PURE Humidifier

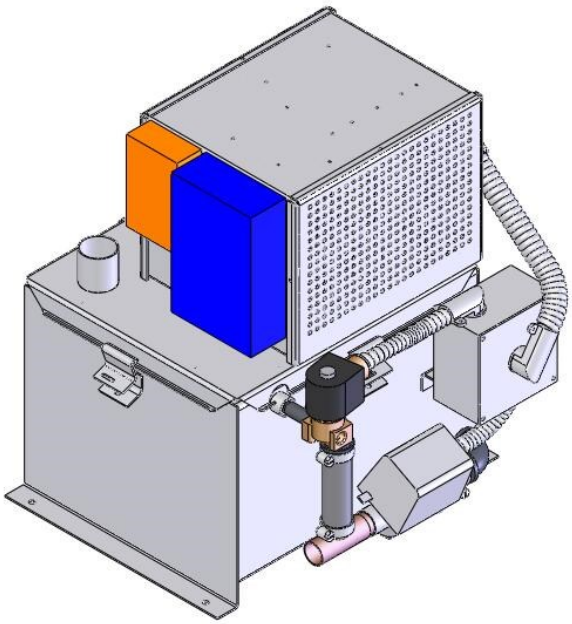
READ AND SAVE THESE INSTRUCTIONS

Standard Water

"ER" Series Electric Humidifier

Installation Instructions

Operation and Maintenance Manual



Our results are comforting

Form No: EROM-10-19

Introduction

To the user of PURE Humidifier Co.'s Electric Humidifiers

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co. Electric 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 "ER" Series Humidifier utilizes a Tri-Probe conductive-type water control system, which is designed for use with standard (hard or soft) tap water. Use of deionized, demineralized, or reverse osmosis water will cause a failure of the water level control system and void the warranty.

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

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

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

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

For indoor installation only.

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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.

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.

PURE Humidifier

Capacity & Weights
Electrical Specifications

Capacities & Weights

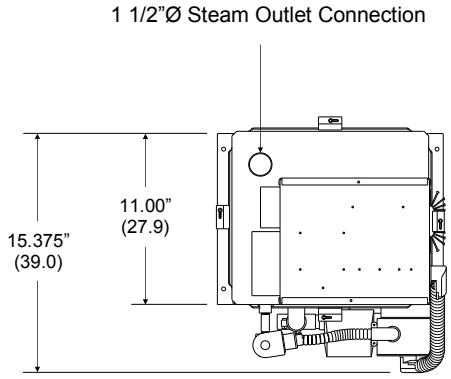
Standard Water Unit Model No.	Steam Output Capacity †		KW	Humidifier Reservoir Weight Empty		Full	
	lbs/hr	kg/hr		lbs	kg	lbs	kg
ER-1	3	1.4	1	42	19	70	31.4
ER-3	9	4.1	3	42	19	70	31.4
ER-5	15	6.8	5	42	19	70	31.4
ER-6	18	8.2	6	42	19	70	31.4
ER-7	21	9.5	7	42	19	70	31.4

† The above capacities are based on 100% nominal 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. This can also be affected by makeup water temperature, voltage variations, carryover losses, heater resistance tolerance, etc.

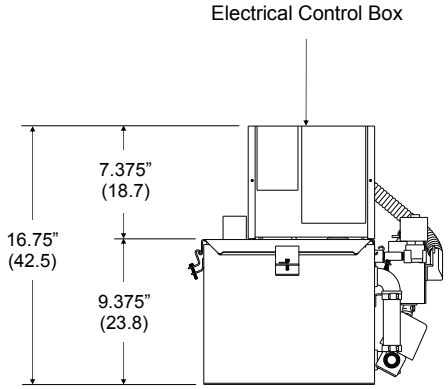
Single Phase Amperage*

Standard Water Unit Model No.	Unit KW	120V	208V	240V	480V	600V	No. of Heaters	Heater KW	Control Circuit Voltage
ER-1	1	8.3	4.8	4.2	2.1	1.7	1	1.0	24 vac
ER-3	3	25.0	14.4	12.5	6.3	5.0	1	3.0	24 vac
ER-5	5		24.0	20.8	10.4	8.3	2	2.5	24 vac
ER-6	6		28.8	25.0	12.5	10.0	2	3.0	24 vac
ER-7	7				14.6	11.7	2	3.5	24 vac

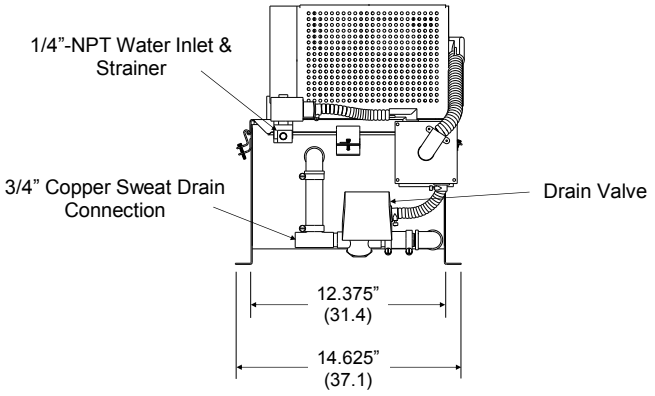
* Other voltages available upon request. Please consult factory for specific availability.



Top View

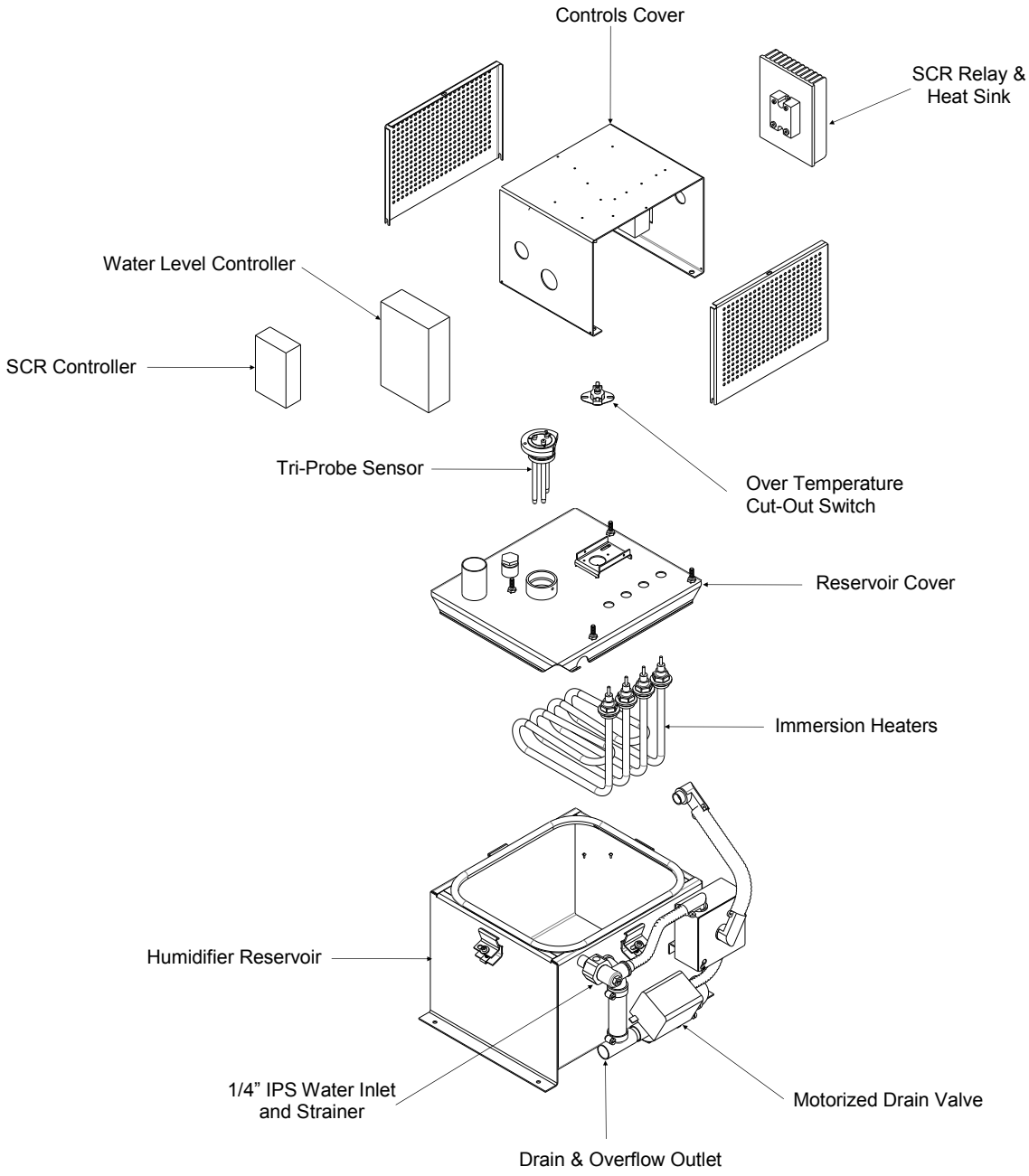


Front View



Right Side View

Humidifier Layout



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 uneven airflow area.

Avoid mounting the single-style injection tube closer than 8-10 feet (244-305 cm) upstream of objects that could become saturated and condense the steam (reference paragraph above).

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

Location of Controls

Fan Interlock Switch
PURE Humidifier Co. recommends the use of an airflow proving switch or fan interlock to prove airflow prior to humidifier cooperation. Humidifier operation without airflow will result in over-saturation of the air stream. Airflow proving switches are available as optional equipment from your PURE Humidifier Co. representative.

High-Limit Humidistat
PURE Humidifier Co. recommends the use of a duct high-limit humidistat to prevent humidifier operation when the duct humidity level exceeds 85% relative humidity. Humidifier operation above 85% relative humidity can result in over-saturation of the air stream. High-limit humidistats are available as optional equipment from your PURE Humidifier Co. representative. The high limit humidistat should be 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube.

Smoke Detectors and Temperature Sensors
Smoke detectors should be upstream from the humidifier injection tube.

Temperature sensors should be located 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube, or past any visible fog travel that may be greater than this distance.

Injection Tube Installation

The injection tube should be installed in the center of the duct. See Injection Tube and Flexible Hose Installation on page 7 for details.

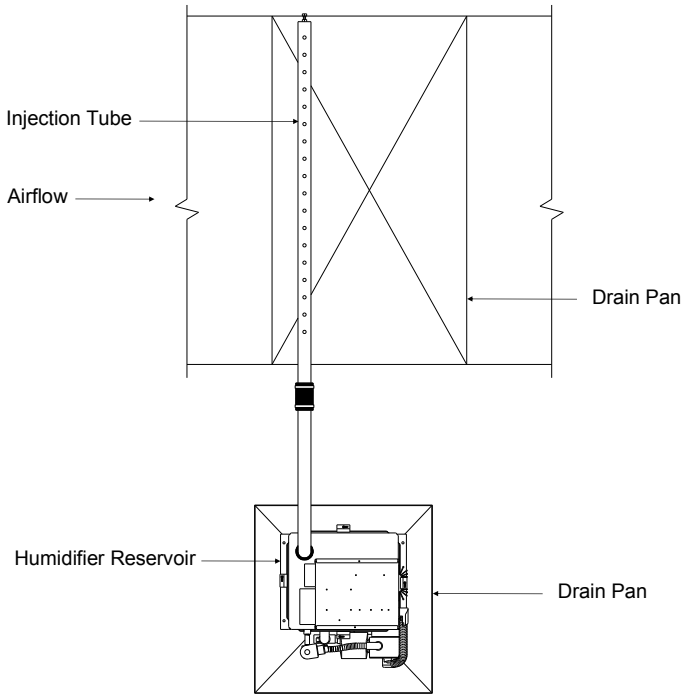
Injection tube should be pitched 2 inches (5 cm) per foot (31 cm), back to the humidifier. If proper pitch cannot be maintained, or the injection tube is mounted lower than the humidifier, a drain “tee” will be required.

Install the 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 airflow slightly (2 o’clock position).

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

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 sufficient to retain sudden drainage of the humidifier's contents. The pan should be drained to a sanitary drain.



Humidifier Reservoir and Injection Tube Plan View

Injection Tube and Flexible Hose

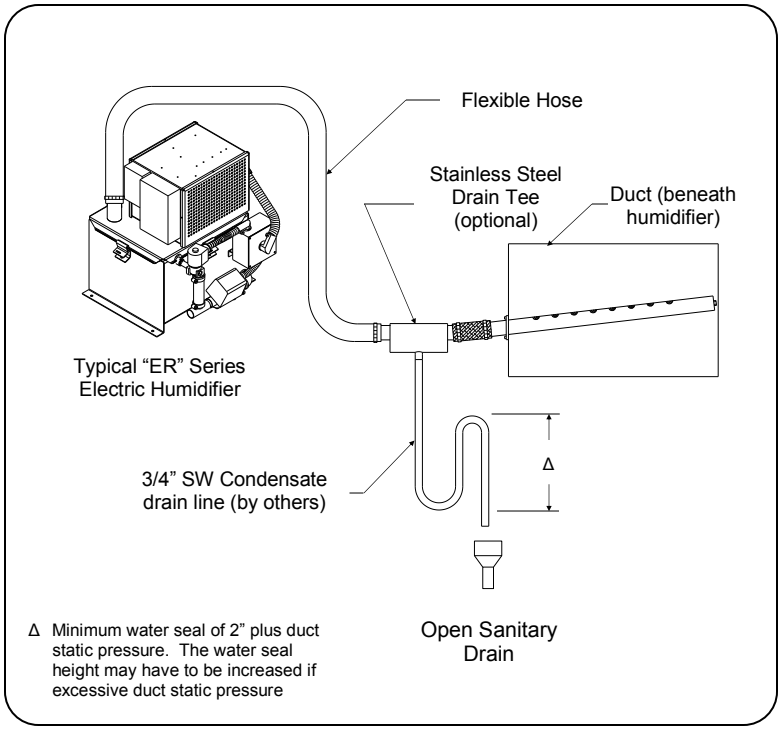
Installation

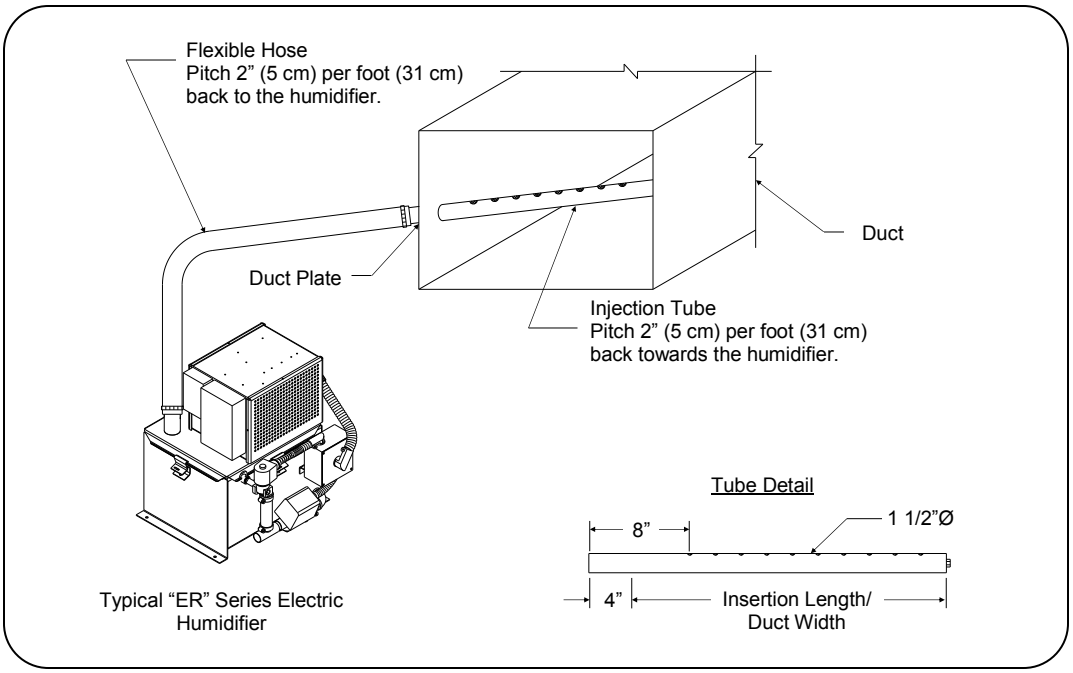
Injection tube shall be installed in the center of the duct. Hose and injection tube should be pitched back to the humidifier two inches (5 cm) per foot (31 cm). If proper pitch cannot be maintained, or the injection tube is mounted lower than the humidifier, a drain "tee" will be required (reference drain "tee" illustration).

Install the 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 slightly with the airflow (2 o'clock position).

The hose connects to the injection tube and humidifier with stainless steel hose clamps (by PURE Humidifier Co.).

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





Water Supply Piping

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

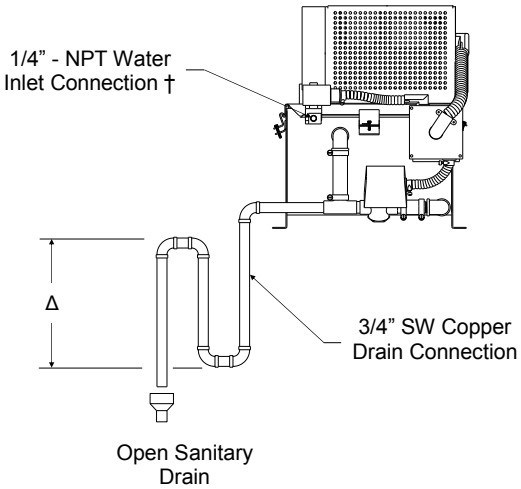
Cold or hot standard tap water can be supplied to the humidifier. A minimum water pressure of 35 psi (2.4 Bar) should be maintained to provide the proper water level within the humidifier. **DO NOT** exceed the maximum acceptable water pressure of 65 psi (4.5 Bar). If the water pressure is above 65 psi (4.5 Bar) a pressure reducing valve should be installed. Failure to do so may cause water to overflow from cover.

The humidifier has a factory built-in 1.5" (4 cm) air gap between the water inlet and the overflow. Local codes should be checked to see if the addition of a vacuum braking device is required. Water connection is made on the side of the humidifier with 1/4" NPT piping.

Drain Piping

The drain piping should be copper or stainless steel. The use of PVC piping is not recommended; the humidifier water temperature will cause the PVC to soften and fail. Use a drain tempering kit before transition to PVC.

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.



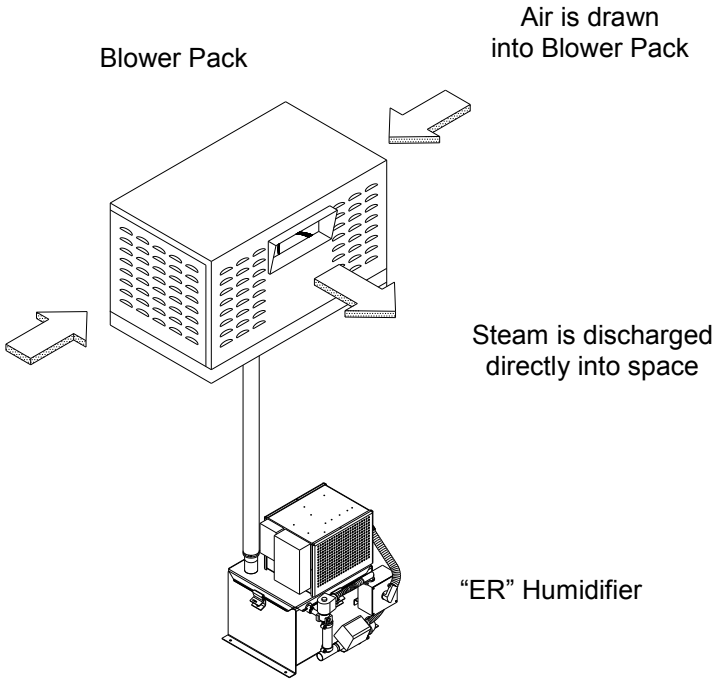
NOTES

1. All drain piping is by others.
2. Drain and overflow piping are factory piped. One 3/4" SW copper drain connection is required.
3. Do NOT use PVC or other plastic piping that is not rated for 220°F or higher.

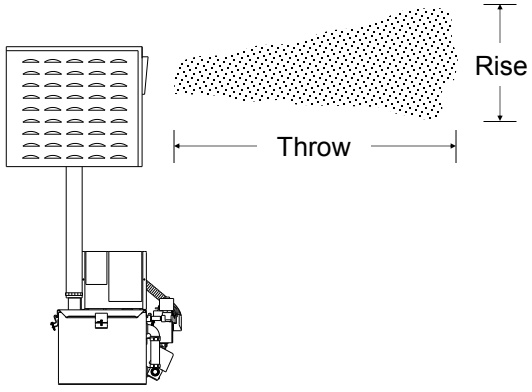
Δ Minimum water seal of 2" plus duct static pressure. The water seal height may have to be increased if excessive

Optional 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).



"ER" With Optional Blower Pack
Fig. 1



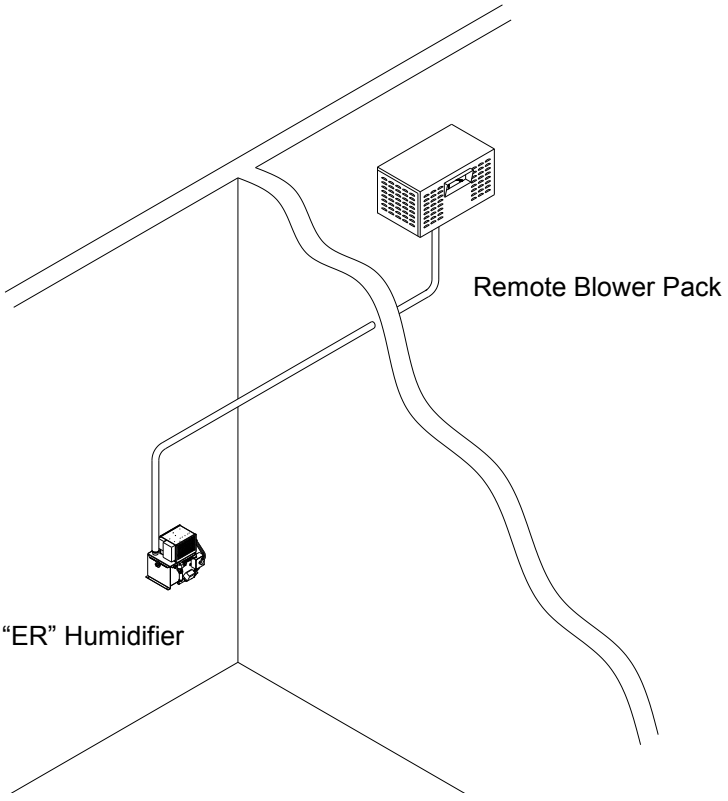
Visible Rise and Throw
Fig. 3

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 Table 4 (Table 4 is located on page 12) for data on visible steam travel. This will aid you in planning the location of the Blower Pack.

Remote Mounting

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



Remote-Mounted Blower Pack
Fig. 2

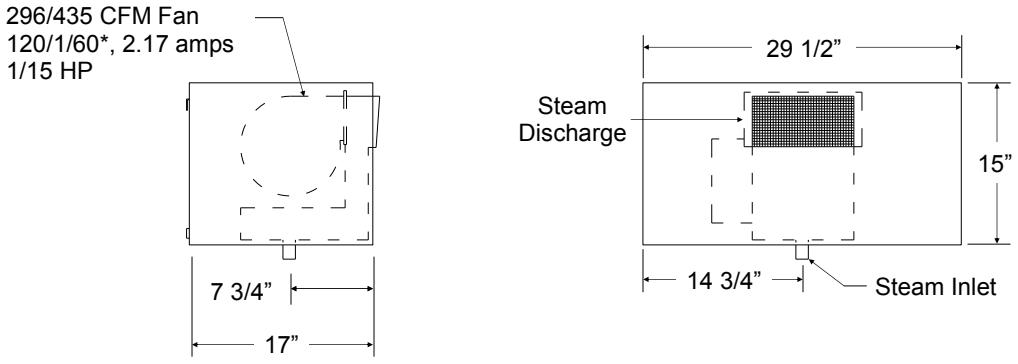
Locating Blower Pack

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 (Fig. 3 is located on page 11) and Table 4 for data on visible steam travel. This will aid you in planning the location of the Blower Pack.

Visible Steam Rise & Throw		Humidifier Model				
		ER-1	ER-3	ER-5	ER-6	ER-7
50% RH	Rise (ft)	1’	1’	1’	2’	2’
	Throw (ft)	8’	8’	8’	10’	10’
60% RH	Rise (ft)	2’	2’	2’	3’	3’
	Throw (ft)	13’	13’	13’	14’	14’

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.

Table 4



Left Side View **Front View**

Optional Blower Pack Dimensions
Fig. 5
Blower Pack weight is 60 lbs (27.2 kg)
* Blower requires a separate 120/1 circuit (by others)

Pre-Startup Checklist

Before starting the "ER" 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 then 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.

_____ 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. Any other control sensors should be at least 10 feet downstream from the humidifier tube. Smoke detectors should not be installed downstream of the humidifier tube. 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 35-65 psi. There should be at least 5 feet of metal pipe and check valve between the tank and any plastic pipe.

_____ 6. PIPING: Steam Outlet - Refer to attachment 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:_____

Non-INTAC® Start-Up Procedure

Start Up Procedure

_____ 1. With the power "off", set the switch on the LC-942 level controller to the "Stand-by" position.

_____ 2. Make sure the manual drain valve lever (located on the side of the drain valve) is in the “automatic” position.

_____ 3. Turn the controlling humidistat to the lowest setting (no call for humidity).

_____ 4. Turn the electric power “on” to the humidifier. The “Power” LED light on the controller should be illuminated.

_____ 5. Set the switch on the control board to the "Normal" position.

_____ 6. Open the water supply on/off control valve (by others) and allow the humidifier evaporating chamber to fill to the proper level.

_____ 7. Make sure all the optional safety switches are satisfied (airflow proving switch, high-limit humidistat, etc.).

_____ 8. After the humidifier is full of water, the "Heat Ready" LED will illuminate. Turn the humidistat up to call for humidifier demand.

_____ 9. Verify the low water safety circuit by opening the drain valve. As the humidifier tank is draining, the "Water Level Full" and "Heater Energized" lights should go out when the low water level is reached; this indicates the low water safety circuit is operational.

_____ 10. Close the drain valve and allow the humidifier to fill to the proper level.

_____ 11. Once full the heater(s) should energize on a call from the humidistat.

_____ 12. 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”.

_____ 13. Check heater amperage draw by testing and recording voltage and amperage. Readings should match the factory heater nameplate.
Amps :_____

_____ 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, reseat gasket and replace cover. A small amount of adhesive (super glue, gorilla glue, spray adhesive, etc.) to hold the gasket in place while repositioning the cover 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 in-lbs.

Signature:_____ Date:_____

PURE Humidifier Co. "ER" Maintenance Instructions

The "ER" 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 buildup occurs, the maintenance schedule should be increased.

Inspect/Maintenance Item	Procedure to Follow
Water Fill Valve	Check to make sure the fill valve is operating properly. If the valve appears to continually fill, check the valve seat and seal (see Troubleshooting instructions).
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(s). 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.
Tri-Probe	**Turn power off before opening control box.** Remove Tri-Probe sensor from humidifier (set-screw and o-ring seal) and inspect for excessive mineral buildup. Inspect plastic housing for cracks. Probe ends should be cleaned and the probe assembly re-installed.
Drain Valve & Drain Piping	The drain valve seat and seal should be inspected and cleaned as required. The drain line and water seal should be inspected and cleaned to ensure freeflow of the overflow and drain line.
Flexible Hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a "set".

Cleaning Instructions

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

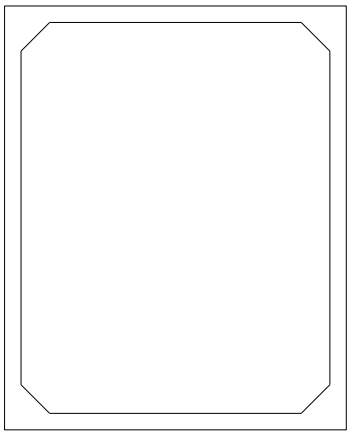
Softened Makeup Water
If utilizing softened makeup water, help eliminate buildup in the tank simply by adding a descaling solution. Contact your local representative for our easy to use, non-toxic PURE Clean descaling solution.

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

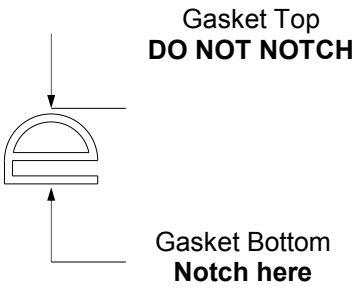
Cover Gasket Replacement Instructions

Installation

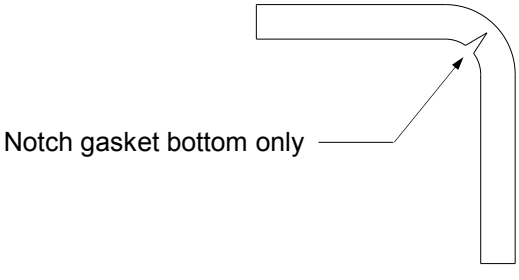
Remove cover. Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8” longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter, and seal the ends together with a small amount of silicone.



Plan View of Humidifier



Section View of Gasket



Bottom View of Gasket

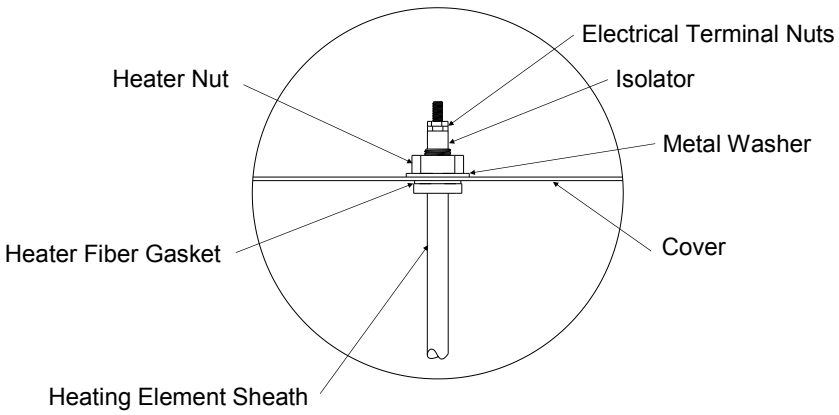
Troubleshooting

Problem	Possible Cause	Recommended Action
Humidifier will not heat	Blown heater fuse(s)	Check and replace.
	Control transformer not producing 24 vac control voltage	Check transformer output. Verify voltage across terminals #9 (hot) and #10 (comm).
	Safety controls open (airflow switch, high-limit, etc.)	Verify that all safety controls are completing the safety circuit.
	Over-temp switch	The level control circuit has interference or is damaged. Tri-probe wires should be run separate from power wiring. 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 humidity sensor	Verify voltage to and from humidity sensor.
	Faulty immersion heater	Check and verify heater voltage and amperage. Compare to diagram or nameplate label 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 manual drain lever on the front of the drain valve is closed.
	No power to the fill valve	Check for 24 vac across solenoid valve.
Humidifier will not stop filling or is short cycling	Fill valve stuck open	Check for 24 vac across solenoid valve. If no voltage, check for dirt under valve seat.
	Drain valve open	Close drain ball valve. If auto drain system is utilized, verify that the manual drain lever on the front of the drain valve is closed.
	Probes need cleaning	**Turn off power.** Remove Tri-Probe sensor and clean probe ends.
	Check probe wiring	**Turn off power.** Grey wire to probe #1 (shortest probe) Violet wire to probe #2 (middle probe) Blue wire to probe #3 (longest probe)
	Line noise or radio frequency	Shielded cable may be necessary.

Recommended Maintenance Tool List
7/16” Wrench
5/16” Nut Driver or Socket
11/32” Nut Driver or Socket
5/32” Nut Driver or Socket
Pliers
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
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

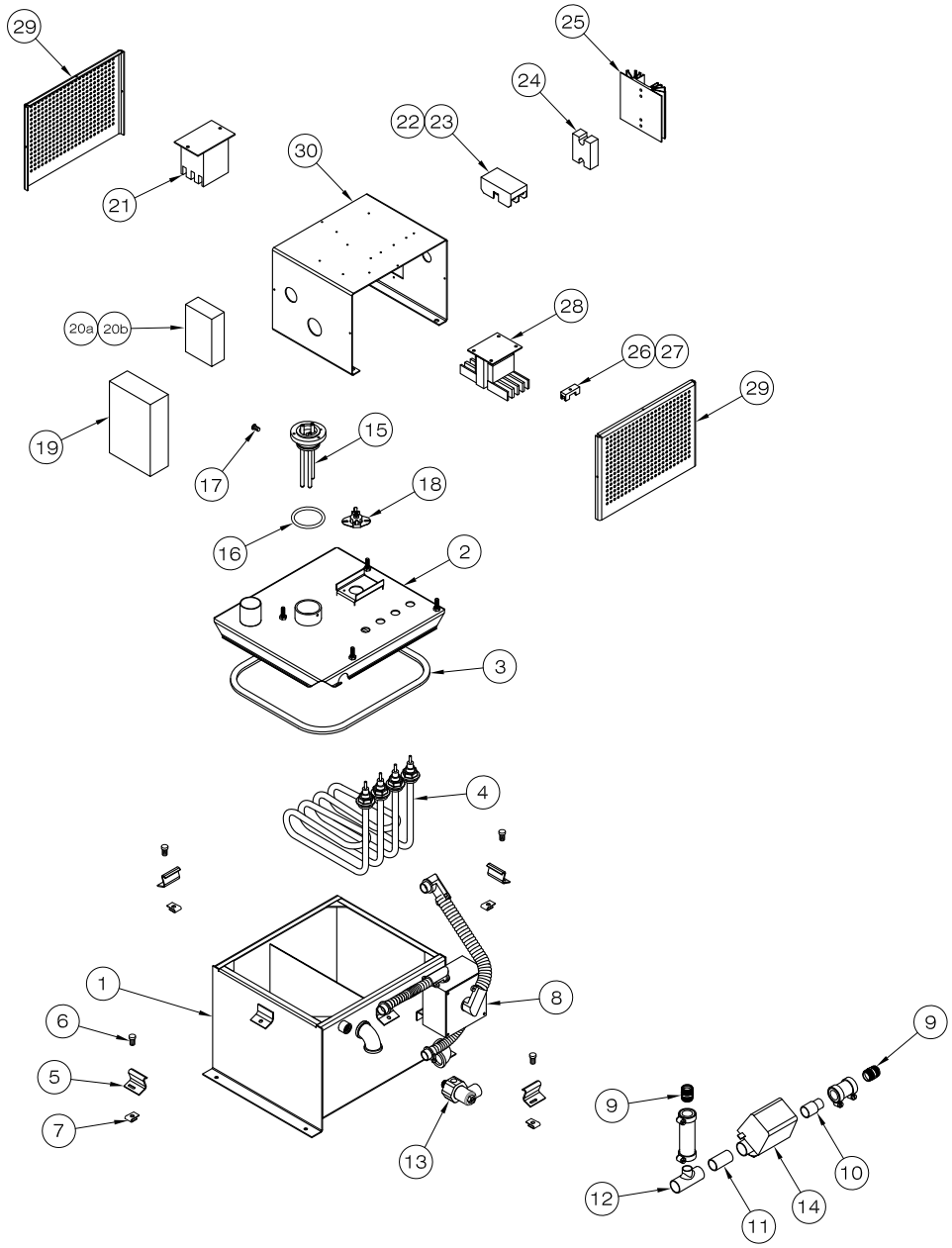


Maintenance Notes

Maintenance Performed	Date	By

Maintenance Notes

Maintenance Performed	Date	By



Title:	ER Exploded Parts View		
Scale: No Scale	Date: July 13, 2015	Drwn: S.A.M.	Dwg No: ER Exploded View

PURE Humidifier

PURE Humididfier Co. "ER" Series
Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	ER Reservior Assembly	97043	1	
2	ER Reservior Cover Assembly	97041	1	
3	Cover Gasket	15520	1	
4	Immersion Heating Element(s)	A	A	
5	Cover Clamp	15930	4	
6	Cover Clamp Screws	15522	4	
7	10-24 U-Nut	15524	4	
8	Electrical Box	15076	1	
9	1/2" NPT Close Nipple	07038	2	
10	3/4" Pipe x 1/2" Female Sweat	08030	1	
11	3/4" x 1 5/8" Copper Tube	01101	1	
12	3/4" x 1/2" x 3/4" Sweat Tee	08038	1	
13	1/4" Stainless Steel Fill Valve with Strainer	09128	1	
14	Motorized Drain Valve	09038	1	
15	ER Tri-Probe Sensor	05347	1	
16	Tri-Probe O-Ring	15166	1	
17	Tri-Probe Set Screw	15525	1	
18	Overtemp Protection Switch	15047	1	
19	LC-942 Water Level Controller	12133	1	
20a	TCM-188	12118	A	
20b	MPS-387	12112	A	
21	Heater Contactor	12017	1	
22	Primary Fuse Holder	A	A	
23	Primary Fuse	A	2	
24	SCR Relay	A	1	
25	SCR Heat Sink	A	1	
26	Secondary Fuse Holder	12085	1	
27	Secondary Fuse	12063	1	
28	Step-Down Transformer	A	1	
29	Control Box Side	97034	2	
30	Control Box	97035	1	

NOTES/CODES:
A = Part Number and quantity vary with model number.

When ordering replacement or spare parts, please have the following information available: Model Number, Primary Voltage, Serial Number, No. of Heaters & Heater KW and any options (i.e., automatic drain, modulating control, insulation, etc.)

Some parts shown may not be required for your unit.

7/13/2015

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.

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