PURE™ Humidifier

READ AND SAVE THESE INSTRUCTIONS

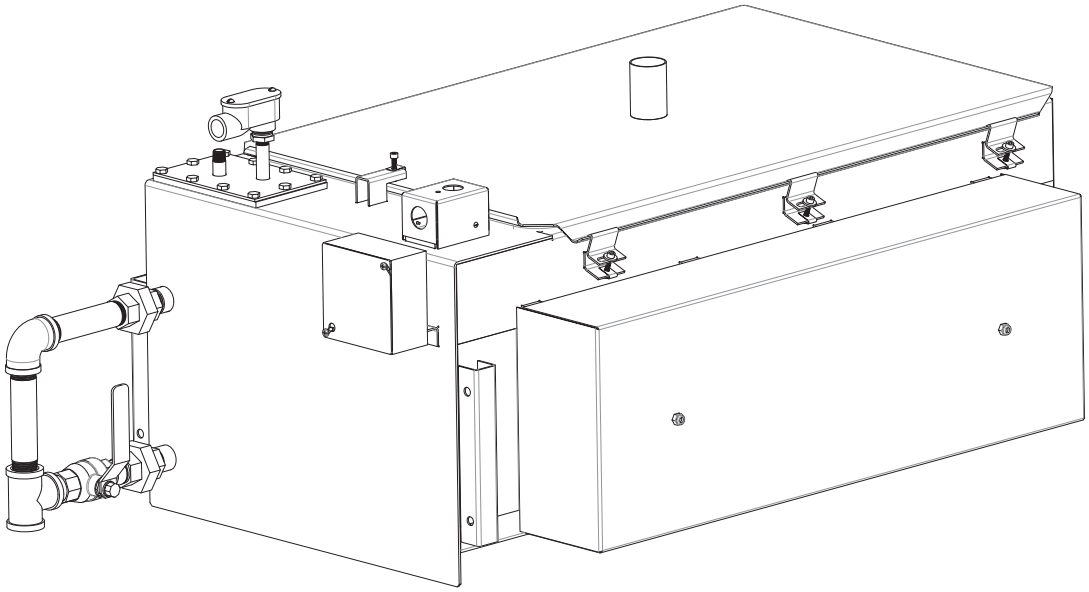
Deionized, Demineralized, or Reverse Osmosis Water

ESDDR Series

Electric Humidifier

Installation Instructions

Operation and Maintenance Manual



Our results are comforting

Form No: ESDOM-6-2023

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

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co.'s ESDDR 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 ESDDR Series Humidifier is specifically designed to operate with deionized, demineralized, or reverse osmosis water. All components that will be in contact with the water are constructed of stainless steel, incoloy, or corrosion resistant materials.

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

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. Consult the factory if you are unsure about which chemical descaler to use.

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.

Installation of humidifier in high humidity or salt water atmospheres will cause accelerated corrosion, resulting in a reduction of the normal lifespan of the unit.

For indoor use only unless supplied with an Outdoor Enclosure.

Installation Date:_____

Model Number: _____

Serial Number:_____

PURE™ Humidifier

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WARNINGS

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⚠ 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.

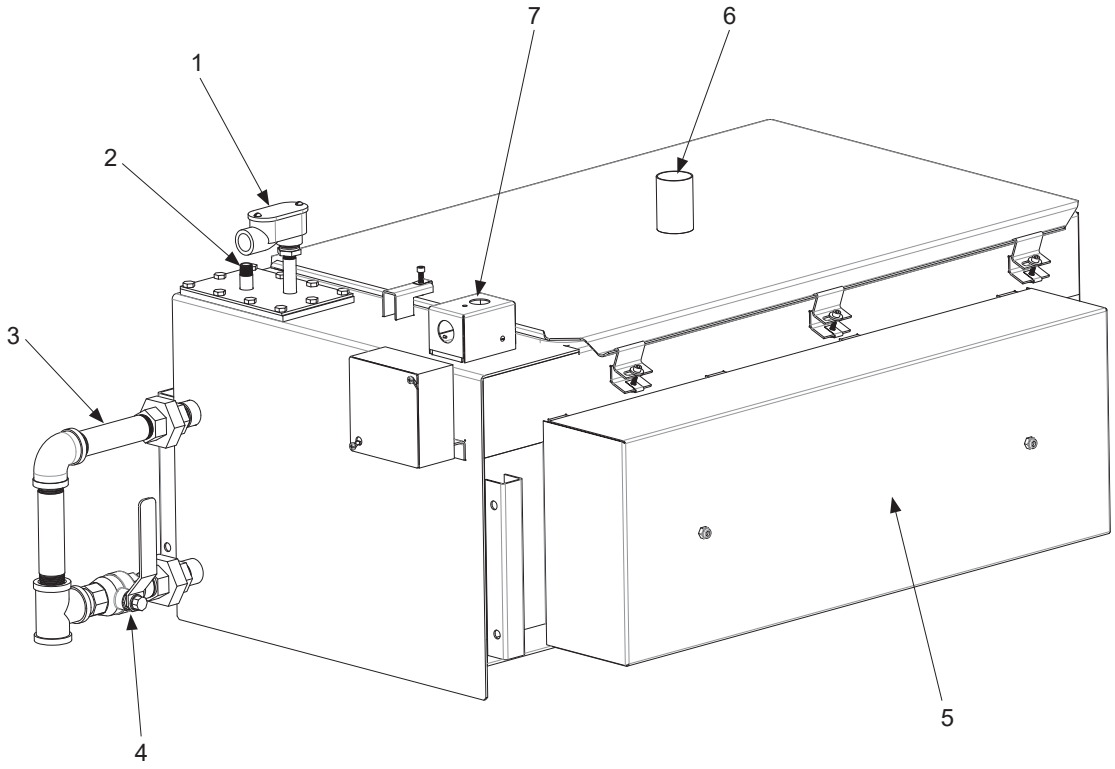
ELECTRICAL
Electrical work should be done by qualified electrical contractors and must be in compliance with local, state, federal, and governing codes.

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 ES 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. Low Water Float Switch Junction Box
2. 1/4” NPT Fill Inlet Connection
3. Overflow Piping
4. 3/4” NPT Ball Valve
5. Heater Assembly Access
6. Humidifier Steam Outlet Connection
7. Over Temperature Cut-Out Switch

PURE™ Humidifier

Capacities & Weights

Standard Water Unit Model No.	Steam Output Capacity †		KW	Humidifier Reservoir Weight*				Control Cabinet Weight Δ	
				Empty		Full			
	lbs/hr	kh/hr		lbs	kg	lbs	kg	lbs	kg
ESDDR-3	9.0	4.1	3	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-4.5	13.5	6.1	4.5	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-5.5	18.0	8.1	6	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-7.5	22.5	10.2	7.5	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-11	31.5	14.2	10.5	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-14	40.5	18.4	13.5	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-15	45.0	20.4	15	50.5	22.9	130.5	59.2	32.0	14.5
ES-16.5	49.5	22.5	16.5	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-19.5	58.5	26.5	19.5	50.5	22.9	130.5	59.2	32.0	14.5
ESDDR-22	63.0	28.6	21	61.0	27.7	177.0	80.3	55.0	25.0
ESDDR-28	81.0	36.7	27	61.0	27.7	177.0	80.3	55.0	25.0
ESDDR-30	90.0	40.8	30	61.0	27.7	177.0	80.3	55.0	25.0
ESDDR-33	99.0	45.0	33	61.0	27.7	177.0	80.3	55.0	25.0
ESDDR-39	117.0	53.1	39	61.0	27.7	177.0	80.3	55.0	25.0
ESDDR-42	126.0	57.2	42	61.0	27.7	177.0	80.3	55.0	25.0
ESDDR-45	135.0	61.2	45	65.5	29.7	181.5	82.3	72.0	32.7
ESDDR-49.5	148.5	67.4	49.5	65.5	29.7	181.5	82.3	72.0	32.7
ESDDR-58.5	175.5	80.0	58.5	65.5	29.7	181.5	82.3	72.0	32.7
ESDDR-63	189.0	85.7	63	65.5	29.7	181.5	82.3	72.0	32.7
ESDDR-66	198.0	89.8	66	88.0	39.9	243.0	110.2	72.0	32.7
ESDDR-78	234.0	106.1	78	88.0	39.9	243.0	110.2	72.0	32.7
ESDDR-84	252.0	114.3	84	88.0	39.9	243.0	110.2	72.0	32.7
ESDDR-102	306.0	138.8	102	88.0	39.9	243.0	110.2	72.0	32.7

* When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight.

Δ The control cabinet is shipped loose unless optional factory mounting is specified. Reference the “Dimension Sheet” for control cabinet dimensions.

† The above capacities are based on 100% efficiency. 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 humidifier reservoir.

PURE™ Humidifier

Electrical Specifications

Single Phase Amperage†

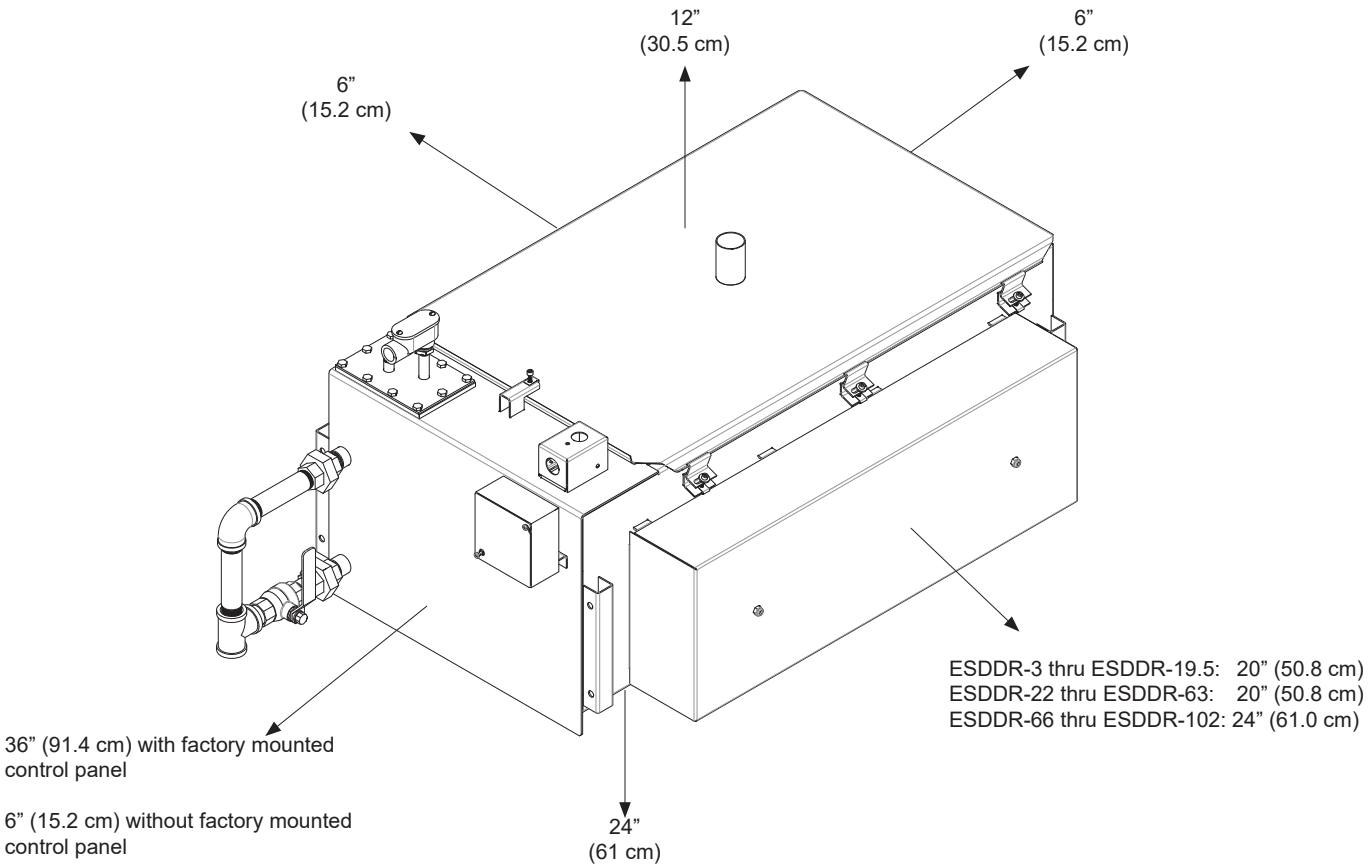
Standard Water Unit Model No.	Unit KW	120V	208V	240V	480V	600V	No. of Heaters	Heater KW	Control Circuit Voltage
ESDDR-3	3	25	14.4	12.5	6.3	5	3	1	24 vac
ESDDR-4.5	4.5	37.5	21.6	18.8	9.4	7.5	3	1.5	24 vac
ESDDR-5.5	6		28.8	25	12.5	10	3	2	24 vac
ESDDR-7.5	7.5		36.1	31.3	15.6	12.5	3	2.5	24 vac
ESDDR-11	10.5				21.9	17.5	3	3.5	24 vac
ESDDR-14	13.5				28.1	22.5	3	1.5	24 vac
ESDDR-15	15				31.3	25	3	5	24 vac
ESDDR-16.5	16.5				34.4	27.5	3	5.5	24 vac
ESDDR-19.5	19.5				40.6	32.5	3	6.5	24 vac
ESDDR-22	21				43.8	35	6	3.5	24 vac
ESDDR-28	27				56.3	45	6	4.5	24 vac
ESDDR-30	30				62.5	50	6	5	24 vac
ESDDR-33	33				68.8	55	6	5.5	24 vac
ESDDR-39	39				81.3	65	6	6.5	24 vac
ESDDR-42	42				87.5	70	6	7	24 vac
ESDDR-45	45				93.8	75	9	5	24 vac
ESDDR-49.5	49.5				103.1	82.5	9	5.5	24 vac
ESDDR-58.5	58.5				121.9	97.5	9	6.5	24 vac
ESDDR-63	63				131.3	105	9	7	24 vac
ESDDR-66	66				137.5	110	12	5.5	24 vac
ESDDR-78	78				162.5	130	12	6.5	24 vac
ESDDR-84	84				175	140	12	7	24 vac
ESDDR-102	102					170	12	8.5	24 vac

Three Phase Amperage†

Standard Water Unit Model No.	Unit KW	208V	240V	480V	600V	No. of Heaters	Heater KW	Control Circuit Voltage
ESDDR-3	3	8.3	7.2	3.6	2.9	3	1	24 vac
ESDDR-4.5	4.5	12.5	10.8	5.4	4.3	3	1.5	24 vac
ESDDR-5.5	6	16.6	14.4	7.2	5.8	3	2	24 vac
ESDDR-7.5	7.5	20.8	18	9	7.2	3	2.5	24 vac
ESDDR-11	10.5	29.1	25.3	12.6	10.1	3	3.5	24 vac
ESDDR-14	13.5	37.5	32.4	16.2	13	3	4.5	24 vac
ESDDR-15	15	41.6	36.1	18	14.4	3	5	24 vac
ESDDR-16.5	16.5	45.8	39.7	19.8	15.9	3	5.5	24 vac
ESDDR-19.5	19.5			23.5	18.8	3	6.5	24 vac
ESDDR-22	21	58.3	50.5	25.3	20.2	6	3.5	24 vac
ESDDR-28	27	75	64.9	32.5	26	6	4.5	24 vac
ESDDR-30	30	83.3	72.2	36.1	28.9	6	5	24 vac
ESDDR-33	33	91.6	79.4	39.7	31.8	6	5.5	24 vac
ESDDR-39	39			46.9	37.5	6	6.5	24 vac
ESDDR-42	42			50.5	40.4	6	7	24 vac
ESDDR-45	45	124.9	108.3	54.1	43.3	9	5	24 vac
ESDDR-49.5	49.5	137.4	119.1	59.5	47.6	9	5.5	24 vac
ESDDR-58.5	58.5			70.4	56.3	9	6.5	24 vac
ESDDR-63	63			75.8	60.6	9	7	24 vac
ESDDR-66	66			79.4	63.5	12	5.5	24 vac
ESDDR-78	78			93.8	75.1	12	6.5	24 vac
ESDDR-84	84			101	80.8	12	7	24 vac
ESDDR-102	102			122.7	98.2	12	8.5	24 vac

† Other voltages available upon request. Please consult factory for specific availability.

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.

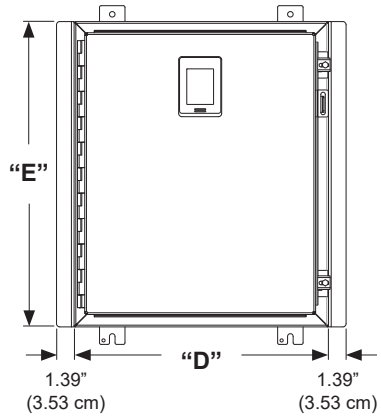
SCR RELAY CLEARANCE NOTE

When SCR modulating control is supplied on a non-factory mounted control panel you will need to leave 12” clearance on the sides of the panels where the SCR heat sinks are located.

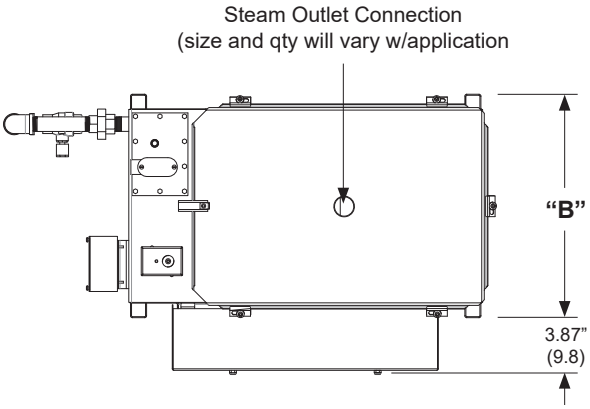
Dimensions

NEMA-12 Humidifier Control Cabinet

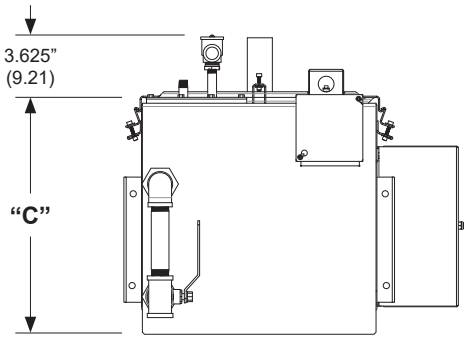
(reference control cabinet notes)



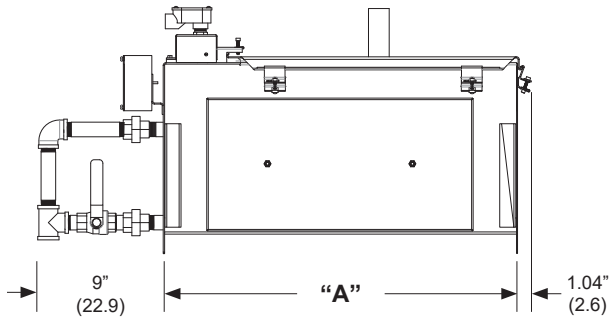
1. Door has been removed from the drawing for clarity.
2. Control cabinet is shipped loose for field mounting unless optional factory mounting is specified.
3. Dimension "F" = Control cabinet depth.
4. Heatsinks located on both sides of cabinet for all units except ESDDR-3 through ESDDR-19.5.



Top View



Front View



Right Side View

Unit Dimensions in inches (cm)

Model Number	Dim. "A"	Dim. "B"	Dim. "C"
ESDDR-3 thru ESDDR-19.5	17.50" (44.5)	14.00" (35.6)	13.75" (34.9)
ESDDR-22 thru ESDDR-63	25.50" (64.8)	14.00" (35.6)	13.75" (34.9)
ESDDR-66 thru ESDDR-102	34.00" (86.4)	18.25" (46.4)	13.75" (34.9)

Control Cabinet Dimensions in inches (cm)

Model Number	Dim. "D"	Dim. "E"	Dim. "F"
ESDDR-3 thru ESDDR-19.5	14.00" (35.6)	16.00" (40.6)	6.00" (15.2)
ESDDR-22 thru ESDDR-63	20.00" (50.8)	20.00" (50.8)	7.00" (17.8)
ESDDR-66 thru ESDDR-102	20.00" (50.8)	24.00" (61.0)	7.00" (17.8)
ESDDR-*	24.00" (61.0)	30.00" (76.2)	7.00" (17.8)

*Control panel for use with units having 123 amps or higher

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.

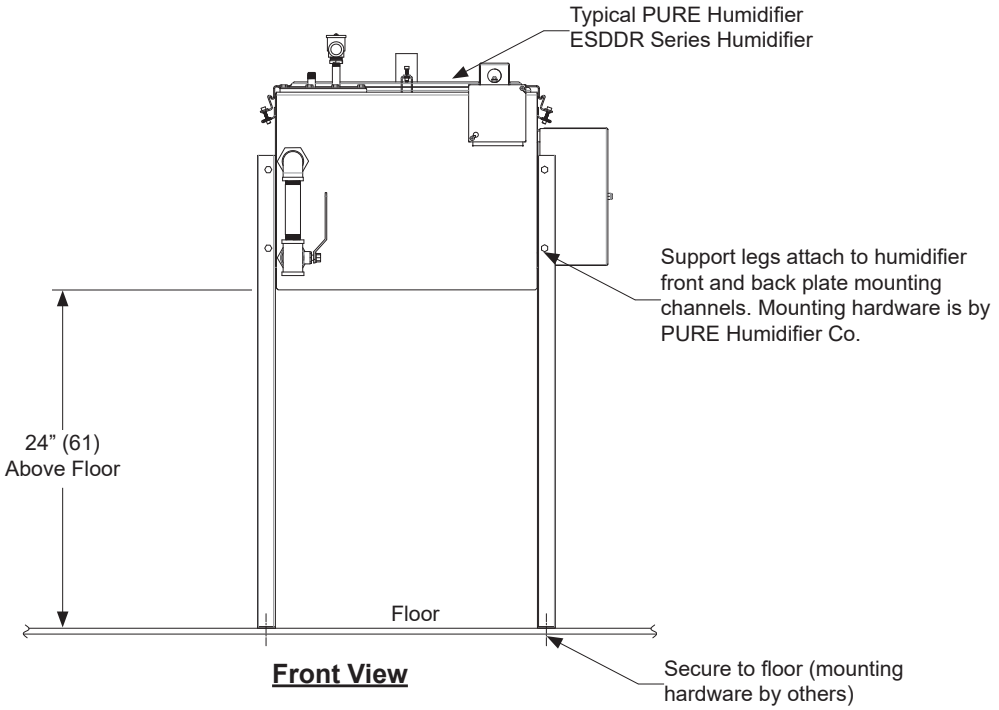
CAUTION: Smoke detectors should not be located downstream of injection tube assemblies.

Location of Controls

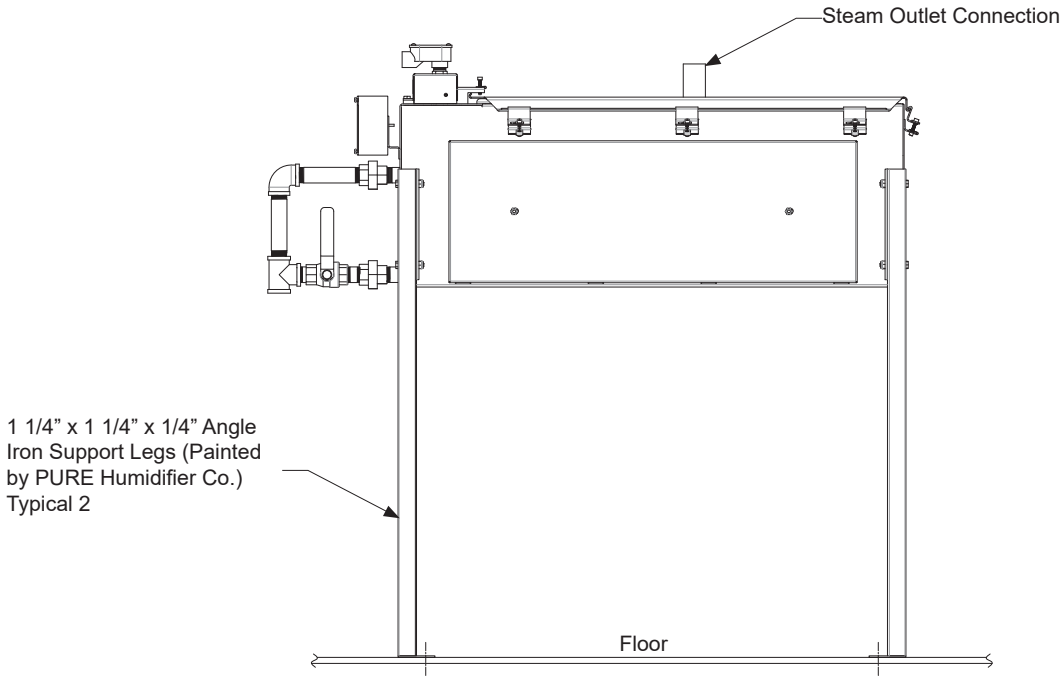
It is important to avoid mounting any controls within the visible steam. The controls should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the humidifier injection tube. Due to the temperature rise that exists within the visible steam dissipation area, thermostats should not be mounted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

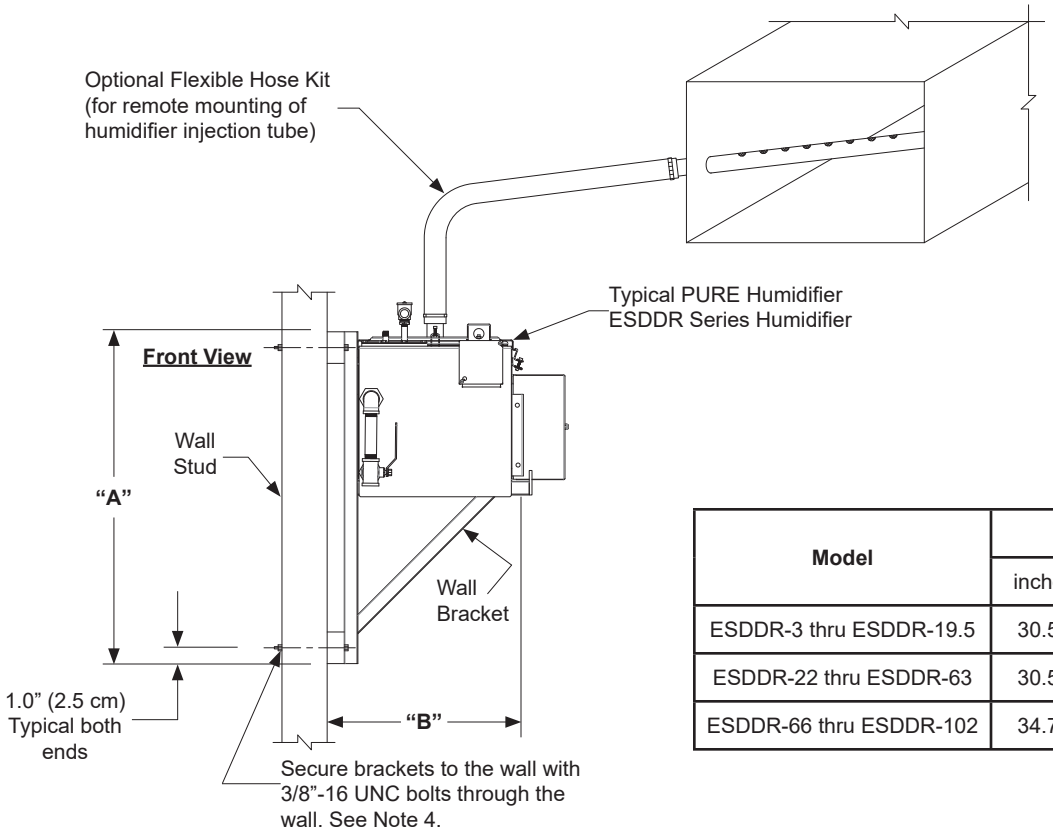


Front View

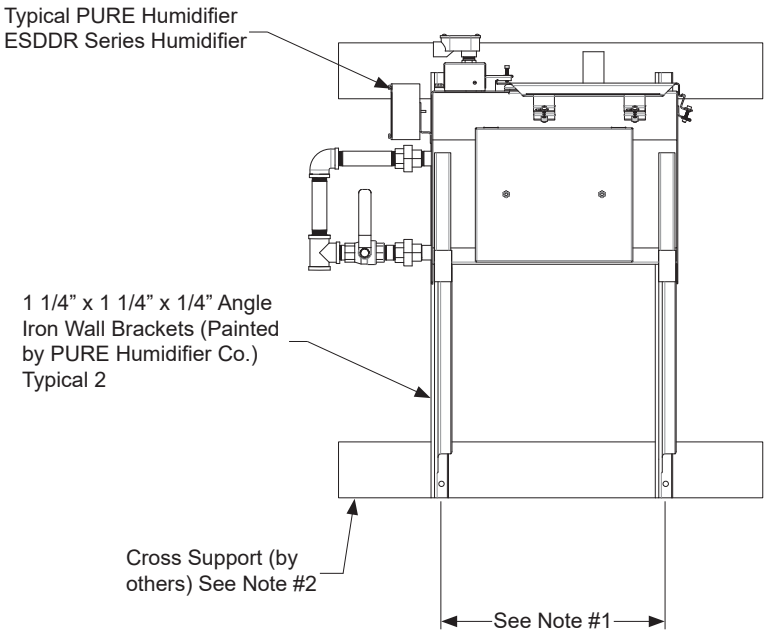


Right Side

Mounting Applications
Wall Brackets



Model	Dim. "A"		Dim. "B"	
	inches	cm	inches	cm
ESDDR-3 thru ESDDR-19.5	30.50	77.5	16.75	42.6
ESDDR-22 thru ESDDR-63	30.50	77.5	16.75	42.6
ESDDR-66 thru ESDDR-102	34.75	88.3	21.00	53.3



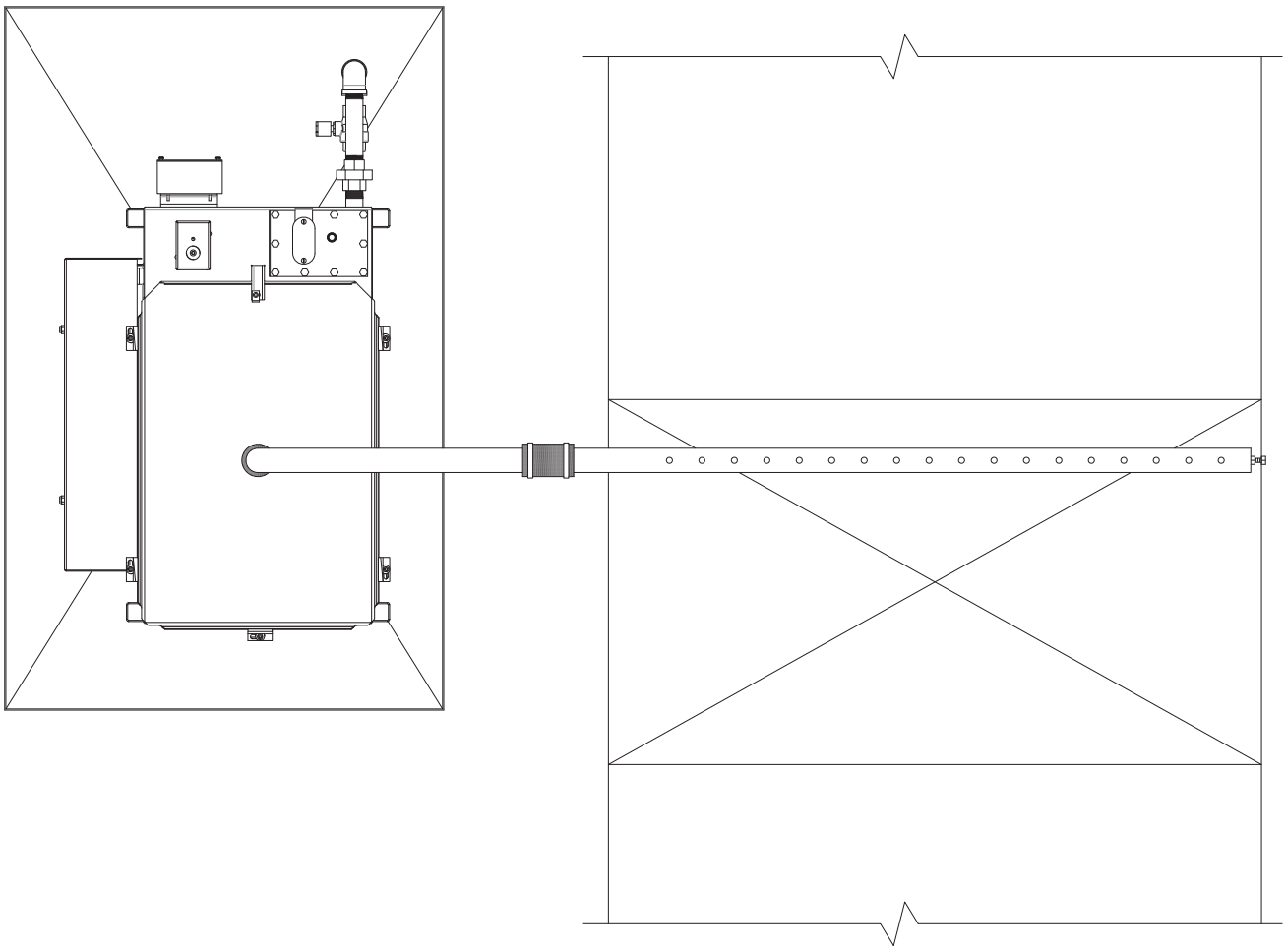
NOTES:

1. Secure brackets to wall support studs. Attachment bolts must be secured throught he wall stud.
2. 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.

Drain Pan Mounting

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 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: 35-55 psi optimal

This style humidifier utilizes a float operated fill valve system which is designed for use with deionized, demineralized, or reverse osmosis water. Use of mineralized tap water will cause fill valve failure and will 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 deionized, demineralized, or reverse osmosis 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 55 psi (3.8 Bar), the valve may not shut off.

Lower pressure than optimal will require adjustment of float valve and may not supply sufficient water for proper operation.

Drain Piping

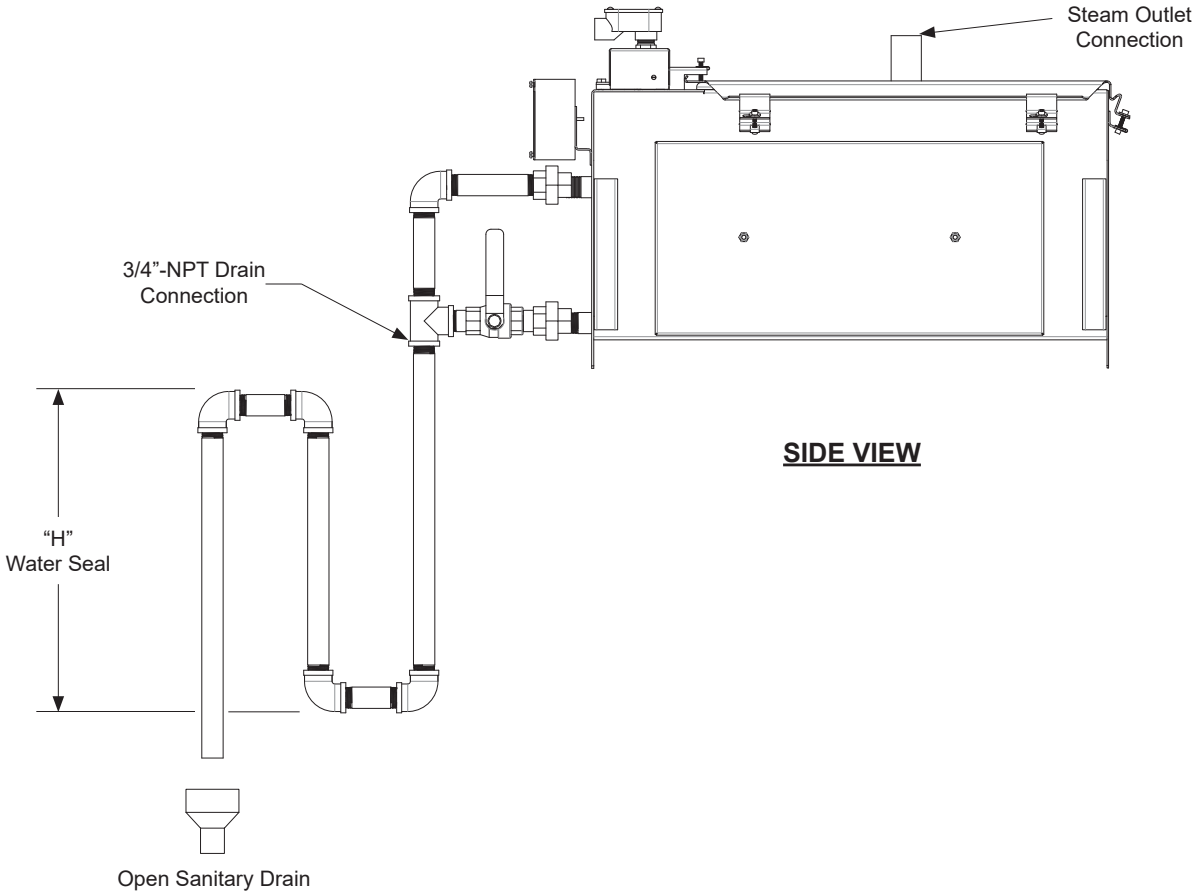
A water seal as shown in the piping illustration should be installed to prevent steam from escaping through the drain line. The water seal should be of sufficient height to overcome the pressure developed in the humidifier (reference water seal height table) and the duct static pressure.

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



SIDE VIEW

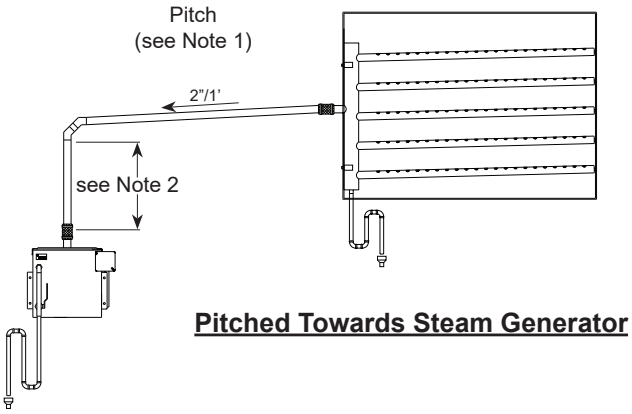
Water Seal Height Δ		
Unit Size	"H"	
Total KW	inches	cm
3 - 19.5	8	20
22 - 33	11	28
39 - 49.5	17	43
58.5 - 102	19	48
Δ The water seal height may have to be increased if excessive duct static pressure exists.		

NOTES

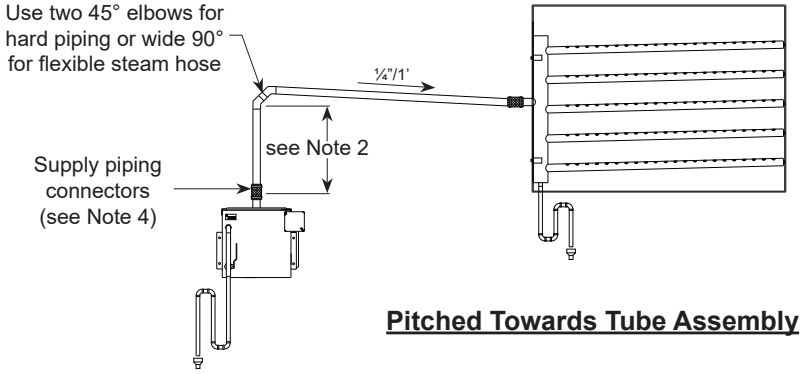
1. All drain piping is by others.
2. Drain and overflow connection requires field piping.
3. Do NOT use PVC or other plastic piping that is not rated for 220°F or higher.

† 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.

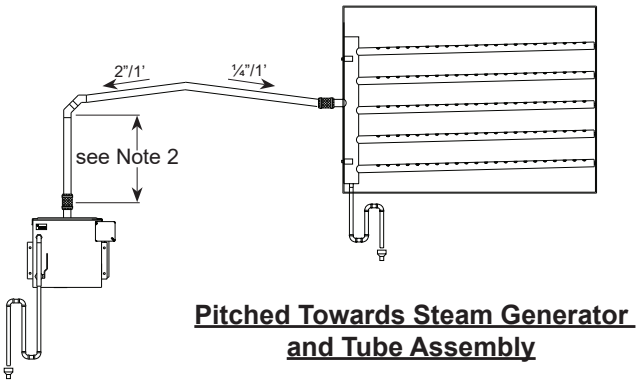
Steam Supply Piping Examples



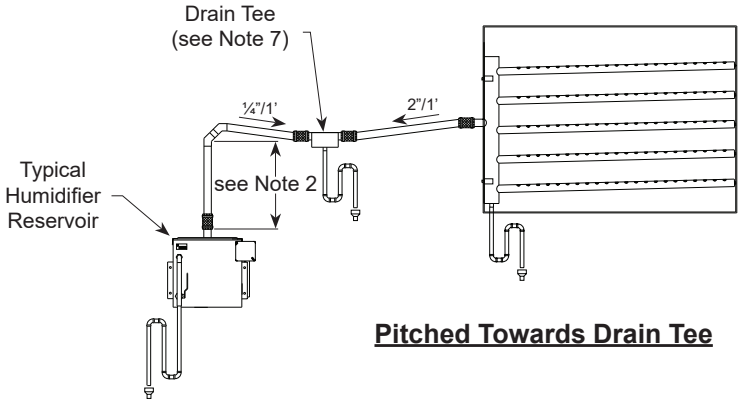
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, ¼" 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

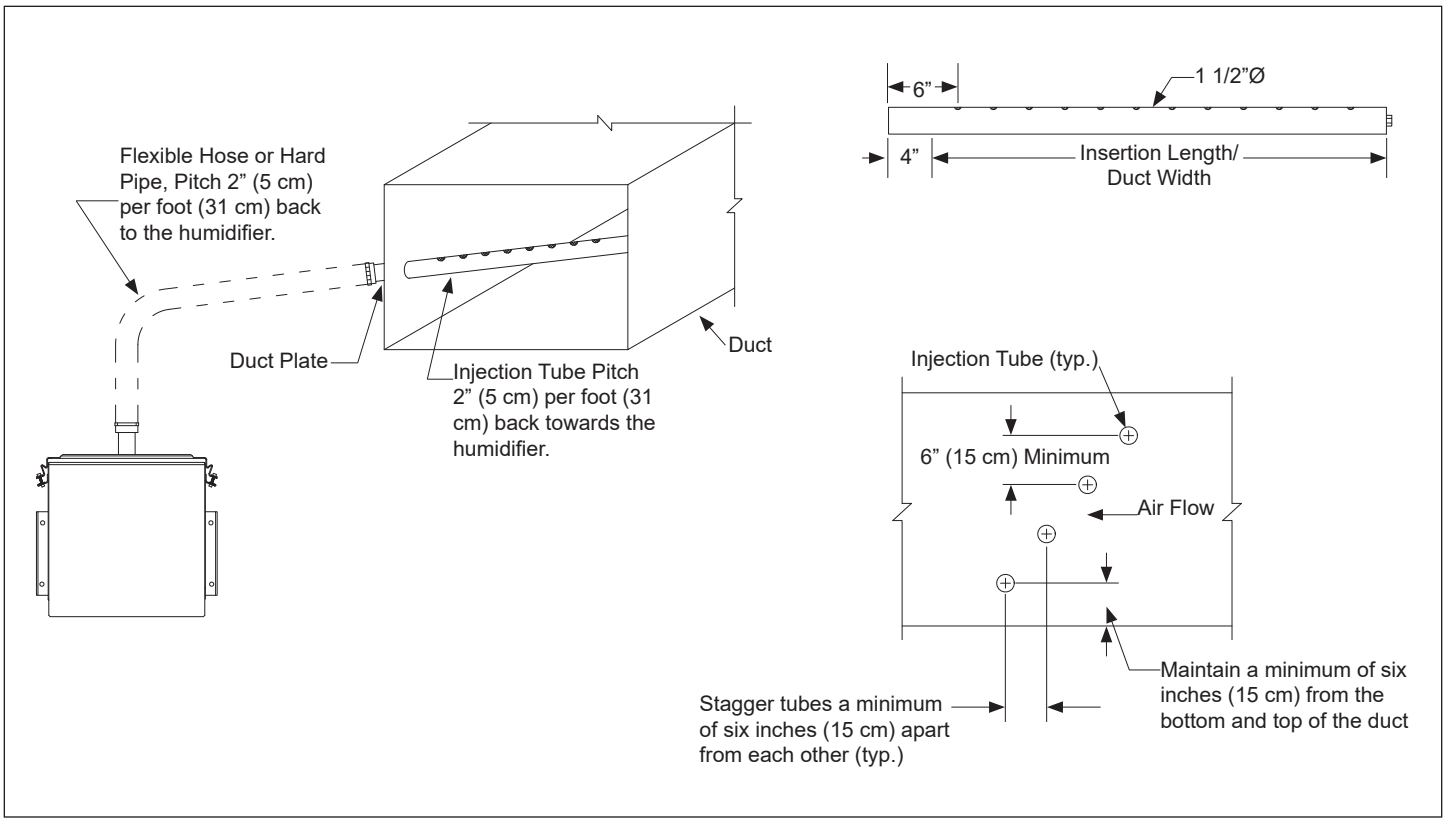
Single injection tubes should be installed in the center of the duct. Multiple injection tubes should have the tubes staggered within the duct as shown in the illustration.

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.

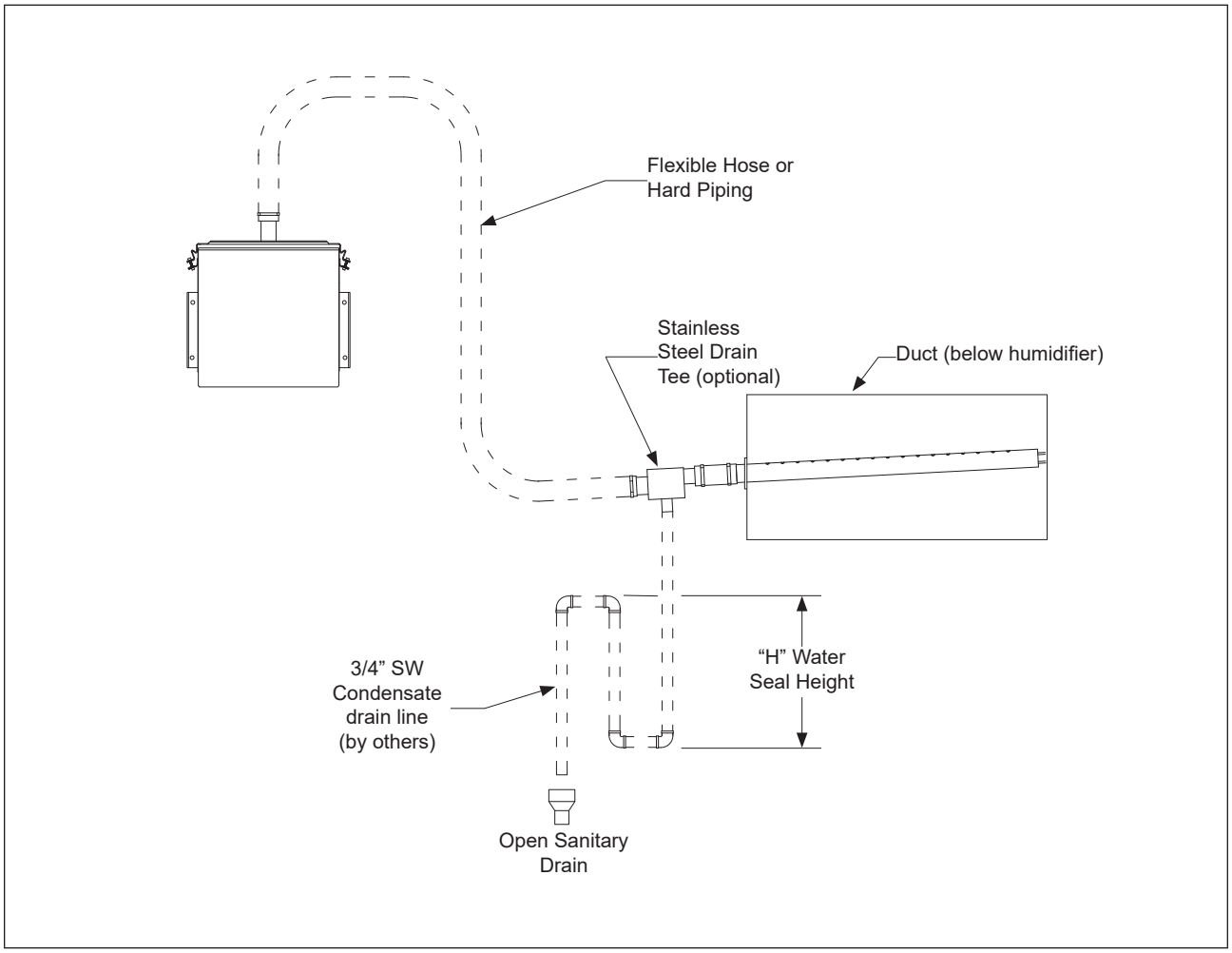
Galvanized steel duct plates are provided to seal the opening where the tube enters the duct.

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		
Unit Size	"H"	
Total KW	inches	cm
3 - 19.5	8	20
22 - 33	11	28
39 - 49.5	17	43
58.5 - 102	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

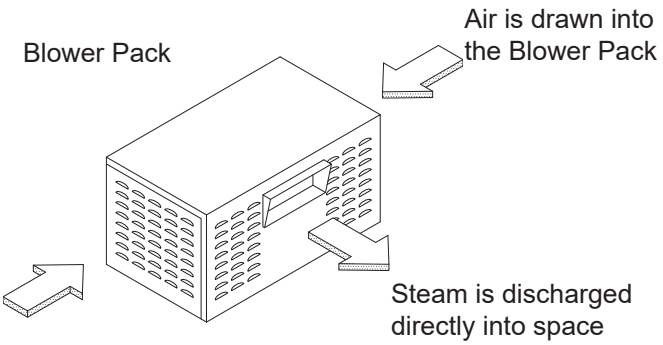
Note: Maximum length of flexible hose is 10’. Longer runs will cause sagging of the line and create low spots.

Blower Pack

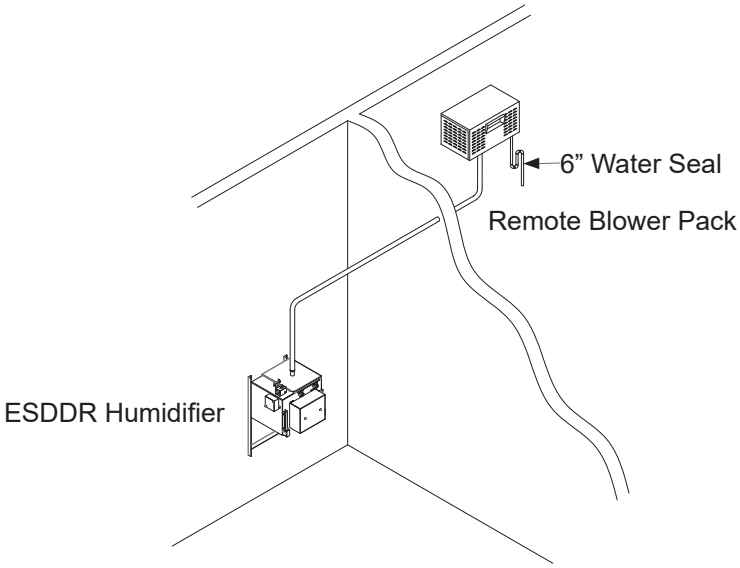
In applications where a ducted air system is not available, PURE offers the optional Blower Pack. The Blower Pack contains a two-speed adjustable blower that moves the air over the steam discharge outlet and disperses the steam directly into the space (see Fig. 1).

Mounting

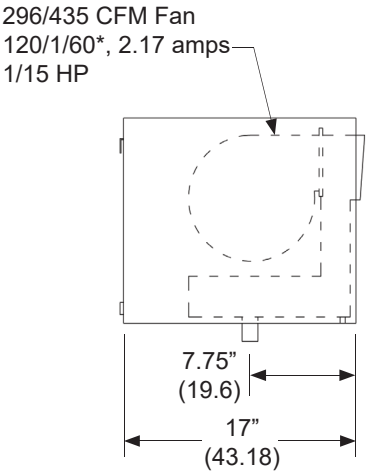
The Blower Pack may be remote-mounted up to ten feet away from the ESDDR humidifier (see Fig. 2).



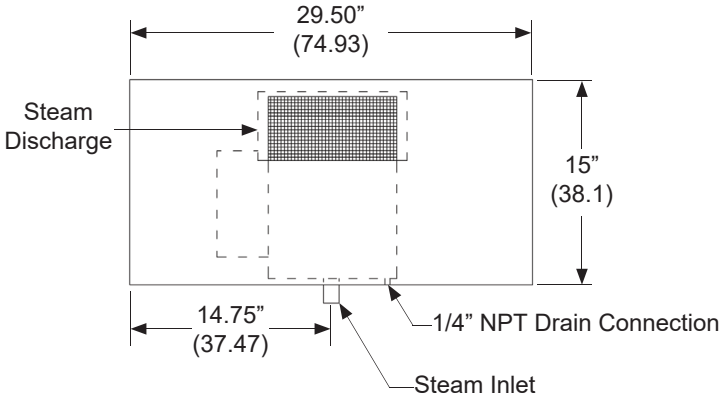
Blower Pack
Fig. 1



Remote-Mounted Blower Pack
Fig. 2



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)

Locating Blower Pack

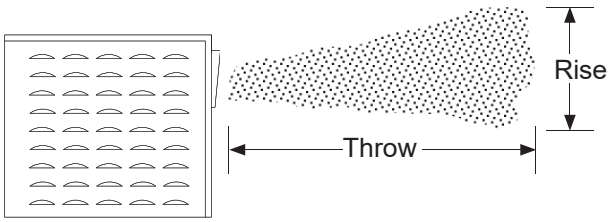
The distance that visible steam will travel after leaving the Blower Pack is dependent upon the relative humidity in the room and the capacity of the humidifier. If this visible steam comes in contact with any solid object (walls, beams, machinery, etc.) it may form condensate and drip. Refer to Fig.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

Visible Steam Rise & Throw		**Humidifier Model 5-25 kW**									
		5 kW (1)		10 kW (1)		15 kW (1)		20 kW (1)		25 kW (1)	
Blower Pack Qty. (-)		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

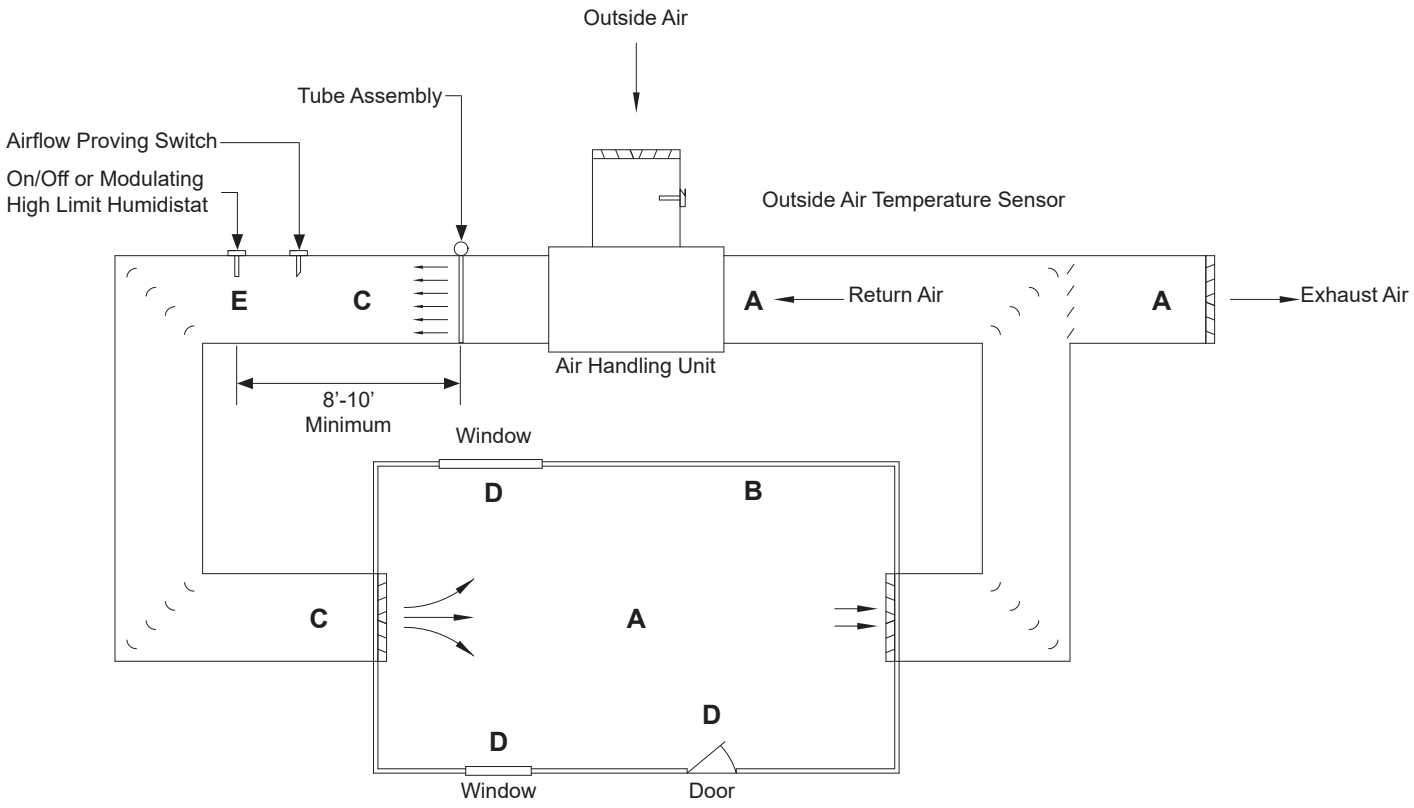
Visible Steam Rise & Throw		**Humidifier Model 33-102 kW**									
		5 kW (1)		10 kW (1)		15 kW (1)		20 kW (1)		25 kW (1)	
Blower Pack Qty. (-)		feet	meters	feet	meters	feet	meters	feet	meters	feet	meters
50% RH	Rise	8.0	2.4	4.0	1.2	5.5	1.7	8.0	2.4	8.0	2.4
	Throw	23.0	7.0	16.0	4.9	18.0	5.5	23.0	7.0	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

ESDDR Pre-Startup Procedure

Pre-Startup Checklist

Before starting the ESDDR 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. If humidifier is installed above equipment or not located near a floor drain than a drain pan should be installed below the humidifier steam generator.

_____ 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: 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 35-55 psi. There should be at least 5 feet of metal pipe and check valve between the tank and any plastic pipe.

_____ 6. PIPING: Drain - Make sure a water seal of the proper height (refer to "Drain Piping" section for height) is provided in the drain line.

_____ 7. 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:_____

ESDDR 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 by manually opening the drain valve and shutting off the water supply valve. The humidifier should drain to a level where the touchscreen will read Water Level “Low”.

_____ 7. Close the drain valve and open the makeup water valve. 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 “Full”. 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 a 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 heater(s) should energize.

_____ 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 heater amperage draw by testing and recording voltage and amperage in each phase. Readings should match the factory heater nameplate.

Amps A:_____ Amps B:_____ Amps C:_____

_____ 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, reseat 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:_____

SCR Modulation

SCR modulation is designed to provide extremely accurate control of humidifier output. For a three phase humidifier, each set of three heating elements within the humidifier evaporating chamber will be modulated to provide 0-100% control of the humidifier output (capacity). The SCRs used are zero-cross, meaning they switch on and off when the alternating current crosses from negative to positive (and vice versa), reducing line noise. It fires on a one-second time base (field adjustable), allowing the humidifier output to parallel the control signal from the humidity controller. The SCR pulses the immersion heater power according to the control signal for a percentage of each second e.g. at 50% power the heater will be on for 1/2 a second and off for 1/2 a second.

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	Blown main power fuse(s)	Check and replace.
	Control transformer not producing 24 vac control voltage	Check transformer output.
	Safety controls open (airflow proving, high limit, etc)	Verify that all safety controls are completing the safety circuit.
	Over-temp protection switch tripped	Indicates the humidifier is running while low on water. The level control circuit has interference or is damaged. Do not reset the switch until the source of the problem is identified and corrected. Consult factory if you are unsure of the source of the problem.
	Faulty immersion heater	Check and verify heater voltage and amperage. Compare to diagram or nameplate ratings.
Humidifier will not fill	No water pressure	Check Water Supply.
	Drain valve open	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.
	Faulty water float valve	Check float valve seat for dirt.
Humidifier does not stop filling or is short cycling	Float valve stuck open	Check float seat for dirt. Adjust float ball arm.
	Drain valve open	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.
	Low water pressure	Adjust float valve arm upward to allow water to fill high enough above low water cutout switch.

PURE Humidifier Co. ESDDR Maintenance Instructions

The EC Series Electric Humidifier is designed to provide the best possible operation with minimum maintenance. However, the humidifier should be inspected and place 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 Make-Up Float 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).
Low Water Float Switch	Check to make sure the switch will shut the humidifier off when the water level drops too low. Close the water supply and open the drain valve to allow water to drain out for checking purposes. Make sure to reset the drain valve after inspection is completed.
Safety Interlocks (Airflow, High Limit)	Check to make sure the safety interlocks (airflow, high-limit, etc) will shut down the humidifier.
Immersion Heaters	Verify the correct amperage is being drawn by the heating element. Reference the wiring diagram for correct amperage.
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.
Flexible Hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a “set”.

Cleaning Instructions

Humidifiers supplied with deionized makeup water with a conductivity less than 1 microsiemen (resistivity greater than 1 meg-ohm) likely do not have any appreciable mineral scale buildup and should not need to be descaled. Humidifiers supplied with make-up water conductivities higher than 1 microsiemen (e.g. a single pass reverse osmosis water supply), may have a slight accumulation of minerals in the tank after one season of operation. If descaling is required, please refer to the PURE Clean O&M.

Heater Plate Gasket Replacement Instructions

WARNING
Disconnect the humidifier power and allow the unit to cool prior to servicing. Drain water from tank.

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 heater plate. It is common for the gasket to appear too long. Now slowly start setting the gasket from the ends towards the middle of the heater plate. 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 heater plate 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 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 100 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 ⅛" 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 ⅛" 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.

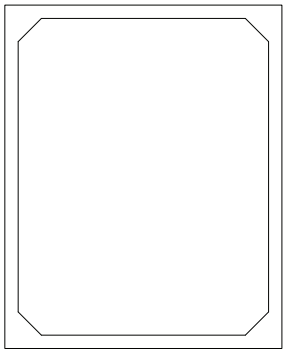


Fig. A
Plan View of Humidifier

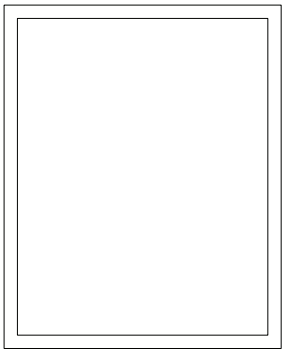
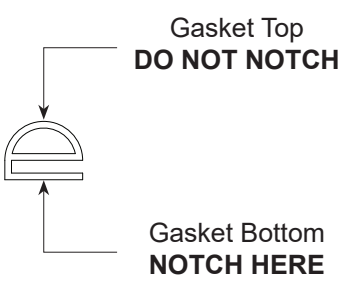
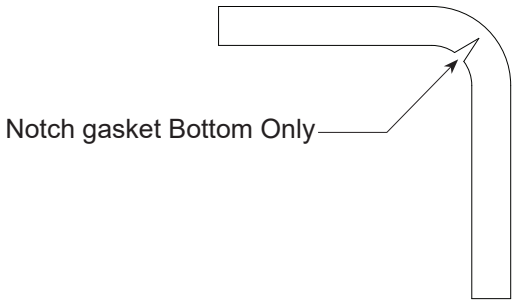


Fig. B
Plan View of Humidifier



Section View of Gasket



Bottom View of Gasket

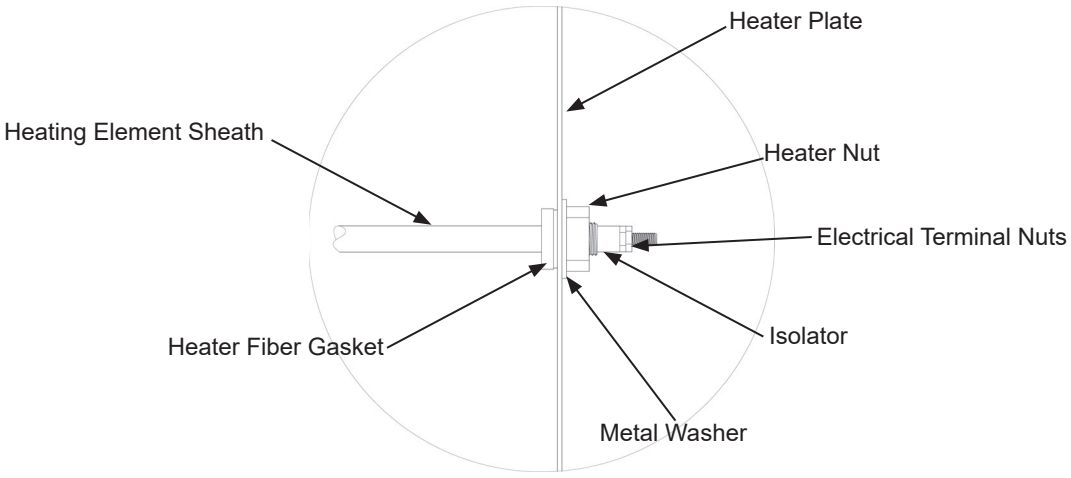
Fig. C

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
Hose Cuff Screws	35-40 inch/pounds MAX when hot
Heater Nut	18-20 **foot/pounds***
Heater Electrical Terminal	35 inch/pounds
* Use a pliers to hold heater sheath from twisting.	

Heater Assembly Sectional Detail



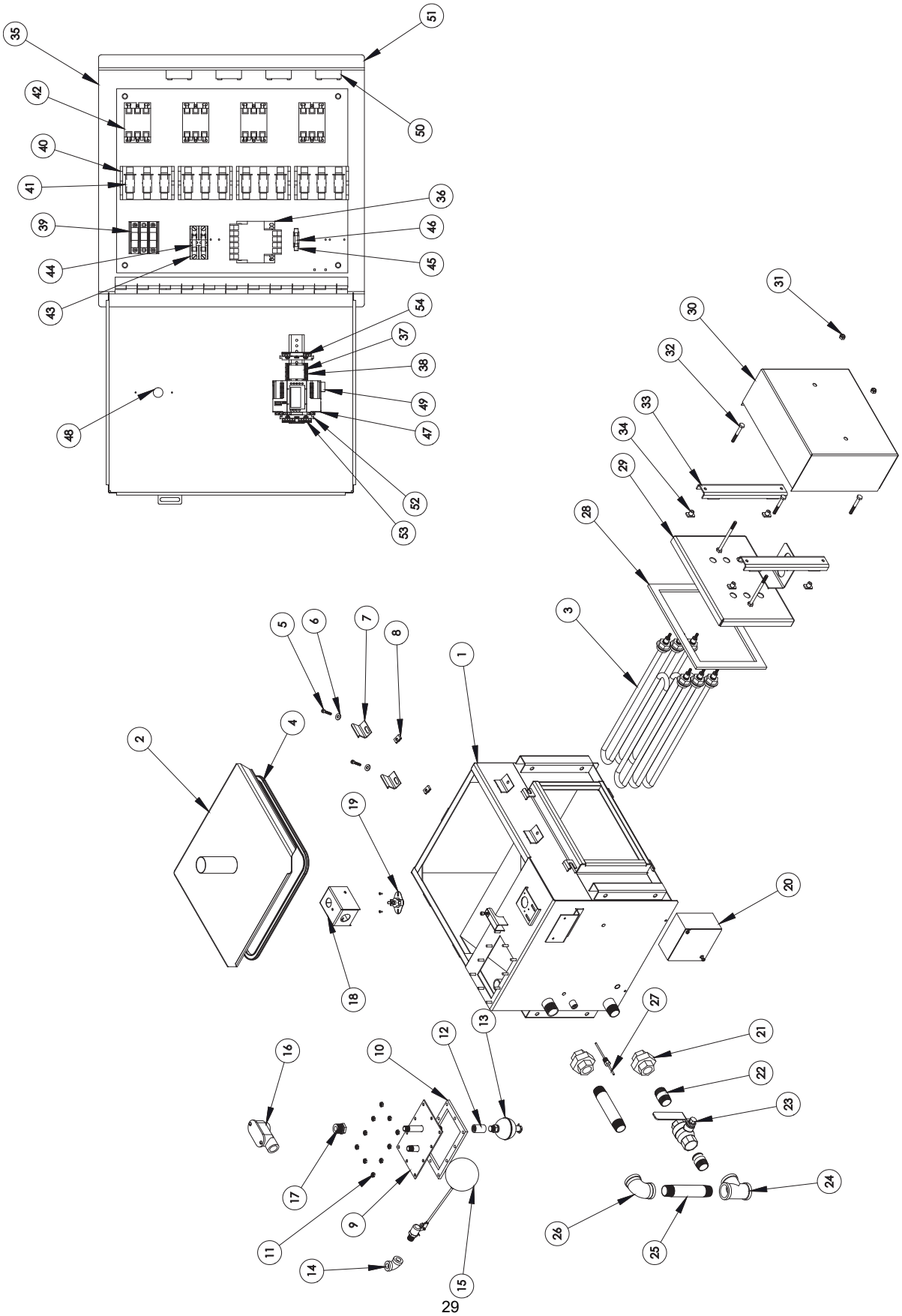
PURE™ Humidifier

Maintenance Notes

Maintenance Performed	Date	By

PURE™ Humidifier

Exploded Parts Drawing



As of June 2023

PURE Humidifier Co. ESDDR Series
Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit
1	ESDDR Tank	A	1
2	ESDDR Top Cover	A	1
3	Immersion Heating Element(s)	A	3
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	DDR Float Plate	99134	1
10	DDR Float Plate Gasket	05052	1
11	DDR Float Plate Nut (10-32 Hex Nut Galv)	15123	10
12	1/4" Coupling 304 SST	07001	1
13	Low Water Float Switch	15048	1
14	1/4" 90 Degree Elbow, 304 SST	07002	1
15	Water Fill Float Valve and Ball 316 Stainless Steel	09079	1
16	1/2" Type LB Conduit Body	15079	1
17	1/4" x 1/2" Hex Reducer	15694	1
18	Overtemp Switch Housing	15072	1
19	Overtemp Protection Switch	15047	1
20	Electrical Box & Cover	15076	1
21	3/4" Union Stainless Steel	07114	2
22	3/4" x 1 1/2" Nipple Stainless Steel	07081	2
23	3/4" Ball Valve, 316 SST	09036	1
24	3/4" Tee Stainless Steel	07115	1
25	3/4" x 5" Nipple Stainless Steel	07011	2
26	3/4" 90° Elbow Stainless Steel	07112	1
27	Type K Thermocouple	15853	1*
28	ES Heater Plate Gasket	A	1
29	ES Heater Plate	A	1
30	ES Heater Cover	A	1
31	Heater Cover Nut (1/4-20 Nylock)	15865	2
32	Clamp Bar Bolt (1/4-20 x 2" Hex)	15841	4
33	Clamp Bar	99136	2
34	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	4
35	Control Enclosure	Consult Factory	
36	Step-Down Transformer	A	1
37	Low Voltage Plug-In Relay	12022	1
38	Relay Base	12020	1
39	Power Distribution Block	A	A
40	Fuse Block	A	1
41	Heater Fuse	A	A
42	Heater Contactor	A	1
43	Primary Fuse Holder	A	A
44	Primary Fuse	A	A
45	Secondary Fuse Holder	12085	1
46	Secondary Fuse	12063	1
47	INTAC® PLC 18I/O	16129	1
48	Touchscreen	16131	1
49	PLC Terminal Blocks	A	A
50	SCR Relay	A	A
51	SCR Heat Sink	A	A
52	Wago 221-500 Splice Terminal Carrier	12382	2
53	Wago 221-415 Lever Splice Terminal (5 Position)	12381	2
54	Wago 221-413 Lever Splice Terminal (3 Position)	12380	2

NOTES/CODES:

A = Part Number and quantity vary with model number.

* = Optional feature that may not be on all equipment.

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.

PURE™ Humidifier

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