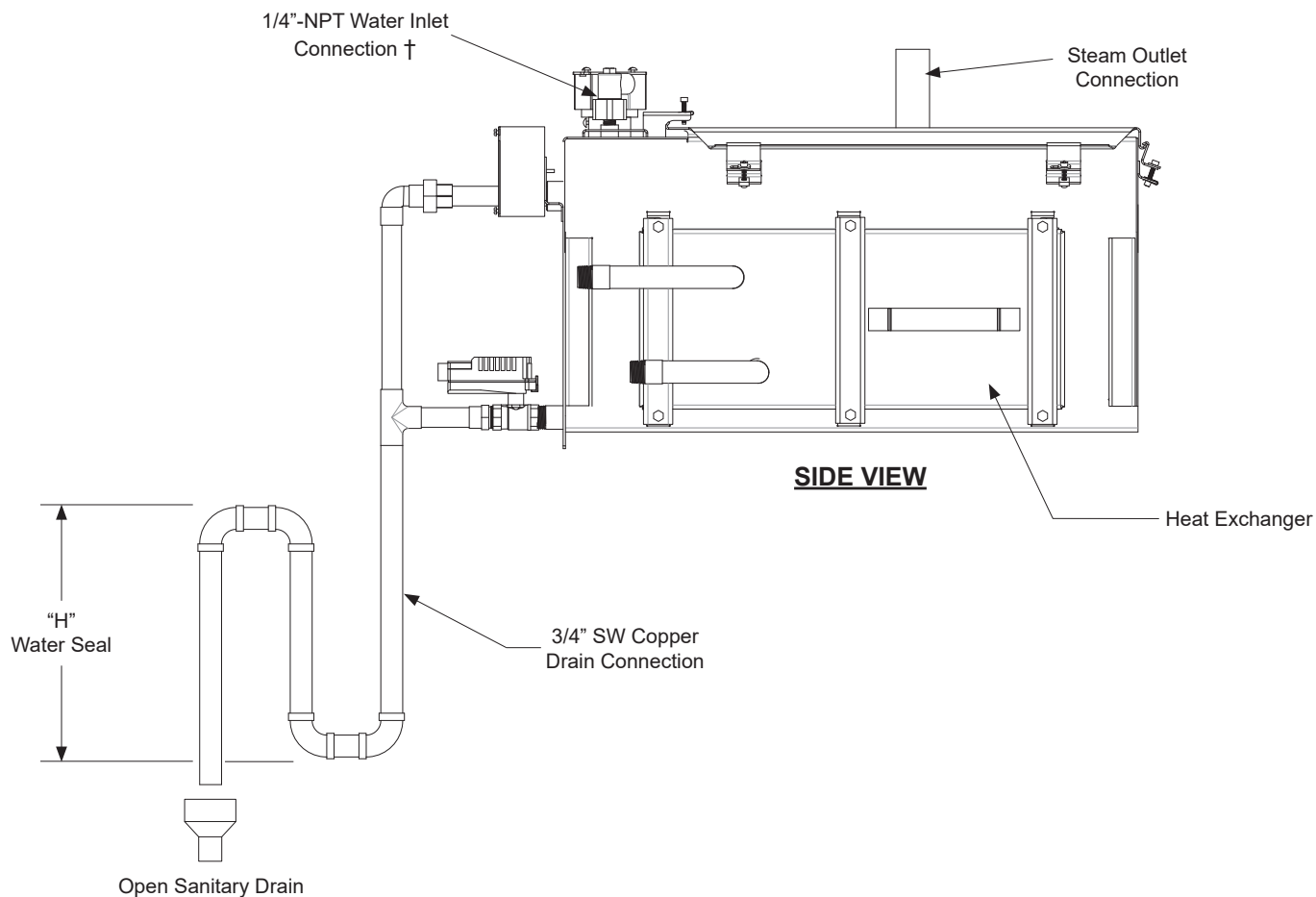
The drain piping should be stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.

If gravity drain is not possible please use a condensate pump rated for 212°F water or contact a PURE Humidifier Co. Representative to purchase one.

Local codes may require tempering of 212°F (100°C) water before entering drain. The PURE Humidifier Co. DCT-927 Drain Tempering Kit will temper water to 140°F (60°C).



Piping Drain Piping



Water Seal Height Δ			
Capacity		"H"	
lbs/hr	kg/hr	inches	cm
Up to 60	Up to 27.2	8"	20
61-99	27.2-45.0	11"	28
100-150	45.4-68.0	17"	43
151 & above	68.5 & above	19"	48
Δ The water seal height may have to be increased if excessive duct static pressure exists.			

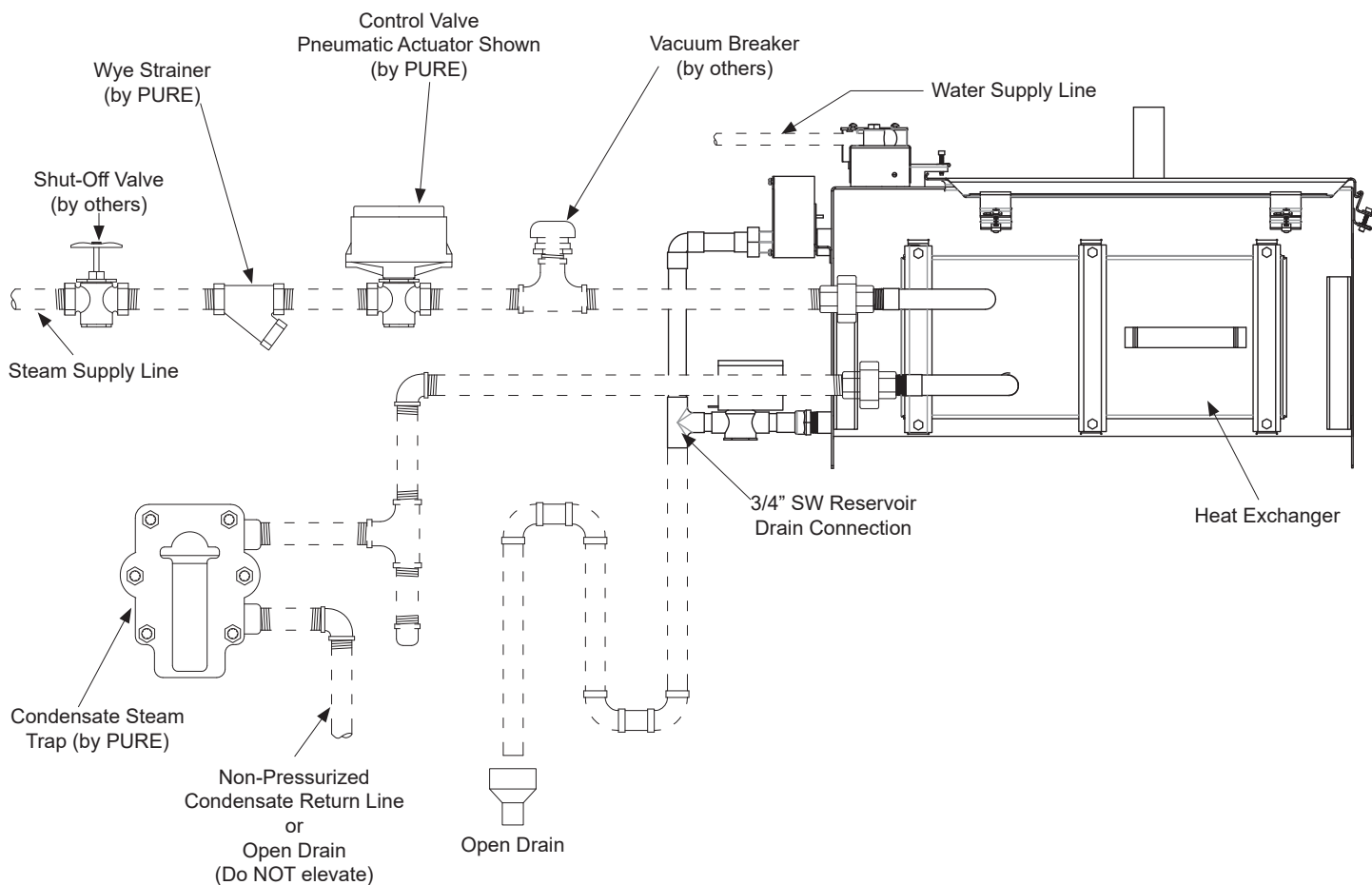
NOTES

1. All drain piping is by others.
2. Drain and overflow connection requires field piping.
3. Do NOT use PVC or other plastic piping that is not rated for 220°F or higher.

† This model is typically supplied with non-potable water. However, a backflow preventer may still be needed to prevent contamination of the attached water system.



Steam & Condensate Piping SX-1R through SX-4R

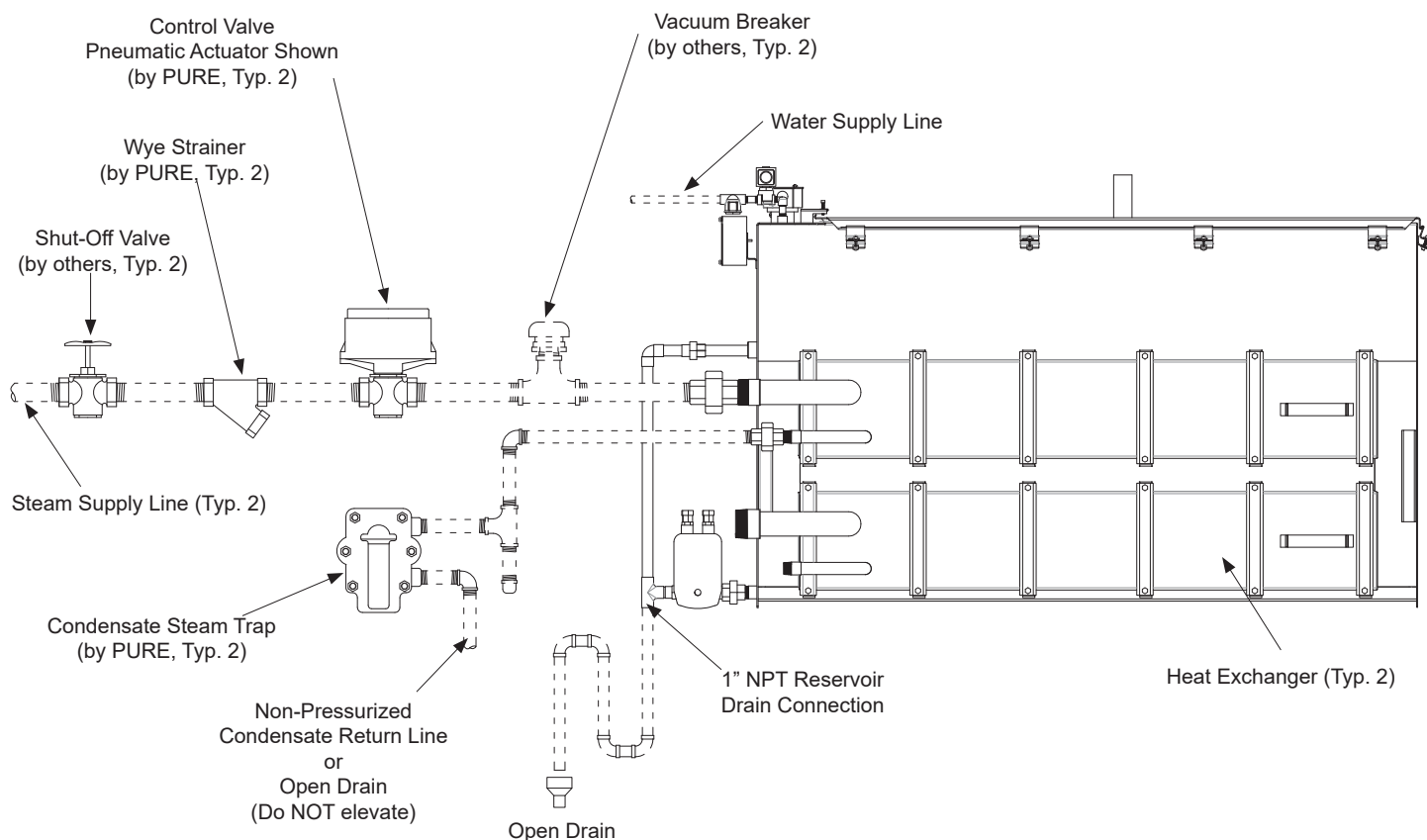


PIPING NOTES

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).
5. See Clearances & Mounting page for humidifier and heat exchanger clearance dimensions.



Steam & Condensate Piping SX-8R

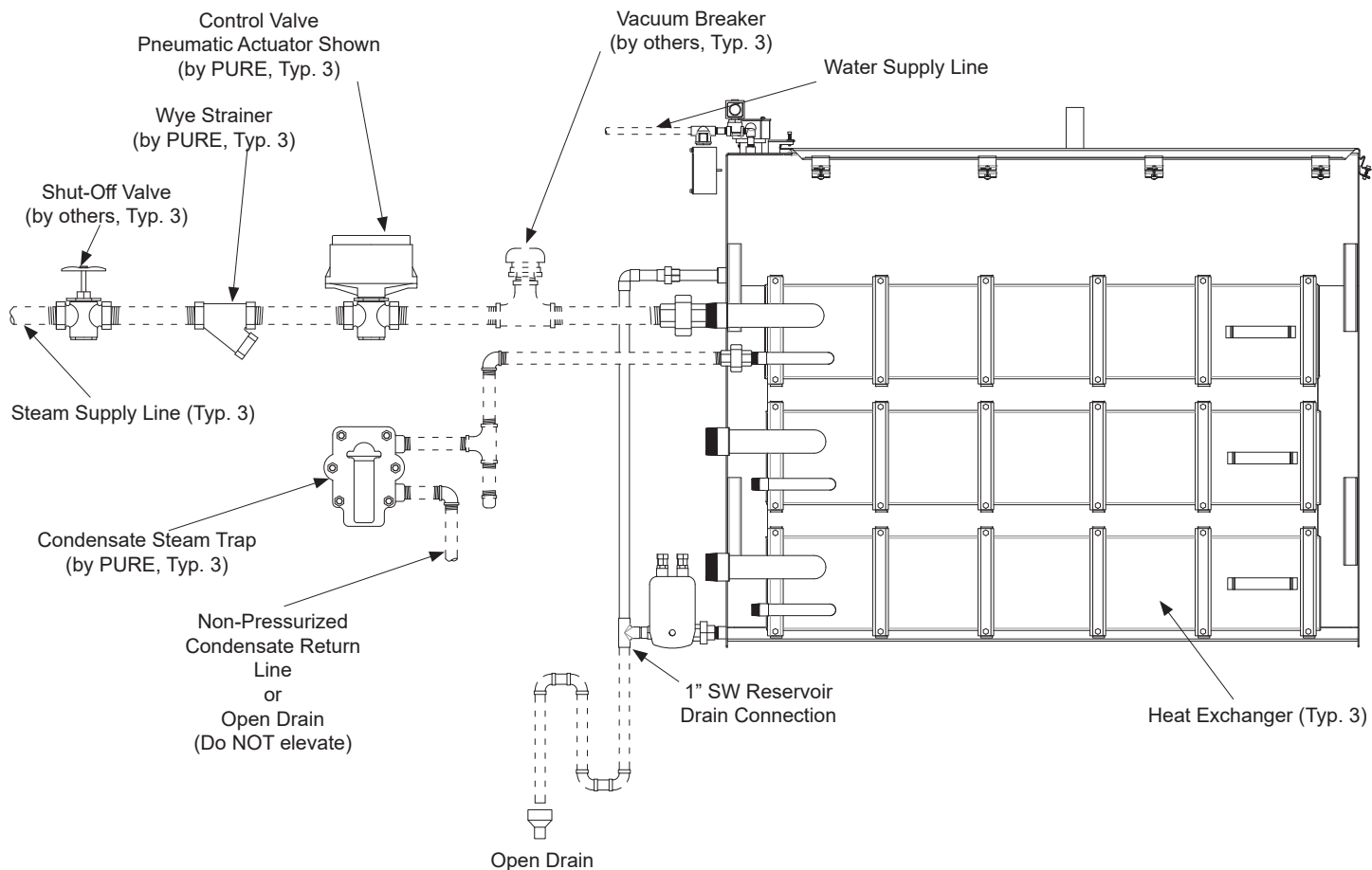


PIPING NOTES

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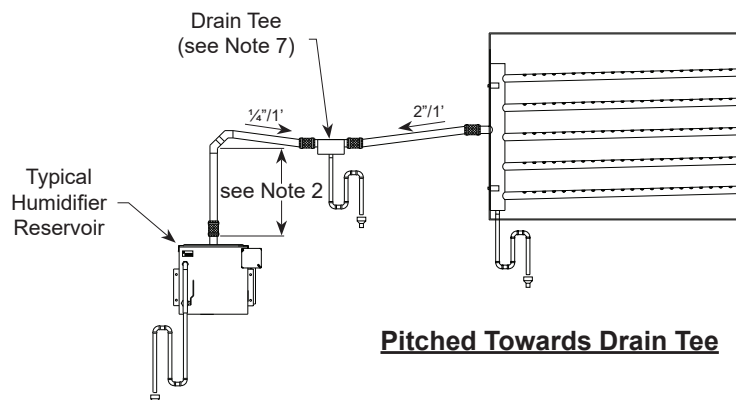
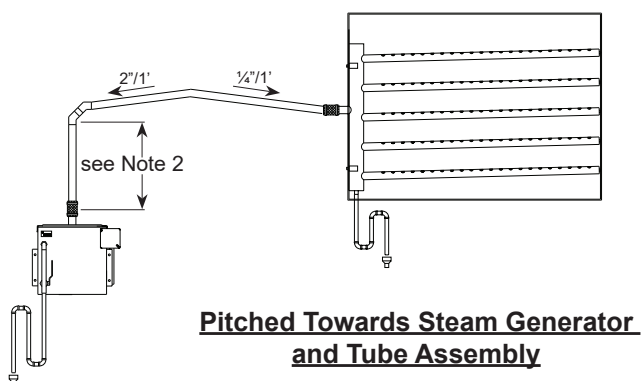
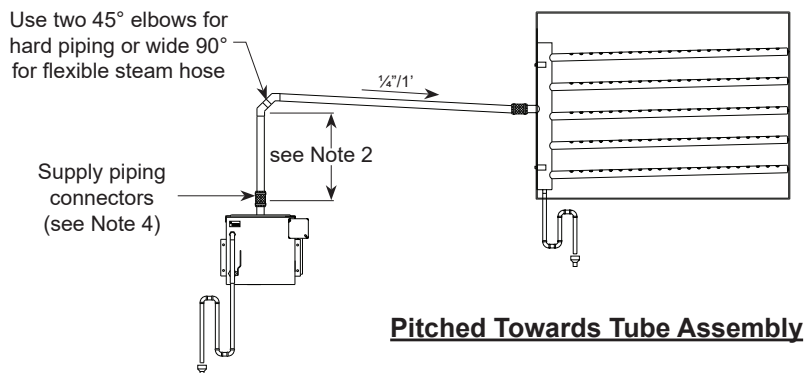
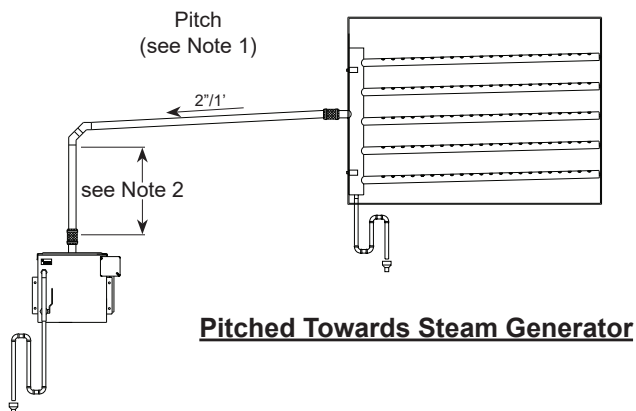
Steam & Condensate Piping SX-12R



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).
5. See Clearances & Mounting page for humidifier and heat exchanger clearance dimensions.

Steam Supply Piping Examples



Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
2. When feasible to do so, install a minimum one-foot riser from the top of the tank to reduce condensate carryover.
3. Use flex connectors or unions to allow for easy removal of cover.
4. Support flexible hose every 18" to avoid sagging.
5. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet.
6. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
7. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate. **All horizontal to vertical up transitions require a water-sealed drip leg.**
8. Reference job specific tube assembly O&M included with your order for complete details.



Single or Multiple Injection Tube Installation

Single or Multiple Injection Tube Installation

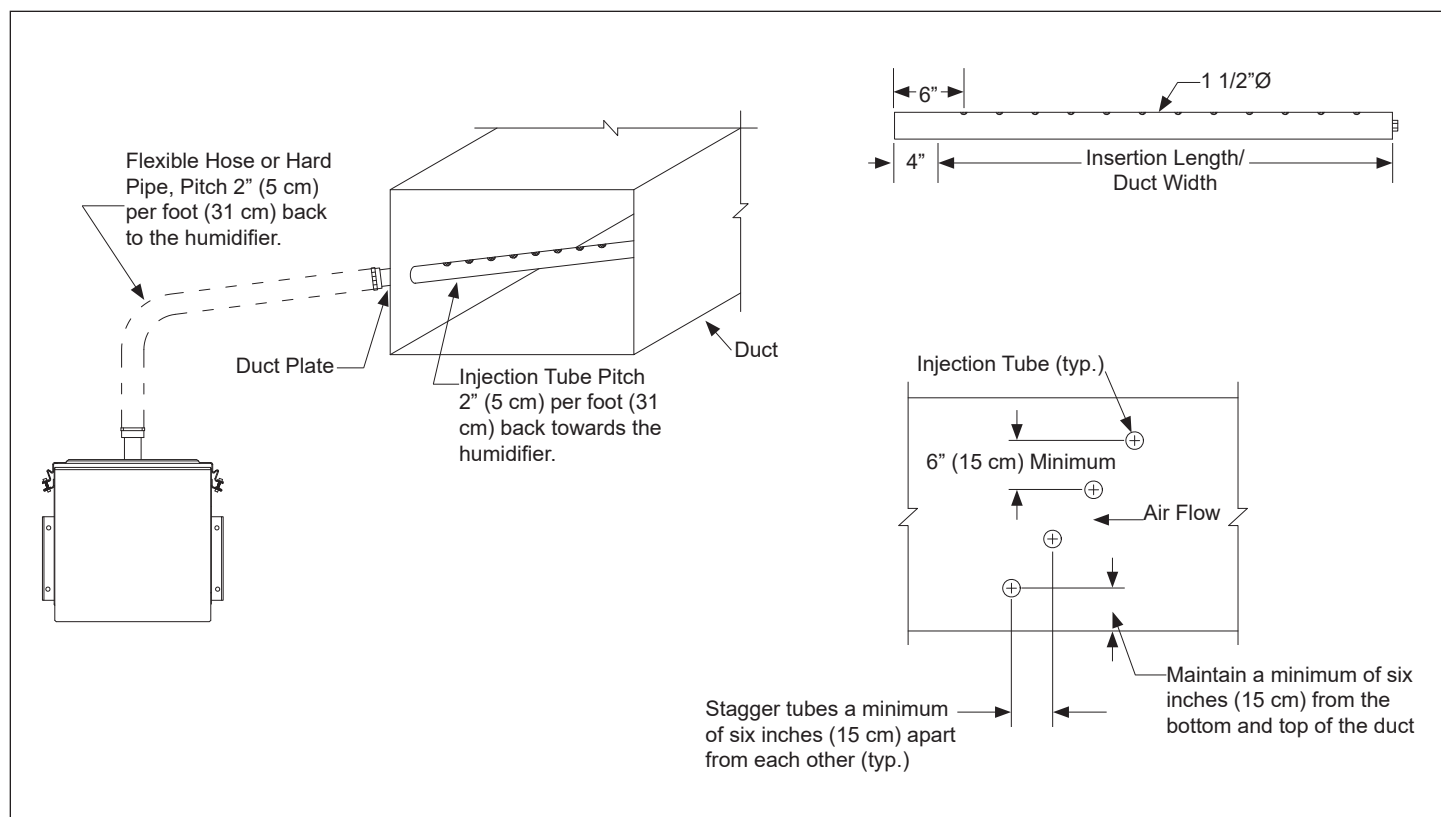
Single injection tubes should be installed in the center of the duct. Multiple injection tubes should have the tubes staggered within the duct as shown in the illustration.

The supply piping and injection tube should be pitched according to the examples on page 13. If the injection tube is mounted lower than the humidifier, a "Drain Tee" will be required (reference "Drain Tee" illustration on page 15).

Install the injection tube with the steam ports injecting steam up. NOTE: If narrow ducts (6" / 15 cm or less, in height) are utilized, install the tube with the steam ports injecting with the air flow at a 45° angle.

Galvanized steel duct plates are provided to seal the opening where the tube enters the duct.

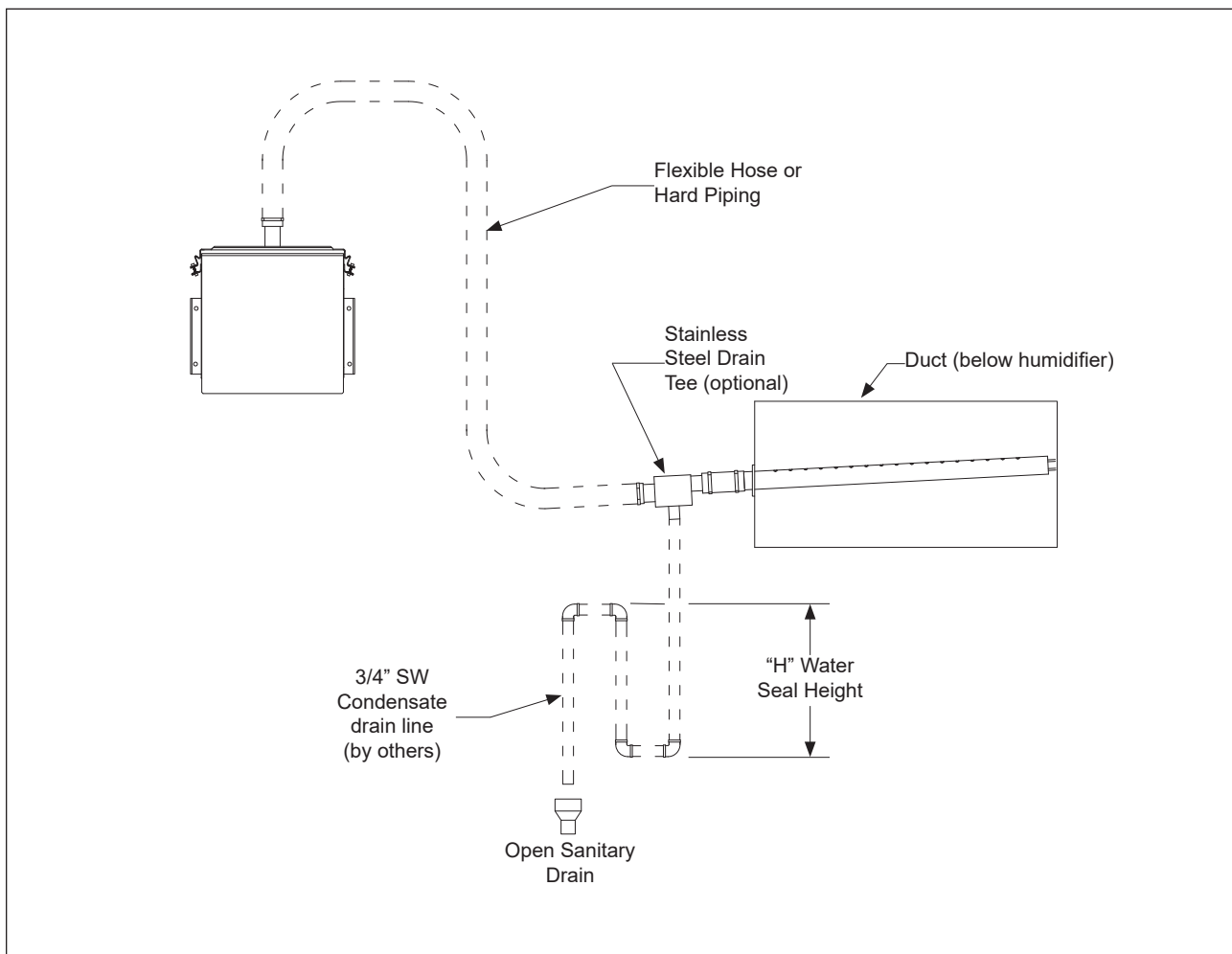
For Fast-Pac or Insty-Pac multiple tube assemblies please reference their O&M for complete installation details.





Single or Multiple Injection Tube Installation

Single or Multiple Injection Tubes with Drain Tee



Water Seal Height Δ			
Capacity		"H"	
lbs/hr	kg/hr	inches	cm
Up to 60	Up to 27.2	8"	20
61 - 99	27.7 - 45.0	11"	28
100 - 150	45.4 - 68.0	17'	43
151 & above	68.5 & above	19"	48
Δ The water seal height may have to be increased if excessive duct static pressure exists.			



Steam Supply Piping

PURE recommends stainless tubing or pipe to match the steam outlet diameter connection on the humidifier cover. Stainless has superior corrosion resistance over copper and is less expensive but slightly harder to install. Stainless tubing is preferable over stainless pipe due to the fact that the tubing is less expensive and reduces heat loss/condensate formation during operation. Stainless pipe may be easier to install compared to stainless tubing because fittings are readily available and it does not require welding. As always, the installer should refer the material required by the project documents and/or the authority having jurisdiction.

Maximum Steam Supply Piping Capacities						
Line I.D.	Flexible Hose		Copper or Stainless Tubing		Schedule 40 Pipe	
	Maximum Capacity		Maximum Capacity		Maximum Capacity	
	lbs/hr	kg/hr	lbs/hr	kg/hr	lbs/hr	kg/hr
1 1/2"	150	68.0	130	59.0	150	68.0
2"	250	113.4	200	90.7	215	97.5
3"	500	226.8	411	186.4	n/a	n/a
4"	n/a	n/a	730	331.1	n/a	n/a
Note: Maximum length of flexible hose is 10'. Longer runs will cause sagging of the line and create low spots.						

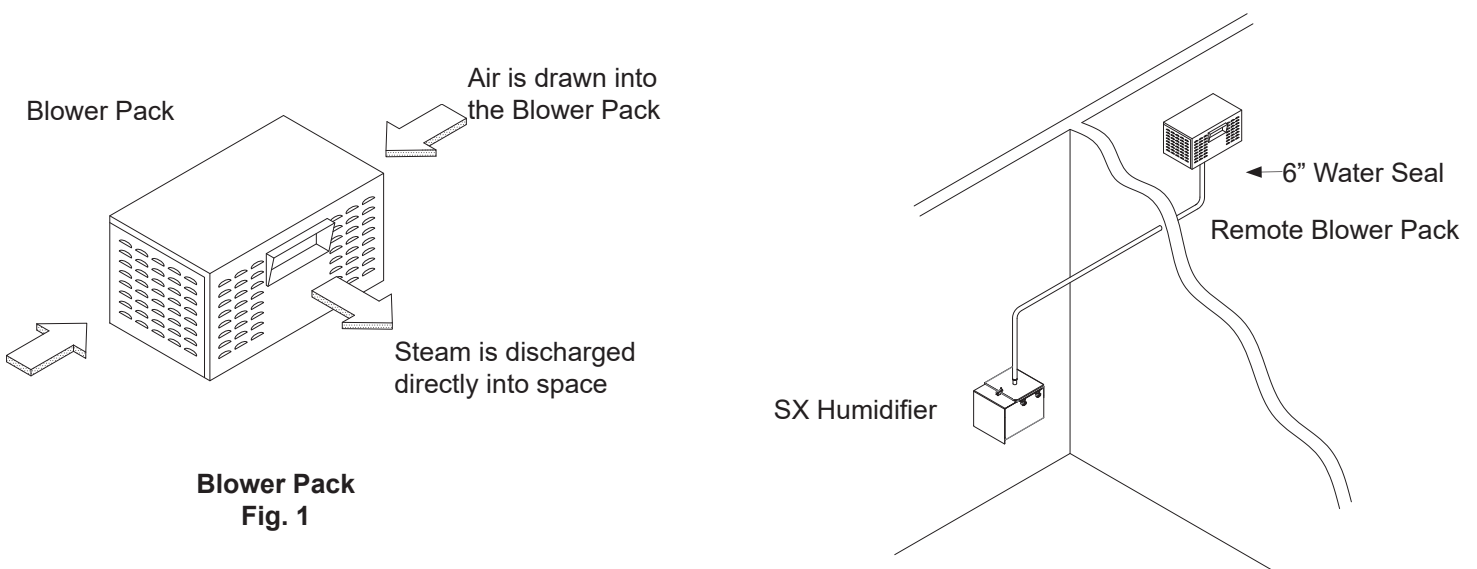


Blower Pack

In applications where a ducted air system is not available, PURE offers the optional Blower Pack. The Blower Pack contains a two-speed adjustable blower that moves the air over the steam discharge outlet and disperses the steam directly into the space (see Fig. 1).

Mounting

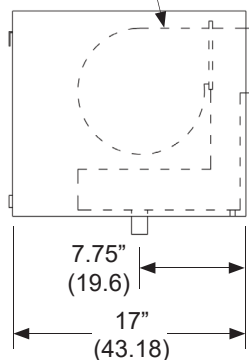
The Blower Pack may be remote-mounted up to ten feet away from the SX humidifier (see Fig. 2).



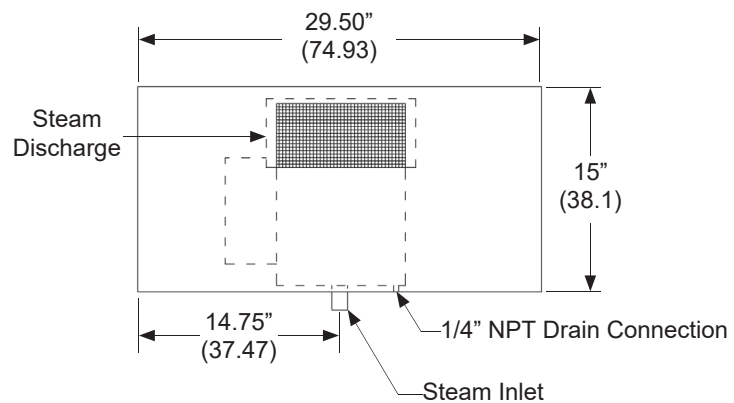
**Blower Pack
Fig. 1**

**Remote-Mounted Blower Pack
Fig. 2**

296/435 CFM Fan
120/1/60*, 2.17 amps
1/15 HP



Left Side View



Front View

Optional Blower Pack Dimensions

Blower Pack weight is 60 lbs (27.2 kg)

* Blower requires a separate 120/1 circuit (by others)



Blower Pack

Locating Blower Pack

The distance that visible steam will travel after leaving the Blower Pack is dependent upon the relative humidity in the room and the capacity of the humidifier. If this visible steam comes in contact with any solid object (walls, beams, machinery, etc.) it may form condensate and drip. Refer to Fig. 3 and tables for data on visible steam travel, this will aid you in planning the location of the Blower Pack.

NOTE: Blower Pack steam capacity is 102 lbs/hr max. Maximum of 3 Blower Packs per humidifier.

Visible Steam Rise & Throw		Humidifier Model 5-25 kW									
		5 kW (1)		10 kW (1)		15 kW (1)		20 kW (1)		25 kW (1)	
		feet	meters	feet	meters	feet	meters	feet	meters	feet	meters
50% RH	Rise	1.0	.30	2.0	.61	3.0	.91	4.0	1.2	5.5	1.7
	Throw	8.0	2.4	10.0	3.0	13.0	4.0	16.0	4.9	18.0	5.5
60% RH	Rise	2.0	.61	3.0	.91	4.0	1.2	5.0	1.5	6.0	1.8
	Throw	13.0	4.0	14.0	4.3	16.0	4.9	18.0	5.5	20.0	6.1

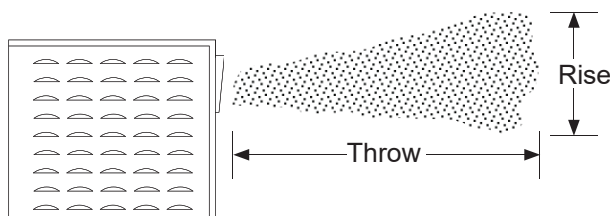
Visible Steam Rise & Throw		Humidifier Model 33-102 kW									
		5 kW (1)		10 kW (1)		15 kW (1)		20 kW (1)		25 kW (1)	
		feet	meters	feet	meters	feet	meters	feet	meters	feet	meters
50% RH	Rise	8.0	2.4	4.0	1.2	5.5	1.7	8.0	2.4	8.0	2.4
	Throw	23.0	7.0	16.0	4.9	18.0	5.5	23.0	7.0	23.0	7.0
60% RH	Rise	8.0	2.4	5.0	1.5	6.0	1.8	8.0	2.4	8.0	2.4
	Throw	25.0	7.6	18.0	5.5	20.0	6.1	25.0	7.6	25.0	7.6

Throw is the horizontal distance the visible steam travels from the steam discharge.

Rise is the vertical distance the visible steam travels from the steam discharge.

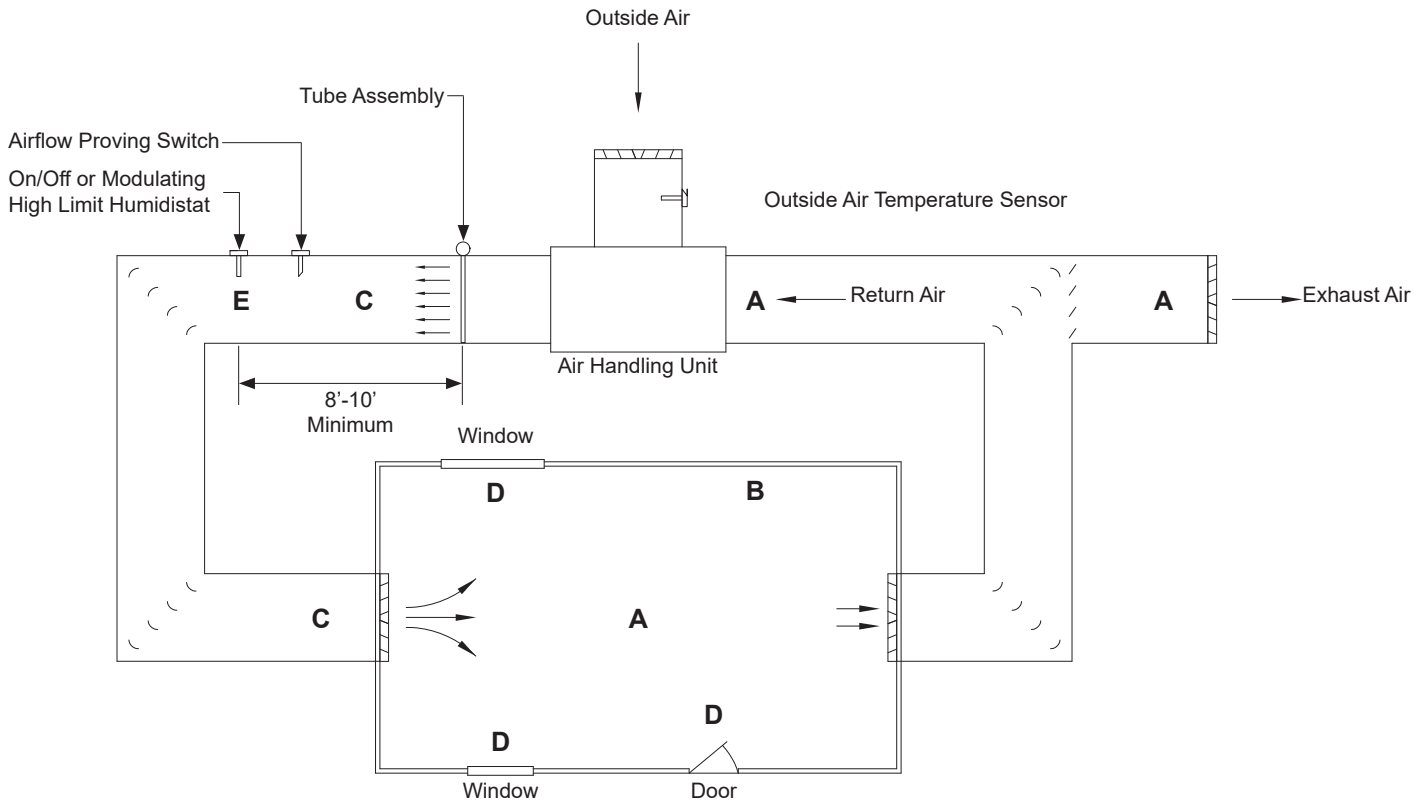
Objects in the direct line of the visible steam or objects that are cooler than the ambient temperature may accumulate condensation.

Note: Data above based on 70°F room temperature.



Visible Rise and Throw
Fig. 3

Controls Locations



Recommended Humidistat and Sensor Locations

- A. Optimal location for even airflow and a stable temperature
- B. Adequate location
- C. Supply air location is not recommended for controlling humidity sensors
- D. Do not locate humidistats or sensors near doors or windows
- E. Best location for on/off or modulating high limit



SX Pre-Startup Procedure

Pre-Startup Checklist

Before starting the SX PURE Humidifier Co. Electric Humidifier, check the following installation items:

_____ 1. MOUNTING - Verify that the humidifier evaporating chamber is securely supported and that the evaporating chamber is level in both directions.

_____ 2. INJECTION TUBE - Verify that the humidifier injection tube is mounted within the duct with the proper pitch back to the humidifier (2"/5 cm per foot / 31 cm). NOTE: If the humidifier evaporating chamber or the flexible hose (optional) is mounted higher than the injection tube, a drain "tee" is required to drain the condensate out of the injection tube steam line. If it is an Insty-Pac or Fast-Pac, refer to the respective O&M to determine if they are mounted properly and have the proper p-trap size.

_____ 3. ELECTRICAL - Verify that all wiring connections have been connected in accordance with the wiring diagram. **CAUTION: Live power may exist in the control cabinet. Turn off the main power at the disconnect switch before verifying the electrical connections!**

_____ 4. SAFETY CONTROLS – The supply air duct RH high-limit should be installed at least 10 feet downstream from the humidifier tube(s). Any other control sensors should be at least 10 feet downstream from the humidifier tube(s). Smoke detectors should not be installed downstream of the humidifier tube(s). If a smoke detector absolutely has to be installed downstream from the humidifier tubes then it should be installed as far from the tubes as possible.

_____ 5. PIPING: Drain - Make sure a water seal of the proper height (reference Drain Piping page for height) is provided in the drain line.

_____ 6. PIPING: Water Supply - Verify that all piping connections have been completed as recommended and that water pressure is available to the humidifier. Verify that the supply water pressure is 35-95 psi. There should be at least 5 feet of metal pipe and check valve between the tank and any plastic pipe.

_____ 7. PIPING: High Pressure Steam Inlet - Make sure a shut-off is installed before the strainer. Make sure a strainer is installed before control valve(s). Make sure vacuum breaker(s) and union(s) is/are installed between the control valve(s) and heat exchanger(s).

_____ 8. PIPING: High Pressure Condensate Line - The condensate line should not be elevated but should run to a non-pressurized condensate pump receiver or through a drain cooler to an open drain.

_____ 9. PIPING: Steam Outlet - Refer to Supply Piping Examples page for proper outlet steam piping from the generator to the tube(s). **Any horizontal to vertical up transition in the outlet steam pipe requires a water-sealed drip leg!** Improper outlet steam piping will cause steam to leak from the steam generator. Runs over 20 feet long may require upsizing of the steam pipe.

Signature: _____ Date: _____



SX Startup Procedure

Startup Procedure

_____ 1. Turn the electric power "on" to the humidifier.

_____ 2. RH Setpoint on the touchscreen should be set to 0.0% RH (no call for humidity). If there is no display of actual humidity on the touchscreen the procedure must be done through the Building Management System.

_____ 3. Open the water supply on/off control valve (by others) and allow the humidifier evaporating chamber to fill to the proper level.

_____ 4. Make sure all the optional safety switches are satisfied (airflow proving switch, high-limit humidistat, etc).

_____ 5. After the humidifier is full of water the touchscreen will read "Water Level FULL".

_____ 6. Verify the low water safety shutoff by changing the operation mode to "Drain" on the touchscreen. The humidifier should drain to a level where the touchscreen will read Water Level "Low".

_____ 7. Change the operation mode back to "Normal". Verify that the Control Relay is off/deenergized while the water level reads "Low". The relay should energize when the water level reading changes to "Refill". This indicates that the low water safety shutoff is operational.

_____ 8. Set The RH Setpoint on the touchscreen above the actual reading to get a call for humidity. If Building Automation System is controlling the humidifier, set it to call for 100% demand. For Building Automation System verify 0% and 100% demands are displayed as 0% and 100% on the touchscreen or adjust the input high and low values to match accordingly.

_____ 9. The modulating steam control valve actuator should begin to open the valve and allow steam to enter the heat exchanger. NOTE: the valve actuator can be either pneumatic or electric modulating. Condensate should begin passing through the condensate trap.

_____ 10. Check operation of optional field-installed safety switches (airflow proving switch, high-limit humidistat, etc) to make sure that they turn the power off to the control circuit power. The safety switches should shut off the humidifier heaters whenever one or more of the optional safety switches create an "open circuit".

_____ 11. Check the main steam supply pressure. The pressure should match the factory nameplate. NOTE: Do not exceed the factory nameplate pressure rating! See warning label on the humidifier.

_____ 12. Inspect installation for leaks by operating humidifier at a full rolling boil. This may take up to 50 minutes from a cold start. Any leaks should be sealed. Just tightening a pressure clamp will not work if the gasket is not properly positioned between the sealing surfaces. If necessary, remove the cover, reseal gasket and replace the cover.

_____ 13. After the unit is producing steam, check and retighten all hose clamp connections in the system and make sure they are torqued to 35-40 in-lbs.

_____ 14. Adjust the RH setpoint back to the desired value.

Signature: _____ Date: _____



Troubleshooting

- Verify humidifier and accessories are installed according to Operation and Maintenance manuals.
- Please read all Operation and Maintenance manuals to familiarize yourself with the equipment.
- A job specific wiring diagram can be located inside the control panel door.

Problem	Possible Cause	Recommended Action
Humidifier will not heat	<p>Blown control fuse</p> <p>Control transformer not producing 24 vac control voltage</p> <p>Safety controls open (airflow proving, high limit, etc)</p> <p>Faulty valve actuator</p> <p>Faulty humidistat</p> <p>Steam trap malfunction</p> <p>Main steam supply</p>	<p>Check and replace.</p> <p>Check transformer output. Verify voltage across 24VAC Fused & 24VAC Com.</p> <p>Verify that all safety controls are completing the safety circuit.</p> <p>Check and verify actuator voltage or pneumatic signal. Compare to diagram or nameplate label ratings.</p> <p>Verify humidistat electric or pneumatic signal. Compare to diagram or nameplate label ratings.</p> <p>Check and verify that the trap is passing condensate.</p> <p>Check and verify that the main steam supply valves are open and that the steam pressure is at the rated pressure.</p>
Humidifier will not fill	<p>No water pressure</p> <p>Drain valve open</p> <p>No power to the fill valve</p>	<p>Check Water Supply.</p> <p>Close drain ball valve. If auto drain system is utilized, verify that the drain valve is closed by removing actuator and looking at valve stem position.</p> <p>Check the fill relay and see if it is energized.</p>
Humidifier does not stop filling or is short cycling	<p>Fill valve stuck open</p> <p>Drain valve open</p> <p>Probes need cleaning</p> <p>Check Tri-Probe wiring on PLC</p>	<p>Check the fill relay and see if it is energized. If no voltage, check for dirt under valve seat.</p> <p>Close drain ball valve. If auto drain system is utilized, verify that the drain valve is closed by removing actuator and looking at valve stem position. The stem can be manually turned.</p> <p>Remove Tri-Probe sensor and clean probe ends.</p> <p>Make sure the Tri-Probe wiring matches the wiring diagram.</p>



Maintenance & Cleaning Instructions

PURE Humidifier Co. SX Maintenance Instructions

The SX Series Electric Humidifier is designed to provide the best possible operation with minimum maintenance. However, the humidifier should be inspected and placed on a dedicated maintenance schedule to ensure continued operation of the humidifier and its accessories. **PURE Humidifier Co. recommends that the following items be inspected, and/or, cleaned on a minimum basis of twice a year.** If excessive mineral build-up occurs, the maintenance schedule should be increased.

Inspect/Maintenance Item	Procedure to Follow
Water Fill Valve	Check to make sure the fill valve is operating properly. If the valve appears to continually fill, check the valve seat and seal (see trouble shooting instructions).
Safety Interlocks (Airflow, High Limit)	Check to make sure the safety interlocks (air flow, high-limit, etc) will shut down the humidifier.
Heat Exchanger	Clean and inspect for any leaks. Completely remove all mineral build-up on the heat exchanger, transfer tubes, and headers.
Humidifier Cover/Tank	Inspect for any leaks. Repair as required. Remove the mineral deposits from floor of the humidifier reservoir. If excessive build-up is found, the cover may need to be removed to facilitate complete cleaning of the humidifier.
Tri-Probe	Remove Tri-Probe assembly from humidifier (set-screw and o-ring seal) and inspect for excessive mineral build-up. Inspect plastic housing for cracks. Probe ends should be cleaned and the probe assembly re-installed.
Drain Valve & Drain Piping	The drain valve seat and seal should be inspected and cleaned as required. The drain line and water seal should be inspected and cleaned to ensure free flow of the overflow and drain line.
Flexible Hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a "set".
Steam Trap & Strainer	Clean and inspect for proper operation.

Cleaning Instructions

Hard Make-up Water

If utilizing hard make-up water, humidifier tanks will likely need to be cleaned manually. This can be done from the side-entry plate or cover. Remove all loose solids from tank and/or exchanger with a wet vacuum or putty knife and bucket. After removal of solids, replace the side-entry plate/cover. At this point you may wish to add a descaling solution. Contact your local representative for our easy to use, non-toxic PURE Clean descaling solution.

Softened Make-up Water

If utilizing softened make-up water, help eliminate build-up in the tank simply by adding a descaling solution. Contact your local representative for our easy to use, non-toxic PURE Clean descaling solution.

DO NOT use Hydrochloric acid-based descalers; this will corrode stainless steel.



PURE™
Humidifier

Exchanger Gasket Replacement Instructions

WARNING

Disconnect the humidifier power, gas, exhaust system and allow the humidifier to cool prior to servicing. Drain water level below the level of the exchanger being serviced. Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.

1. Loosen the exchanger cover clamp screws with a 7/16" socket wrench until the locknuts can be slid out from the mounting clamps. Repeat this step for all clamps. Remove exchanger.
2. Remove the old gasket and adhesive left of the heat exchanger. Make sure this surface is clean, dry, and free of oil, grease or water. Turpentine may be used to clean the surface areas.
3. Spray contact adhesive such as 3M product Super 77 on one side of the new gasket and on the exchanger surface where the gasket is to be applied. Allow both surfaces to dry a minimum of one minute or until the surfaces become tacky to assure proper bonding.
4. Square one end of the new gasket on one end of the exchanger and set by applying light to moderate pressure to the gasket. Square the other end of the gasket on the other end of the exchanger. It is common for the gasket to appear too long. Now slowly start setting the gasket from the ends towards the middle of the exchanger. A slight compression of the gasket will occur ensuring proper fit on the ends.
5. Apply moderate to heavy pressure on the newly installed gasket all the way around ensuring proper fit. A properly installed gasket will lay flat with no raised areas.
6. Reinstall the heat exchanger into the humidifier.
7. Loosely install all of the exchanger cover clamps.
8. Using a 7/16" torque wrench set at 60 inch/pounds tighten all clamp screws.
9. In a reverse manner, reconnect all gas, exhaust and electrical connections. Fill humidifier with water and check for leaks.
10. Observe for leaks and tighten slightly if a leak area is found. DO NOT EXCEED 120 inch/pounds.



Cover Gasket Replacement Instructions

Remove the reservoir cover. While looking at the top of the unit, reference Figure A and B to determine which humidifier tank style you have.

Figure A Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket $\frac{1}{8}$ " longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter, and seal the ends together with a small amount of silicone.

Figure B Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket $\frac{1}{8}$ " longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter. Notch only the bottom flap of the gasket (reference Fig. C) in the corners of the tank. Seal the ends together with a small amount of silicone.

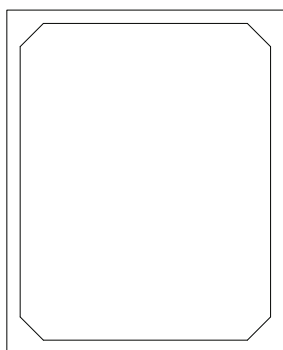


Fig. A
Plan View of Humidifier

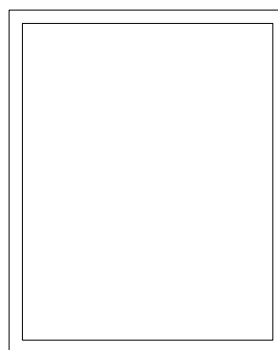
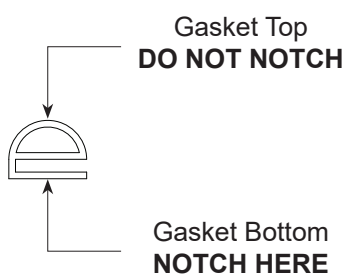
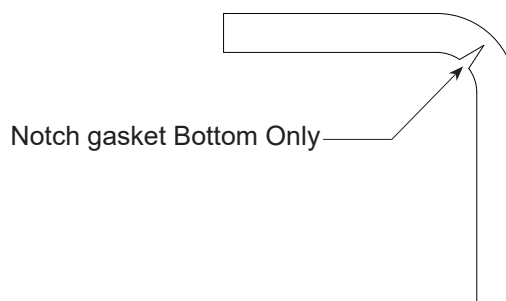


Fig. B
Plan View of Humidifier



Section View of Gasket



Bottom View of Gasket



Tool Requirements & Torque List

Recommended Maintenance Tool List
7/16" Wrench
3/4" Wrench
Crescent Wrench
11/32" Nut Driver or Socket
3/8" Nut Driver or Socket
5/32" Allen Head
Flat Head Screw Driver
Wire Stripper
Wire Crimper

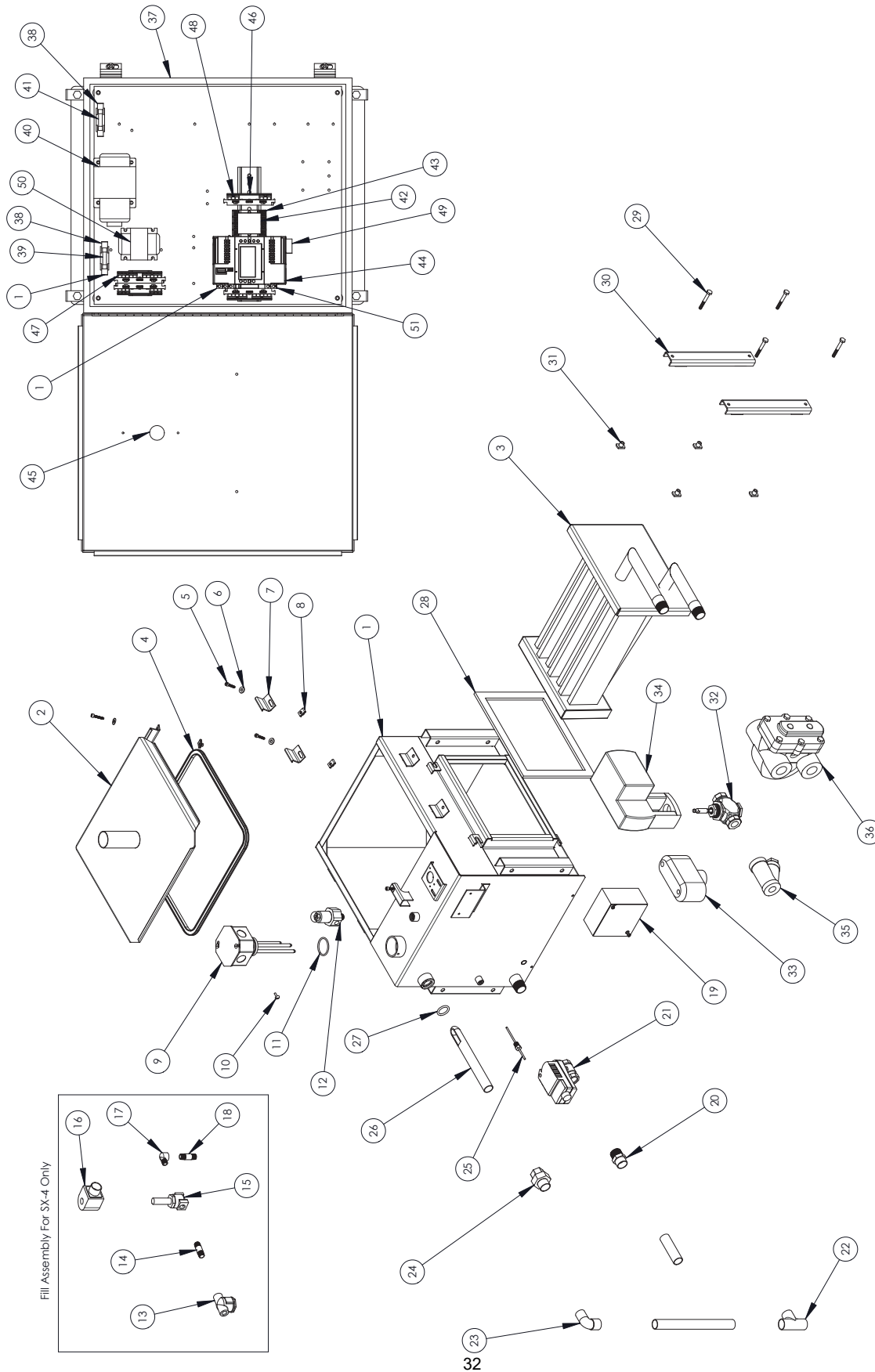
Torque List	
Cover Bolts	18 inch/pounds MAX
Side Entry Exchanger Bolts	80 inch/pounds MAX
Hose Cuff Screws	35-40 inch/pounds MAX when hot



Maintenance Notes

[illegible]

Exploded Parts Drawing SX-1 through SX-4





PURE Humidifier Co. SX-1 through SX-4 Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit
1	SX Tank	A	1
2	SX Top Cover	A	1
3	SX Heat Exchanger	A	1
4	Cover Gasket	15520	1
5	Cover Clamp Screw (10-24 x 1" Hex Socket)	15522	A
6	#12 SAE Zinc Washer	15184	A
7	Cover Clamp	15930	A
8	Cover Clamp Nut (10-24 U-Nut)	15524	A
9	SX Tri-Probe	05328	1
10	Tri-Probe Set Screw (10-32 x 3/8" SST)	15525	1
11	Tri-Probe O-Ring	15166	1
12	1/4" Stainless Steel Fill Valve with Strainer	09128	1
13	1/4" Fill Valve Strainer Brass	15139	1
14	1/4" x 1 1/2" Nipple Brass	08021	1
15	1/4" Fill Valve	09075	1
16	Fill Valve Solenoid	09078	1
17	1/4" Street Elbow Brass	08020	1
18	1/4" x 1 1/2" Stainless Steel Nipple	07043	1
19	Electrical Box & Cover	15076	1
20	3/4" Copper Male Adaptor	08013	1
21	Motorized Drain Valve	A	1
22	3/4" Copper Sweat Tee	08014	1
23	3/4" 90 Degree Copper Elbow	08011	1
24	Sweat Union	08015	1
25	Tank Temp Sensor	A	1
26	Copper Flusher	01113	1
27	Flusher O-Ring	15164	1
28	SX Heat Exchanger Gasket	A	1
29	Clamp Bar Bolt (1/4"-20 x 2" Hex)	15841	A
30	Clamp Bar	99136	A
31	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	A
32	Valve Body	A	1
33	Pneumatic Valve Actuator	03013	1**
34	Electric Valve Actuator	09132	1**
35	Wye Strainer	A	1
36	Float & Thermostatic Trap	16065	1
37	Control Enclosure	Consult Factory	
38	Fuse Holder	12085	2
39	2 amp Fuse	12063	1
40	Step-Down Transformer	12245	1
41	4 Amp Fuse	12065	1
42	Low Voltage Plug In Relay	12018	1
43	Relay Base	12020	1
44	INTAC® PLC 18I/O	16129	1
45	Touchscreen	16131	1
46	Wago 221-500 Splice Terminal Carrier	12382	4
47	Wago 221-415 Lever Splice Terminal (5 Position)	12381	5
48	Wago 221-413 Lever Splice Terminal (3 Position)	12380	4
49	PLC Terminal Blocks	A	A
50	24VAC To 24 VAC 20VA Transformer	12062	1
51	Slim Relay 24VAC/DC	16133	1

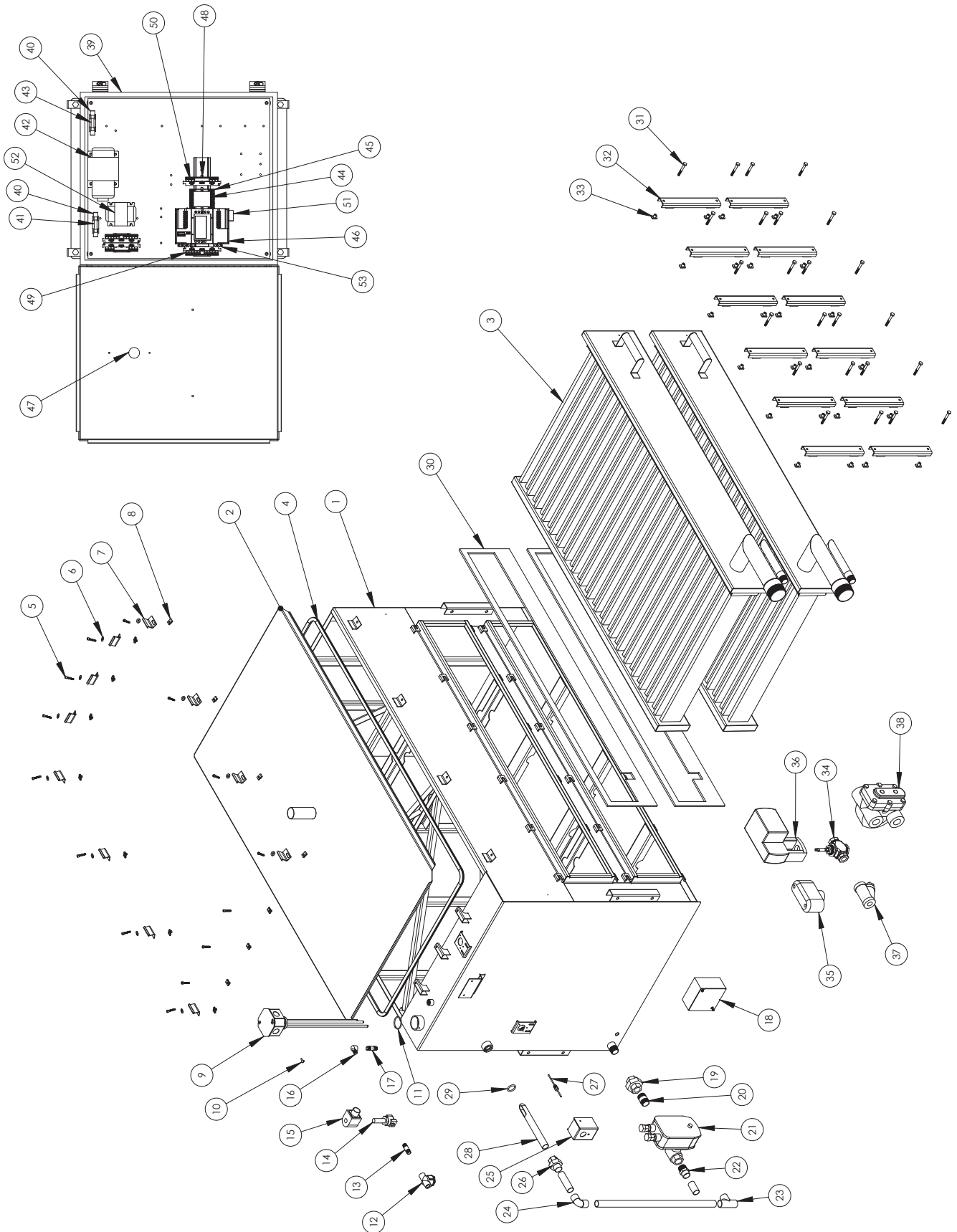
NOTES/CODES:

A = Part Number, quantity and price vary with model number.

* Optional feature that may not be on all equipment

** Only one style valve actuator will be used.

Exploded Parts Drawing SX-8





PURE Humidifier Co. SX-8

Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit
1	SX SIZE 8 Tank	10015	1
2	SX SIZE 8 Top Cover	99087	1
3	SX-4R Heat Exchanger	05400	2
4	Cover Gasket	15520	1
5	Cover Clamp Screw (10-24 x 1" Hex Socket)	15522	14
6	#12 SAE Zinc Washer	15184	11
7	Cover Clamp	15930	11
8	Cover Clamp Nut (10-24 U-Nut)	15524	14
9	SX-8R Tri-Probe	05884	1
10	Tri-Probe Set Screw (10-32 x 3/8" SST)	15525	1
11	Tri-Probe O-Ring	15166	1
12	1/4" Fill Valve Strainer Brass	15139	1
13	1/4" x 1 1/2" Nipple Brass	08021	1
14	1/4" Fill Valve	09075	1
15	Fill Valve Solenoid	09078	1
16	1/4" Street Elbow Brass	08020	1
17	1/4" x 1-1/2" Nipple	07043	1
18	Electrical Box & Cover	15076	1
19	3/4" Union Stainless Steel	07114	1
20	3/4" x 1 1/2" Nipple Stainless Steel	07081	1
21	3/4" Motorized Drain Valve Stainless Steel	A	1
22	3/4" Copper Male Adaptor	08013	1
23	3/4" x 3/4" x 3/4" Sweat Tee Copper	08014	1
24	3/4" 90 Degree Elbow Copper	08022	1
25	Overtemp/Thermocouple Housing	16071	1
26	3/4" Sweat Union Copper	08015	1
27	Tank Temp Sensor	A	1
28	Copper Flusher	01113	1
29	Flusher O-Ring	15164	1
30	SX SIZE 4 Heat Exchanger Gasket	05386	2
31	Clamp Bar Bolt (1/4"-20 x 2" Hex)	15841	24
32	Clamp Bar	99136	12
33	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	24
34	Valve Body	A	2
35	Pneumatic Modulating Actuator	A	2*
36	Electric Modulating Actuator	09132	2**
37	2" Wye Strainer	15145	2
38	Float & Thermostatic Trap	16065	2
39	Control Enclosure	Consult Factory	
40	Fuse Holder	12085	2
41	2 amp Fuse	12063	1
42	Step-Down Transformer	12245	1
43	4 Amp Fuse	12065	1
44	Low Voltage Plug In Relay	12018	1
45	Relay Base	12020	1
46	INTAC® PLC 18I/O	16129	1
47	Touchscreen	16131	1
48	Wago 221-500 Splice Terminal Carrier	12382	4
49	Wago 221-415 Lever Splice Terminal (5 Position)	12381	5
50	Wago 221-413 Lever Splice Terminal (3 Position)	12380	4
51	PLC Terminal Blocks	A	A
52	24VAC To 24 VAC 20VA Transformer	12062	1
53	Slim Relay 24VAC/DC	16133	1

NOTES/CODES:

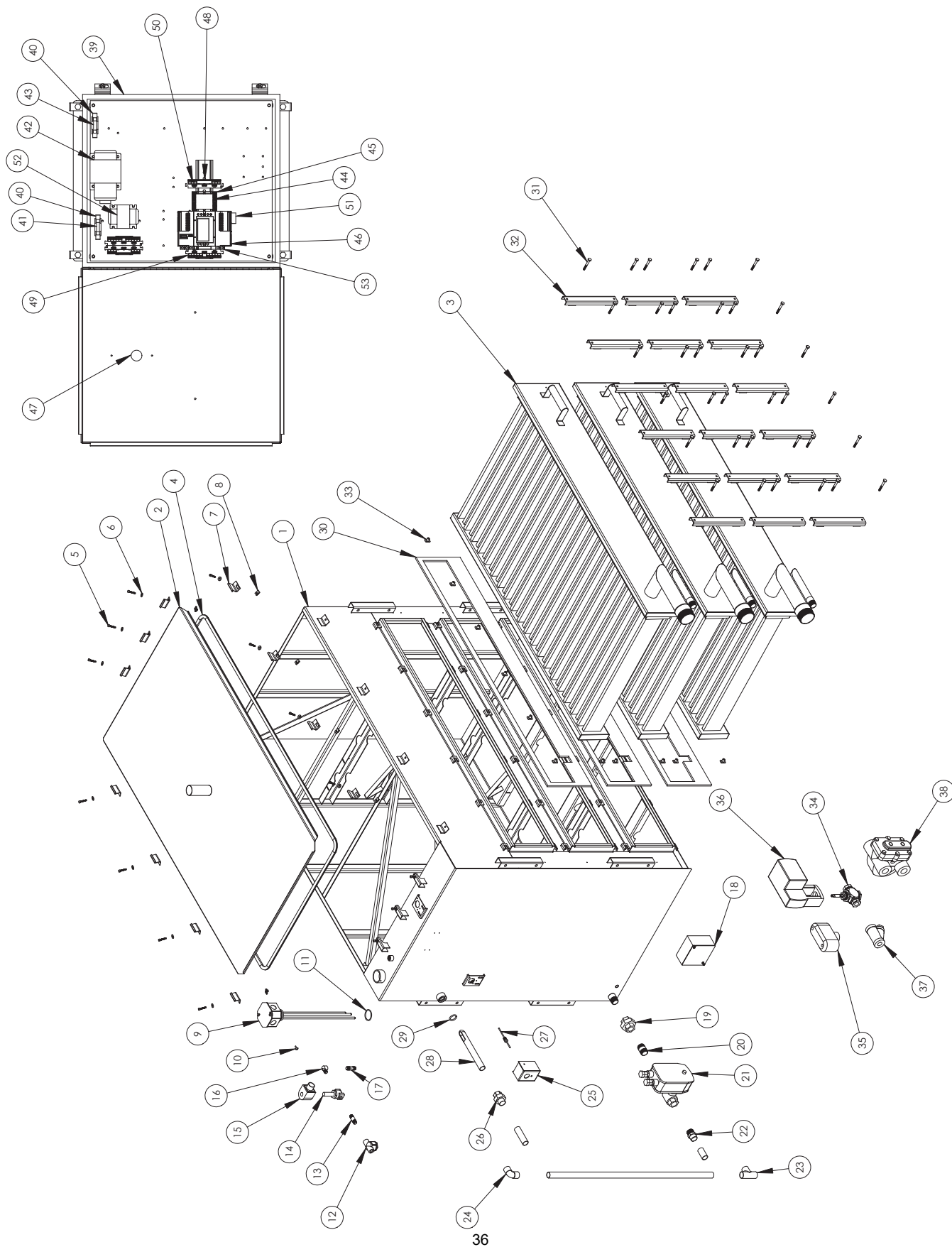
A = Part Number, quantity and price vary with model number.

* Optional feature that may not be on all equipment

** Only one style valve actuator will be used.

As of June 2023

Exploded Parts Drawing SX-12





PURE Humidifier Co. SX-12

Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit
1	SX SIZE 12 Tank	10018	1
2	SX SIZE 12 Top Cover	99087	1
3	SX-4R Heat Exchanger	05400	3
4	Cover Gasket	15520	1
5	Cover Clamp Screw (10-24 x 1" Hex Socket)	15522	14
6	#12 SAE Zinc Washer	15184	11
7	Cover Clamp	15930	11
8	Cover Clamp Nut (10-24 U-Nut)	15524	14
9	SX-12R Tri-Probe	05884	1
10	Tri-Probe Set Screw (10-32 x 3/8" SST)	15525	1
11	Tri-Probe O-Ring	15166	1
12	1/4" Fill Valve Strainer Brass	15139	1
13	1/4" x 1 1/2" Nipple Brass	08021	1
14	1/4" Fill Valve	09075	1
15	Fill Valve Solenoid	09078	1
16	1/4" Street Elbow Brass	08020	1
17	1/4" x 1 1/2" Stainless Steel	07043	1
18	Electrical Box & Cover	15076	1
19	3/4" Union Stainless Steel	07114	1
20	3/4" x 1 1/2" Nipple Stainless Steel	07081	1
21	3/4" Motorized Drain Valve Stainless Steel	A	1
22	3/4" Copper Male Adaptor	08013	1
23	3/4" x 3/4" x 3/4" Sweat Tee Copper	08014	1
24	3/4" 90 Degree Elbow Copper	08022	1
25	Overtemp/Thermocouple Housing	16071	1
26	3/4" Sweat Union Copper	08015	1
27	Tank Temp Sensor	A	1
28	Copper Flusher	01113	1
29	Flusher O-Ring	15164	1
30	SX SIZE 4 Heat Exchanger Gasket	05386	3
31	Clamp Bar Bolt (1/4"-20 x 2" Hex)	15841	36
32	Clamp Bar	99136	18
33	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	36
34	Valve Body	A	3
35	Pneumatic Modulating Actuator	A	3*
36	Electric Modulating Actuator	09132	3**
37	2" Wye Strainer	15145	3
38	Float & Thermostatic Trap	16065	3
39	Control Enclosure	Consult Factory	
40	Fuse Holder	12085	2
41	2 amp Fuse	12063	1
42	Step-Down Transformer	12245	1
43	4 Amp Fuse	12065	1
44	Low Voltage Plug In Relay	12018	1
45	Relay Base	12020	1
46	INTAC® PLC 18I/O	16129	1
47	Touchscreen	16131	1
48	Wago 221-500 Splice Terminal Carrier	12382	4
49	Wago 221-415 Lever Splice Terminal (5 Position)	12381	5
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As of June 2023



The PURE Humidifier Co. Warranty

PURE Humidifier Co. guarantees its products to be free from defects in material and workmanship for a period of one year from the date of shipment; provided the product is properly installed, serviced, and put into the service for which it was intended.

Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

PURE Humidifier Co. is obligated under the terms of this warranty to the repair or replacement of the defective part(s), excluding any labor charges, or to refund the purchase price at our option. PURE Humidifier Co. assumes no obligation for incidental or consequential damages. The above provisions are in lieu of all other guarantees, obligations, liabilities or warranties, expressed or implied.

DISCLAIMER

Product Changes: Changes in products may be required from time to time due to the need for continuing improvement of products and due to factors beyond PURE Humidifier Co.'s control. PURE Humidifier Co. reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. PURE Humidifier Co. also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by PURE Humidifier Co. PURE Humidifier Co. shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by PURE Humidifier Co.



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