PURE™ Humidifier

READ AND SAVE THESE INSTRUCTIONS

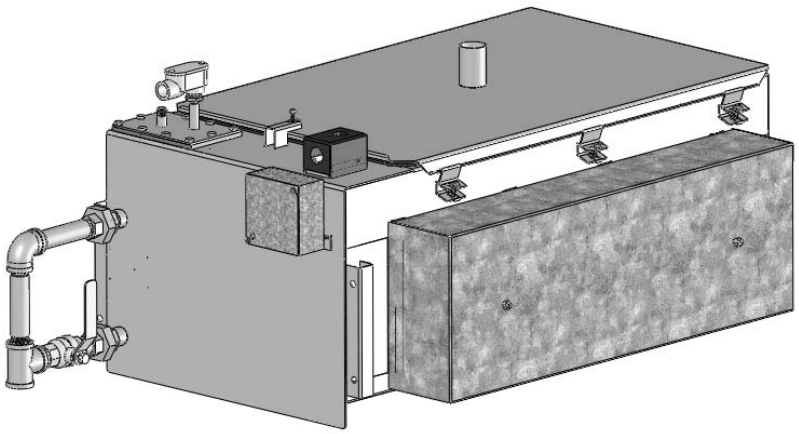
Deionized, Demineralized, or Reverse Osmosis Water

"ESDDR" Series

Electric Humidifier

Installation Instructions

Operation and Maintenance Manual



Our results are comforting

Form No: ESDOM-11-21

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 fill valve failure 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:_____

Table of Contents

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.

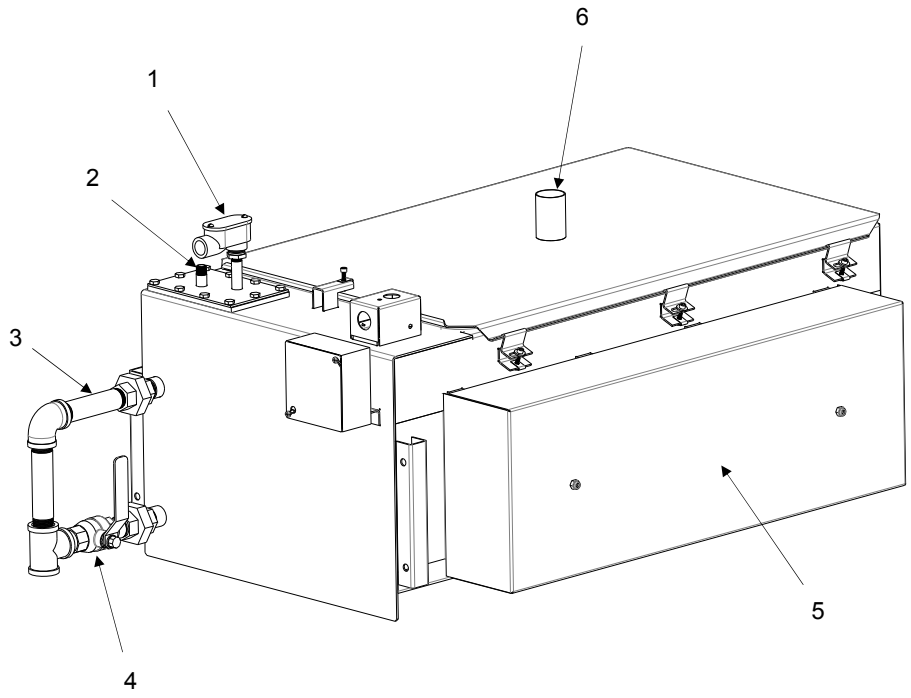
High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

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

Capacities, Weights and Water Volume

Model	Steam Output Capacity †		KW	Humidifier Reservoir Weight* Empty		Humidifier Reservoir Weight* Full		Control Cabinet Weight Δ	
	lbs/hr	kg/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	6.0	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
ESDDR-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.

Reservoir Water Volume		
Model	**Gallons**	**Liters**
ESDDR-3 - ESDDR-19.5	10.2	38.6
ESDDR-22 - ESDDR-63	14.8	56.0
ESDDR-66 - ESDDR-102	26.4	99.9

Electrical Specifications

Single Phase Amperage†

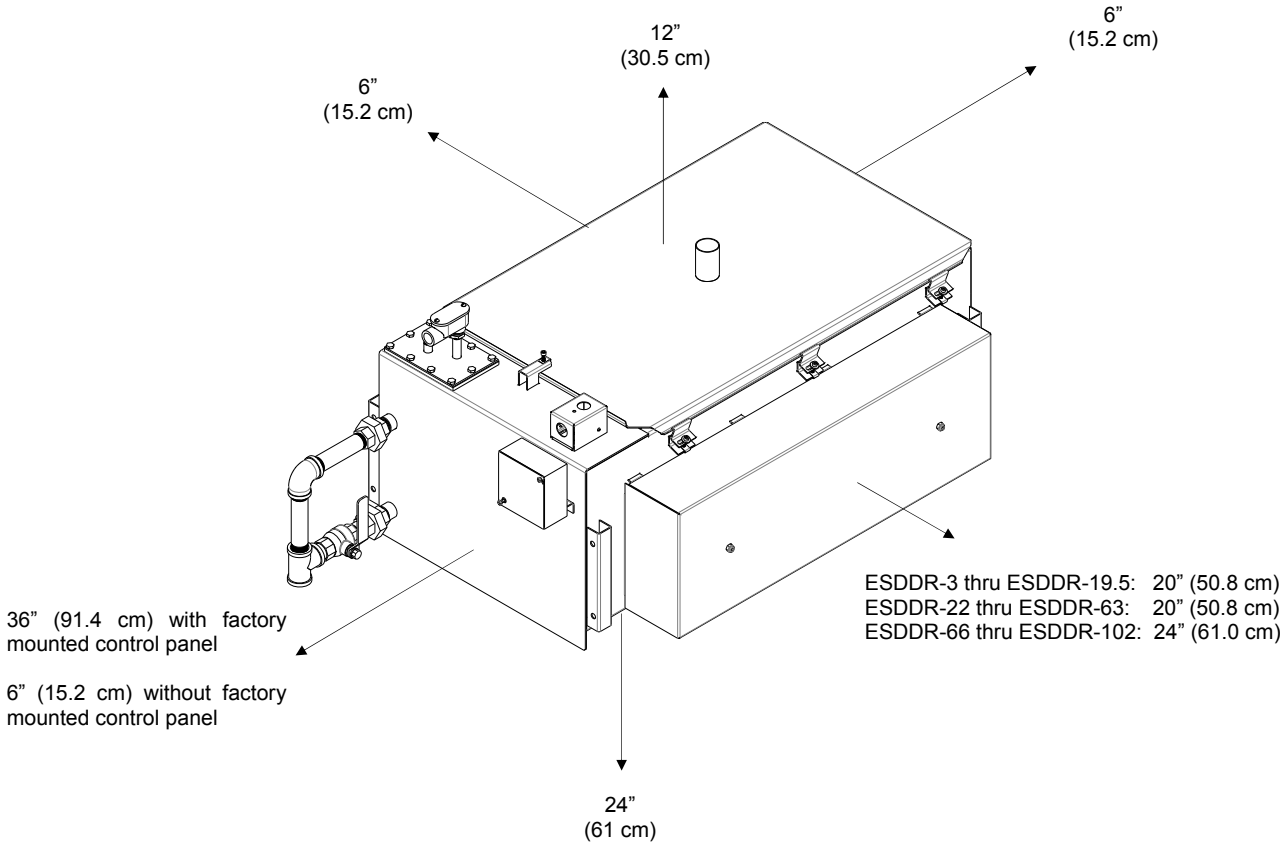
Model	Unit KW	120V	208V	240V	480V	600V	No. of Heaters	Heater KW	Control Circuit Voltage
ESDDR-3	3	25.0	14.4	12.5	6.3	5.0	3	1.0	24 vac
ESDDR-4.5	4.5	37.5	21.6	18.8	9.4	7.5	3	1.5	24 vac
ESDDR-5.5	6.0		28.8	25.0	12.5	10.0	3	2.0	24 vac
ESDDR-7.5	7.5		36.1	31.3	15.6	12.5	3	2.5	24 vac
ESDDR-11	10.5				21.9	17.5	3	3.5	24 vac
ESDDR-14	13.5				28.1	22.5	3	4.5	24 vac
ESDDR-15	15				31.3	25.0	3	5.0	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	35.0	6	3.5	24 vac
ESDDR-28	27				56.3	45.0	6	4.5	24 vac
ESDDR-30	30				62.5	50.0	6	5.0	24 vac
ESDDR-33	33				68.8	55.0	6	5.5	24 vac
ESDDR-39	39				81.3	65.0	6	6.5	24 vac
ESDDR-42	42				87.5	70.0	6	7.0	24 vac
ESDDR-45	45				93.8	75.0	9	5.0	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	105.0	9	7.0	24 vac
ESDDR-66	66				137.5	110.0	12	5.5	24 vac
ESDDR-78	78				162.5	130.0	12	6.5	24 vac
ESDDR-84	84				175.0	140.0	12	7.0	24 vac
ESDDR-102	102					170.0	12	8.5	24 vac

Three Phase Amperage†

Model	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	1.0	24 vac
ESDDR-4.5	4.5	12.5	10.8	5.4	4.3	3	1.5	24 vac
ESDDR-5.5	6.0	16.6	14.4	7.2	5.8	3	2.0	24 vac
ESDDR-7.5	7.5	20.8	18.0	9.0	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	13.0	3	4.5	24 vac
ESDDR-15	15	41.6	36.1	18.0	14.4	3	5.0	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	75.0	64.9	32.5	26.0	6	4.5	24 vac
ESDDR-30	30	83.3	72.2	36.1	28.9	6	5.0	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	7.0	24 vac
ESDDR-45	45	124.9	108.3	54.1	43.3	9	5.0	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	7.0	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			101.0	80.8	12	7.0	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 and 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 seals depths.

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

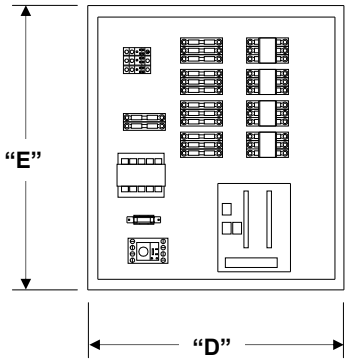
Do not install near variable frequency drives, electromagnetic equipment or motors.

SCR RELAY CLEARANCE NOTE

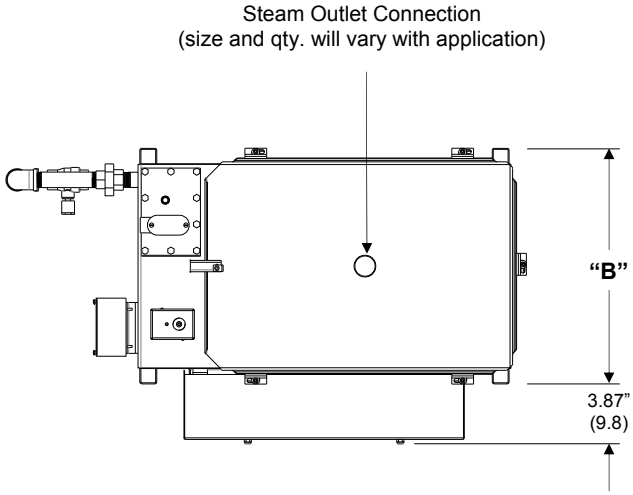
If SCR modulating control is supplied on a non-factory mounted control panel you will need to leave 12” clearance on the sides of the panels where the SCR heat sinks are located.

Location & Mounting

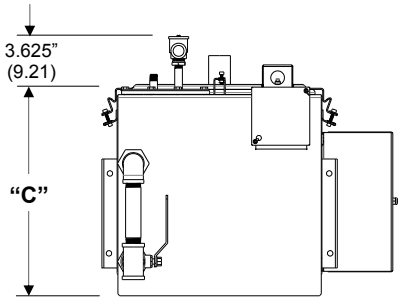
NEMA–12 Humidifier Control Cabinet
(reference control cabinet notes)



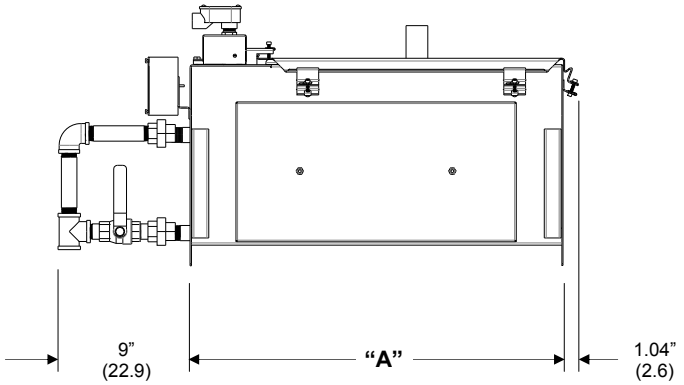
1. Door has been removed from the drawing for clarity.
2. Control cabinet is shipped loose for field mounting unless optional factory mounting is specified.
3. Dimension "F" = Control cabinet depth.



Top View



Front View



Right Side View

Unit Dimensions						
Model	Dim. "A"		Dim. "B"		Dim. "C"	
	inches	cm	inches	cm	inches	cm
ESDDR-3 thru 19.5	17.68"	44.9	16.21"	41.2	13.84"	35.2
ESDDR-22 thru 63	25.68"	65.2	16.21"	41.2	13.84"	35.2
ESDDR-66 thru 102	34.18"	86.8	20.46"	52.0	13.84"	35.2

Control Cabinet Dimensions						
Model	Dim. "D"		Dim. "E"		Dim. "F"	
	inches	cm	inches	cm	inches	cm
ESDDR-3 thru 19.5	14.00	35.6	16.00	40.6	6.00	15.2
ESDDR-22 thru 63	20.00	50.8	20.00	50.8	7.00	17.8
ESDDR-66 thru 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

Location & Mounting

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, condensation, and excessive back pressure 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 the injection tube 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.

Tube assembly must be installed in a location that allows for laminar air flow across entire grid. A minimum velocity of 350 feet per minute is required to avoid saturation and excessive fog travel.

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

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

The humidifier should be mounted dead level in both directions. PURE Humidifier Co. recommends that the humidifier be mounted using one of the following two methods: (ref. pages 8 & 9).

1. Mounted on the wall. PURE Humidifier Co. offers wall mounting brackets as an option. The wall bracket installation sheet should be followed when installing the brackets.

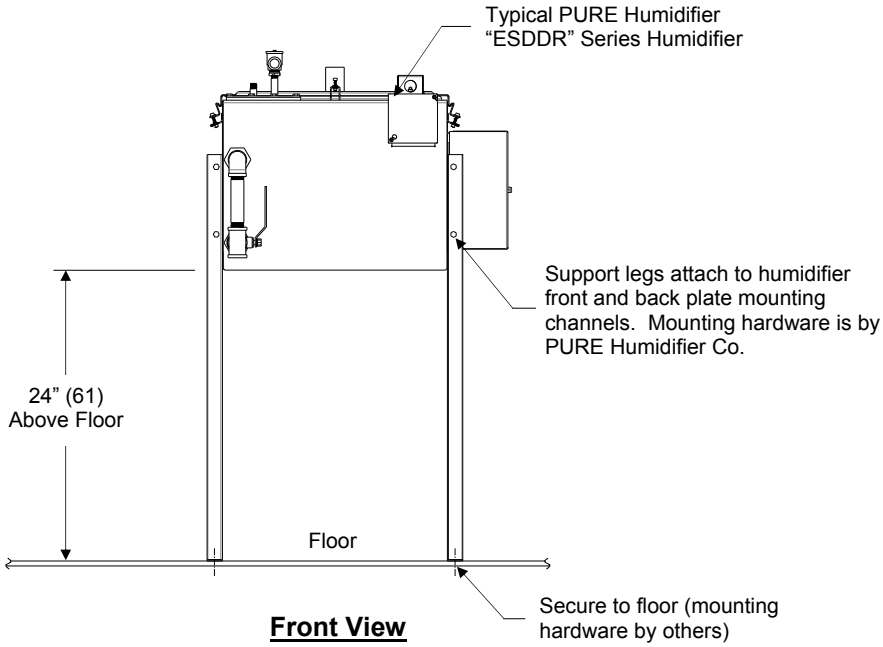
2. Mounted off the floor with floor legs. PURE Humidifier Co. offers floor support legs as an option. The humidifier is mounted 24” (61 cm) up from the floor. Floor legs can be constructed from 1-1/4” x 1-1/4” x 1/4” angle iron. The support legs should be secured to the humidifier side mounting holes.

Drain Pan Mounting

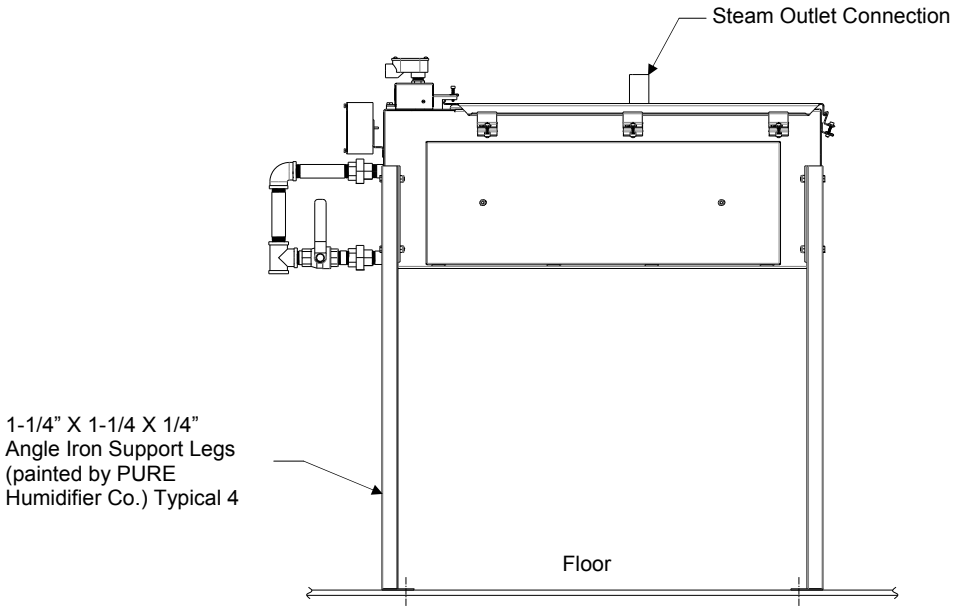
A drain pan is an additional safety feature which may be required to be supplied in the field. In a proper humidifier installation, a drain pan is not required. However, if the humidifier and injection tube are located in or above an area that contains valuable equipment or is a water sensitive area, 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 sufficient to retain sudden drainage of the humidifier’s contents. The pan should be drained to a sanitary drain. See page 10 for Drain Pan Mounting details.

Mounting Applications

Support Legs



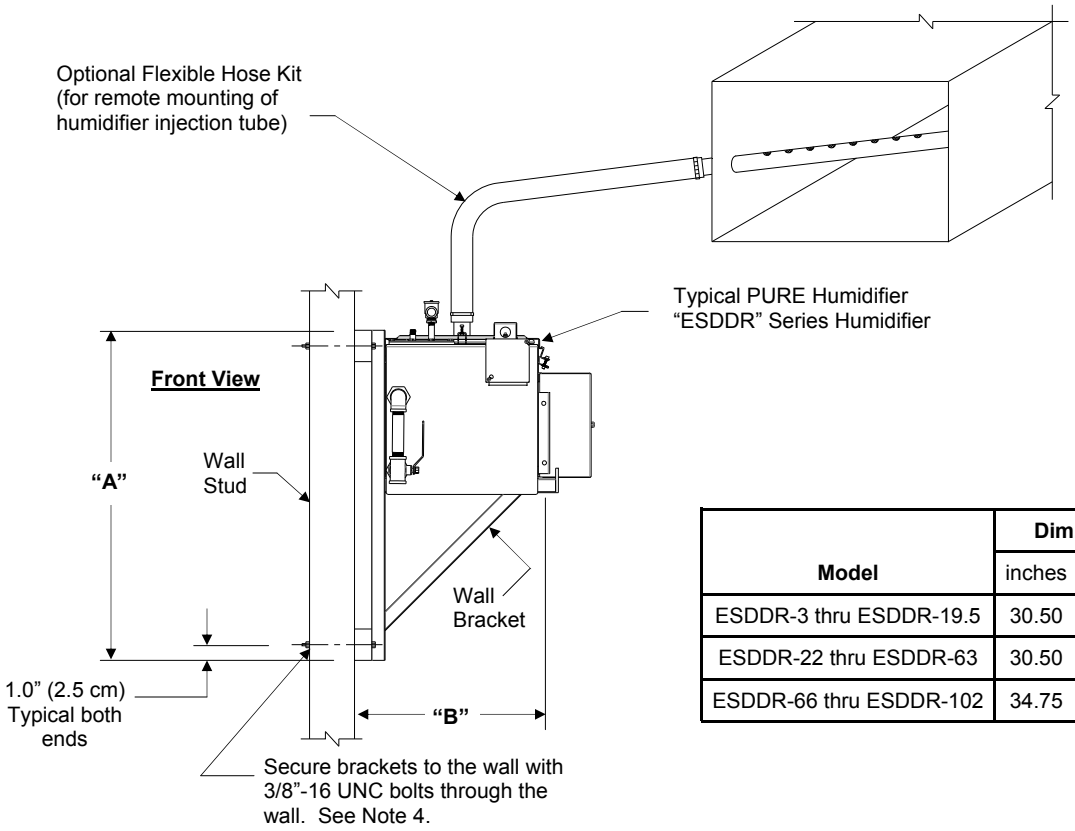
Front View



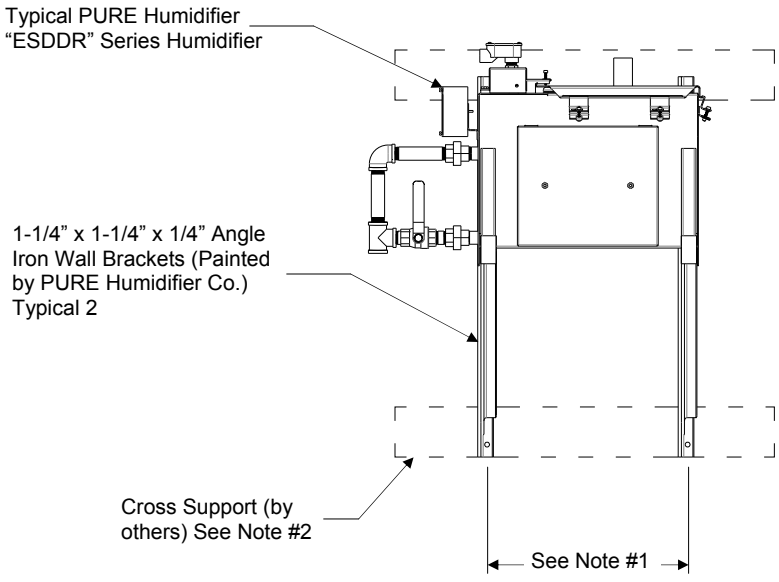
Right Side

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



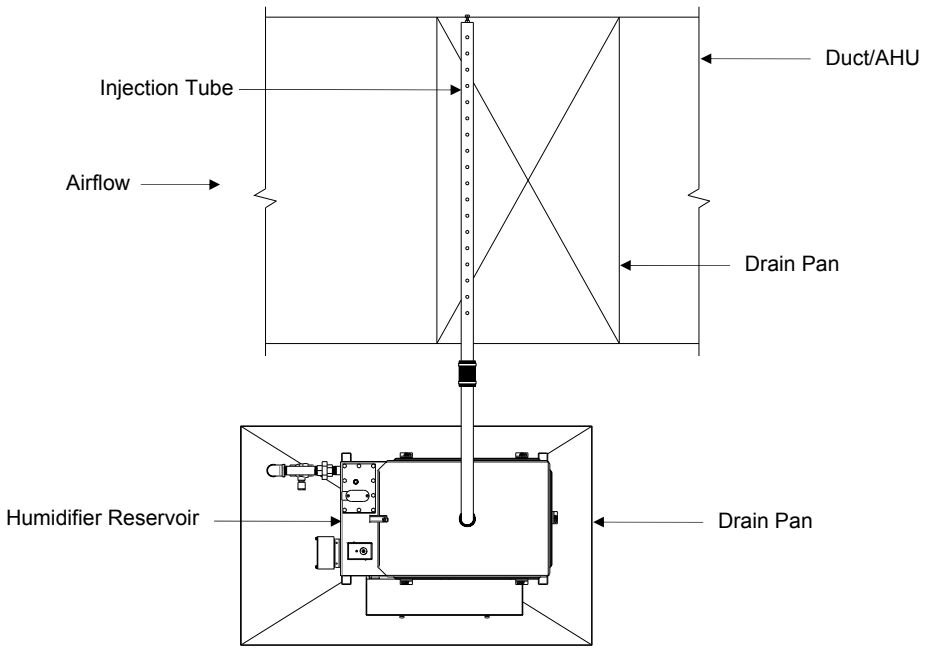
NOTES:

1. Secure brackets to wall support studs. Attachment bolts must be secured through the 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.



Humidifier Reservoir and Injection Tube Plan View

Piping

REMOVE INTERNAL PACKING MATERIAL WRAPPED AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

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: 35-50 psi

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 50 psi (3.5 Bar), the valve may not shut off.

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.

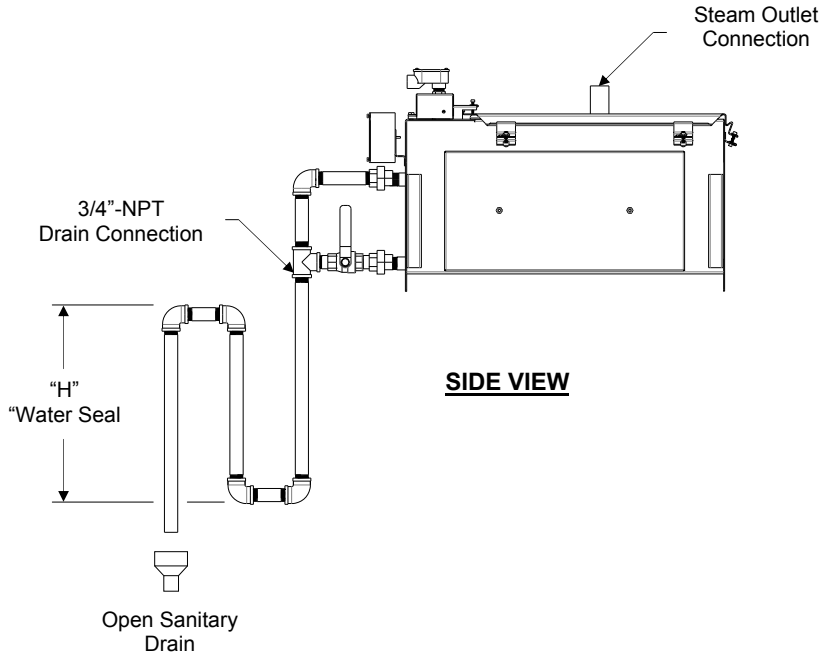
The drain piping should be stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.

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



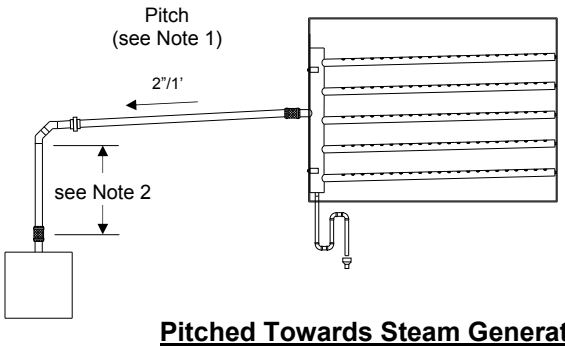
Water Seal Height Δ		
Unit Size	“H”	
Total KW	inches	cm
3 - 19.5	8	20
22 - 33	11	28
39 - 49.5	17	43
58.5 - 102	19	48
Δ The water seal height may have to be increased if excessive duct static pressure exists.		

NOTES

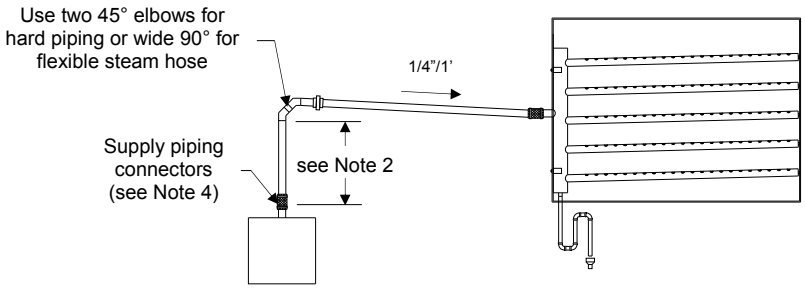
1. All drain piping is by others.
2. Drain and overflow connection requires field piping.
3. Do NOT use PVC or other plastic piping that is not rated for 220°F or higher.

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

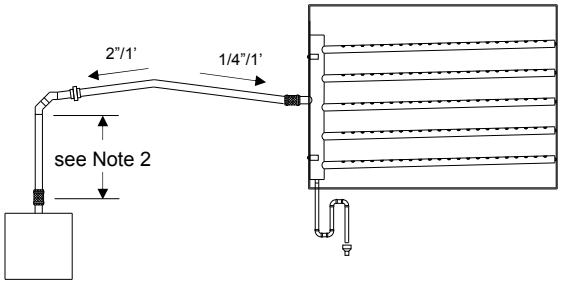
Steam Supply Piping Examples



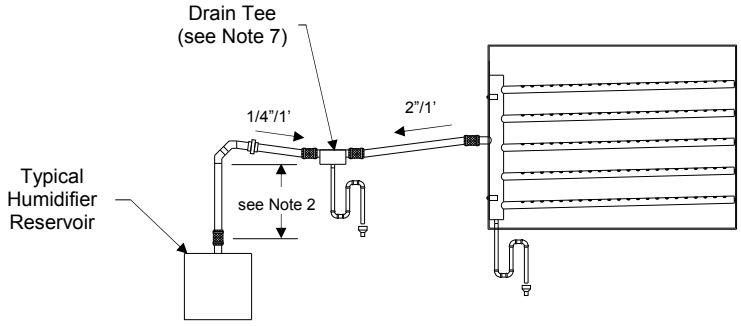
Pitched Towards Steam Generator



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, 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

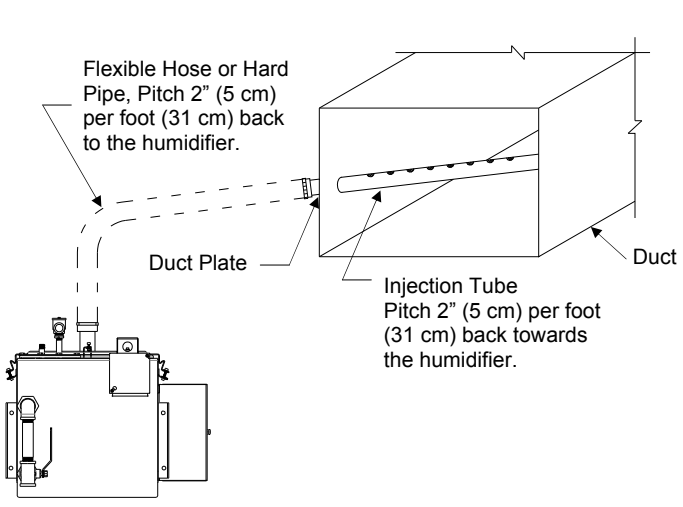
Single injection tubes should be installed in the center of the duct. Multiple injection tubes should have the tubes staggered within the duct as shown in the illustration.

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).

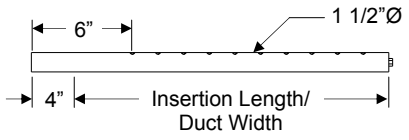
Install the injection tube with the steam ports injecting steam up. NOTE: If narrow ducts (6” / 15 cm or less, in height) are utilized, install the tube with the steam ports injecting with the air flow at a 45° angle.

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

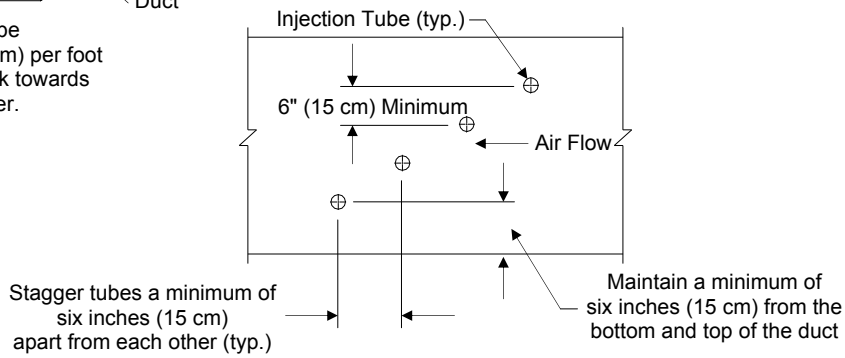
For Fast-Pac or Insty-Pac multiple tube assemblies please reference their O&M for complete installation details.



Tube Detail

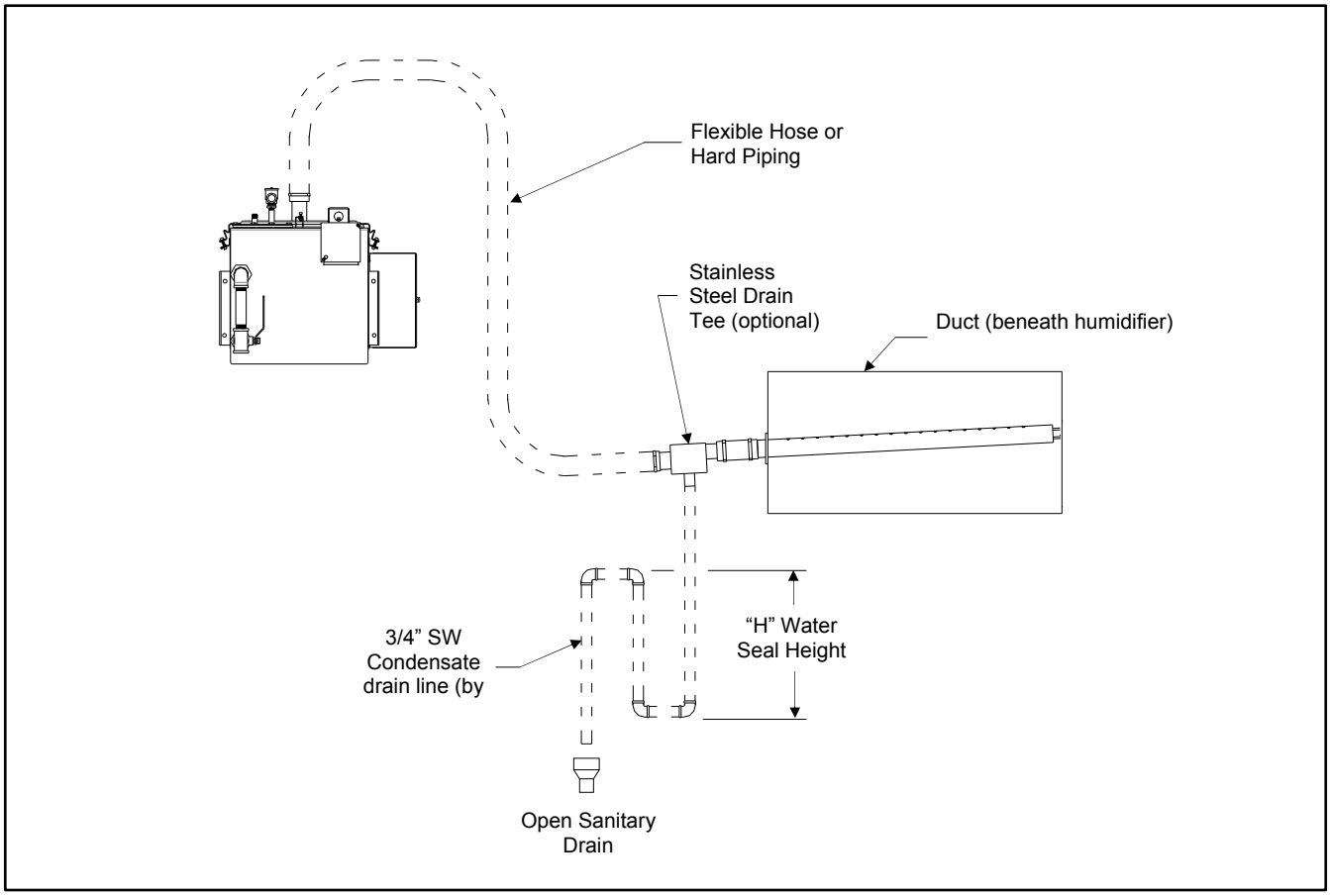


Multiple Injection Tube Application



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

For installations using deionized, demineralized, or reverse osmosis water fed humidifiers, 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

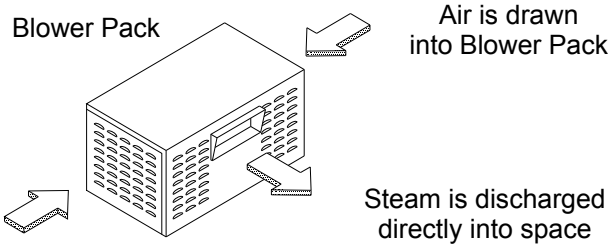
Note: Maximum length of flexible hose is 10’. Longer runs will cause sagging of the line and create low spots.

Blower Pack

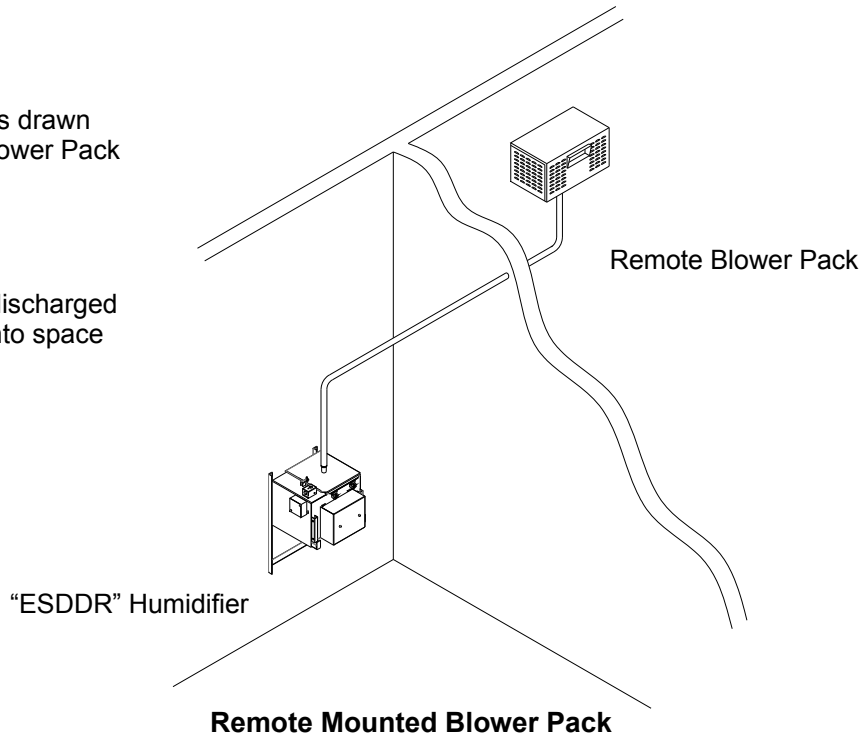
In applications where a ducted air system is not available, PURE offers the optional Blower Pack. The Blower Pack contains a two-speed adjustable blower that moves the air over the steam discharge outlet and disperses the steam directly into the space (see Fig. 1).

Mounting

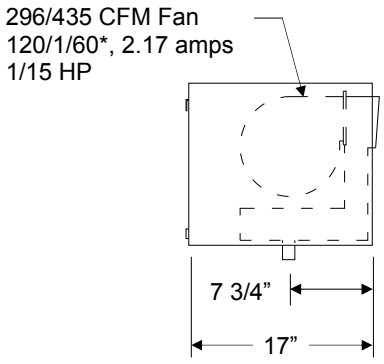
The Blower Pack may be remote-mounted up to ten feet away from the “ESDDR” humidifier (see Fig. 2).



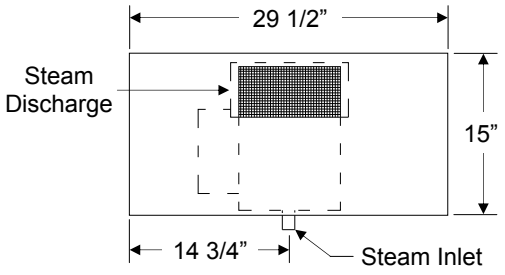
Blower Pack
Fig. 1



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)

Blower Pack

Locating Blower Pack

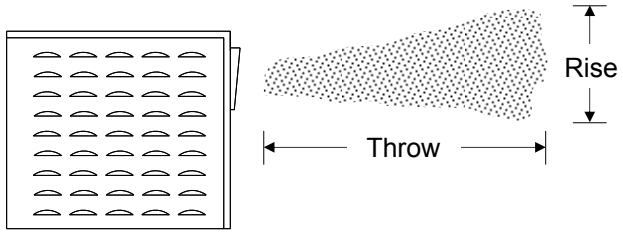
The distance that visible steam will travel after leaving the Blower Pack is dependent upon the relative humidity in the room and the capacity of the humidifier. If this visible steam comes in contact with any solid object (walls, beams, machinery, etc.) it may form condensate and drip. Refer to Fig.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

NOTE: One Blower Pack can only be used per 33 KW.

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

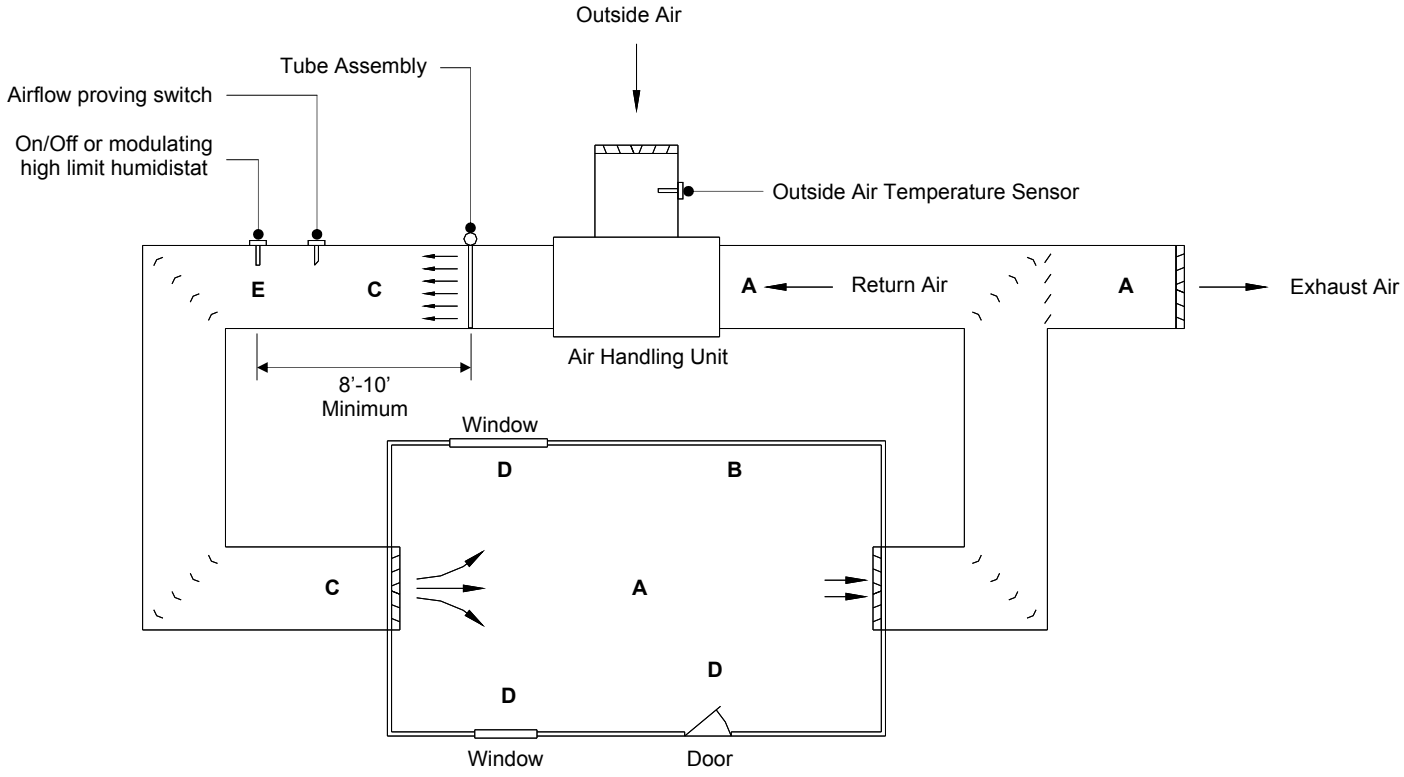
Visible Steam Rise & Throw		**Humidifier Model 33-102 kW**									
		33 kW (1)		42 kW (2)		49.5 kW (2)		66 kW (2)		102 kW (3)	
Blower Pack Qty. (-)		feet	meters	feet	meters	feet	meters	feet	meters	feet	meters
50% RH	Rise	8.0	2.4	4.0	1.2	5.5	1.7	8.0	2.4	8.0	2.4
	Throw	23.0	7.0	16.0	4.9	18.0	5.5	23.0	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 no locate humidistats or sensors near doors or windows.
E. Best location for on/off or modulating high limit.

Pre-Startup Checklist

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, 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 ten feet downstream from the humidifier tube(s). Any other control sensors should be at least ten 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 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 35-50 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 attachment for proper outlet steam piping from the generator to the tube(s). **Any horizontal to vertical 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:_____

Start-Up Procedure

Start-Up Procedure

_____ 1. Make sure the electric power to the humidifier is shut off.

_____ 2. Close the humidifier manual drain ball valve (located on the left side of the humidifier evaporating chamber faceplate).

_____ 3. Turn the electric power "on" to the humidifier. The display on the INTAC® controller should illuminate "Normal Operation".

_____ 4. Set menu 101 "RH Setpoint" to the lowest setting (no call for humidity). If 100 menu shows "No Parameters Available" the procedure must be done through the Building Management System.

_____ 5. Open the water supply on/off control valve by others and allow the humidifier evaporating chamber to fill to the proper level.

_____ 6. After the humidifier is full of water, menu 004 will read "FULL".

_____ 7. Verify the low water safety switch by closing the water supply, opening the drain valve and verifying that the low voltage pilot relay within the control cabinet de-energizes when the water level is dropped below the low water shut off switch (you can hear the relay switch "out"). Menu 004 should now read "LOW"; this indicates that the low water safety circuit is operational. The pilot relay opening should shut down the humidifier steam control valve actuator.

_____ 8. Close the drain valve, open the water supply valve, and allow the humidifier to fill to the proper level.

_____ 9. Make sure all the optional safety switches are satisfied (airflow proving switch, high-limit humidistat, etc.).

_____ 10. Turn menu 101 "RH Setpoint" up to a call for humidity or set the building management demand to 100%.

_____ 11. The heater(s) should energize on a call from the humidistat or BMS.

_____ 12. Check operation of optional field-installed safety switches (air flow 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 steam control valve whenever one or more of the optional safety switches create an open circuit.

_____ 13. Check heater amperage draw by testing and recording the values in each phase. Readings should match the factory heater nameplate.

_____ 14. Inspect installation for leaks by operating humidifier at a full rolling boil. This may take up to 15 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 or side-entry plate, reseat gasket and replace cover or side-entry plate. A small amount of adhesive (super glue, gorilla glue, spray adhesive, etc.) to hold the gasket in place while repositioning the cover or side-entry plate will aid in this process.

_____ 15. 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 inch/pounds.

Signature:_____ Date:_____

Modulating Control Descriptions

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 ½ a second and off for ½ a second.

Time Cycle Modulation

Time Cycle Modulation provides 0-100% modulating control of humidifier output by cycling the immersion heaters on and off according to a field-adjustable cycle time between 0-100%. The cycle rate is adjustable between 30 seconds and 4 minutes, depending upon the application and control tolerances desired e.g. for a one-minute time cycle at 50% power, the contactor will be on for ½ a minute and off for ½ a minute. Watt-cycle rotates heater usage on multiple heater units to extend heater life. A slower cycle rate extends the contactor life, whereas faster cycle rates improve control response time.

Trouble Shooting

- **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.
	Faulty humidistat	Verify humidistat electric or pneumatic signal. Compare to diagram or nameplate label ratings.
	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.
	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.

Maintenance Instructions & Cleaning

The "ESDDR" Series 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 Make-Up Float Valve	Check to make sure the float valve is operating properly. If the valve appears to continually fill, check the valve adjustment or 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 (air flow, high-limit)	Check to make sure the safety interlocks (air flow, 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 the correct amperage.
Humidifier Cover/Tank	Inspect for any leaks. Repair as required. Remove the heat exchanger and remove mineral deposits from the floor of the humidifier reservoir. If excessive mineral 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". Replace periodically.

Cleaning Instructions

All humidifier tanks should be cleaned manually from the side entry plate or cover. Remove all loose solids with a wet vacuum, stainless steel brush, scouring pad, putty knife and/or bucket. Heaters should also be cleaned and loose build-up removed by hand (if applicable). After removal of solids and replacing the cover you may wish to add a de-scaling solution. DO NOT use Hydrochloric acid-based de-scalers; this will corrode stainless steel. PURE Humidifier Co. recommends the use of a vinegar, citric acid, diluted phosphoric acid or diluted nitric acid-based cleaner. Follow all precautions on the cleaner packaging. Some cleaners will give off overwhelming and noxious odors, so make sure there is proper ventilation in the working area and the cover is removed so that fumes are not spread throughout the building. After cleaning the tank, flush the tank multiple times to remove any remaining acid. Drain tank completely and allow the tank to air dry for a few hours. This will ensure that the outer protective layer of the stainless steel will passivate and ensure corrosion resistance.

Heater Plate Gasket Replacement Instructions

WARNING
Disconnect the humidifier power and allow the unit to cool prior to servicing. Drain water level below the level of the exchanger being serviced.

- 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.

- 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.

- 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.

- 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.

- 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.

- Reinstall the heat exchanger into the humidifier.

- Loosely install all of the exchanger cover clamps.

- Using a 7/16" torque wrench set at 60 inch/pounds tighten all clamp screws.

- In a reverse manner, reconnect all electrical connections. Fill humidifier with water and check for leaks.

- 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 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 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.

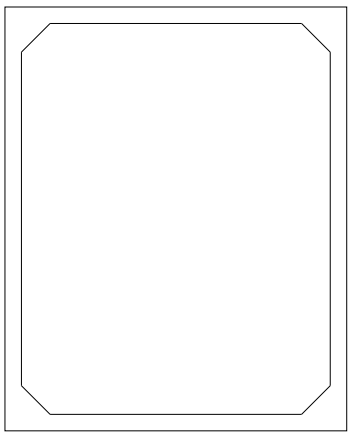


Fig. A
Plan View of Humidifier

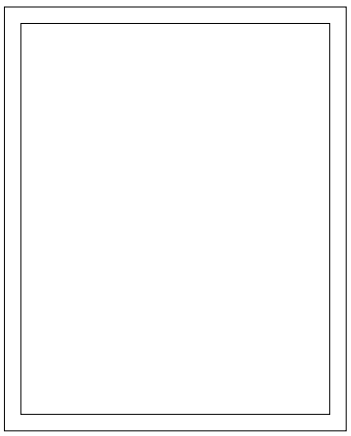


Fig. B
Plan View of Humidifier

Section View of Gasket

Bottom View of Gasket

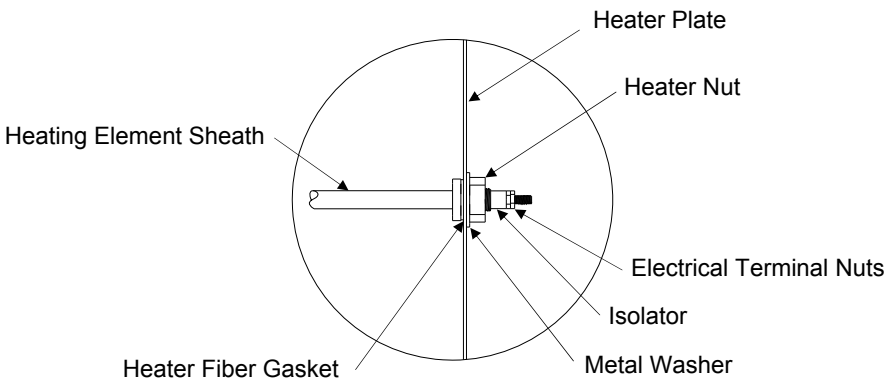
Fig. C

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 Screwdriver
Wire Stripper
Wire Crimper

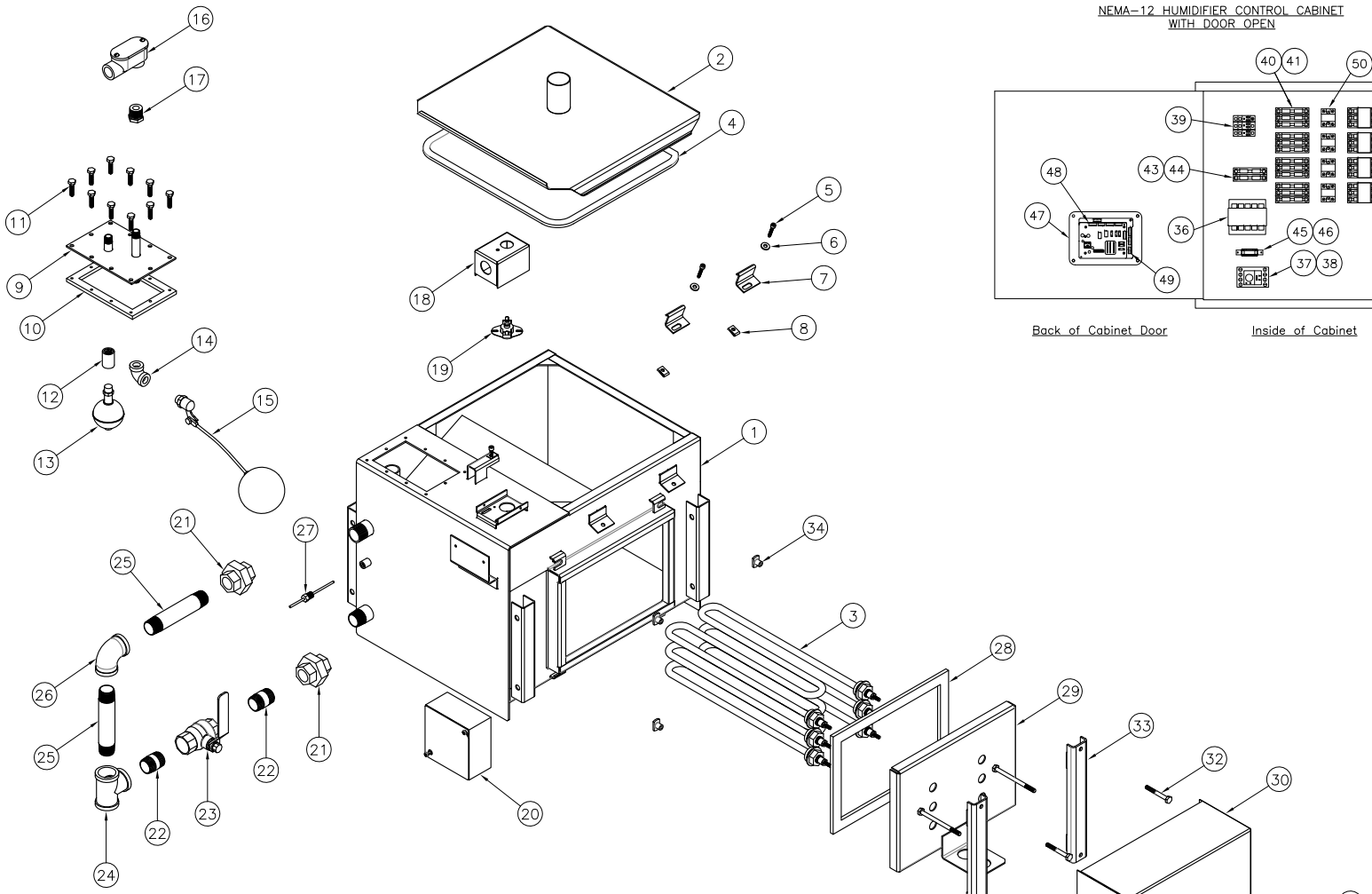
Torque List	
Cover Bolts	18 inch/pounds MAX
Hose Cuff Screws	35-40 inch/pounds MAX when hot
Side Entry Exchanger Bolts	80 inch/pounds MAX
Heater Nut	18-20 **foot/pounds***
Heater Electrical Terminal	35 inch/pounds
* Use a pliers to hold heater sheath from twisting.	

Heater Assembly Sectional Detail



Maintenance Notes

Maintenance Performed	Date	By



Title: ESDDR SERIES ASSEMBLY			
Scale: No Scale	Date: August 13, 2013	Drwn: S.A.M.	Dwg No: 1322

PURE Humidifier

PURE Humidifier Co. "ESDDR" Series

Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty.
1	ESDDR Reservoir Assembly	A	1	
2	ESDDR Reservoir Cover Assembly	A	1	
3	Immersion Heating Element(s)	A	A	
4	Cover Gasket	15520	1	
5	Cover Clamp Screws	15522	A	
6	#12 SAE Zinc Washer	n/a	A	
7	Cover Clamp	15930	A	
8	10-24 U Nut	15524	A	
9	DDR Float Plate Assembly	99134	1	
10	DDR Float Plate Gasket	05052	1	
11	10-32 x 3/4" Hex Bolt	15523	10	
12	1/4" Coupling 304 SST	07001	1	
13	Low Water Float Switch	15048	1	
14	1/4" 90 Elbow 304 Stainless Steel	07002	1	
15	Water Fill Float Valve and Ball 316 Stainless Steel	A	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	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 Stainless Steel	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	Heater Plate Gasket	A	1	
29	Heater Plate	A	1	
30	Heater Cover	A	1	
31	Heater Cover Nut	15865	2	
32	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	A	
33	U-Clamp Bar Assembly	99136	A	
34	1/4"-20 Weld Nut	15702	A	
35	Control Enclosure	A	1	
36	Step-Down Transformer	A	1	
37	Time Delay On Relay	12022	1	
38	Relay Base	12020	1	
39	Power Distribution Block	A	A	
40	Fuse Block	A	A	
41	Heater Fuses	A	A	
42	Heater Contactors	A	A	
43	Primary Fuse Holder	A	1	
44	Primary Fuse	A	1	
45	Secondary Fuse Holder	12085	A	
46	Secondary Fuse	A	A	
47	INTAC® Microprocessor	A	1	
48	7 Pin Terminal Connector	12310	A	
49	6 Pin Terminal Connector	12309	A	
50	SCR Relay	A	A	
51	SCR Heat Sink	A	A	

NOTES/CODES:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment

When ordering replacement or spare parts please have Model and Serial numbers. 9/18/2013

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

PURE Humidifier

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