

READ AND SAVE THESE INSTRUCTIONS

DRI-STEEM[®] Models **LTS[®] and LTS-DI[®]** **LIQUID-TO-STEAM HUMIDIFIERS**

Installation Instructions and Maintenance Operations Manual

**For Toll-Free Customer Support,
Call: 1-800-328-4447
or Call: 612-949-2415**



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DRI-STEEM[®]
HUMIDIFIER COMPANY



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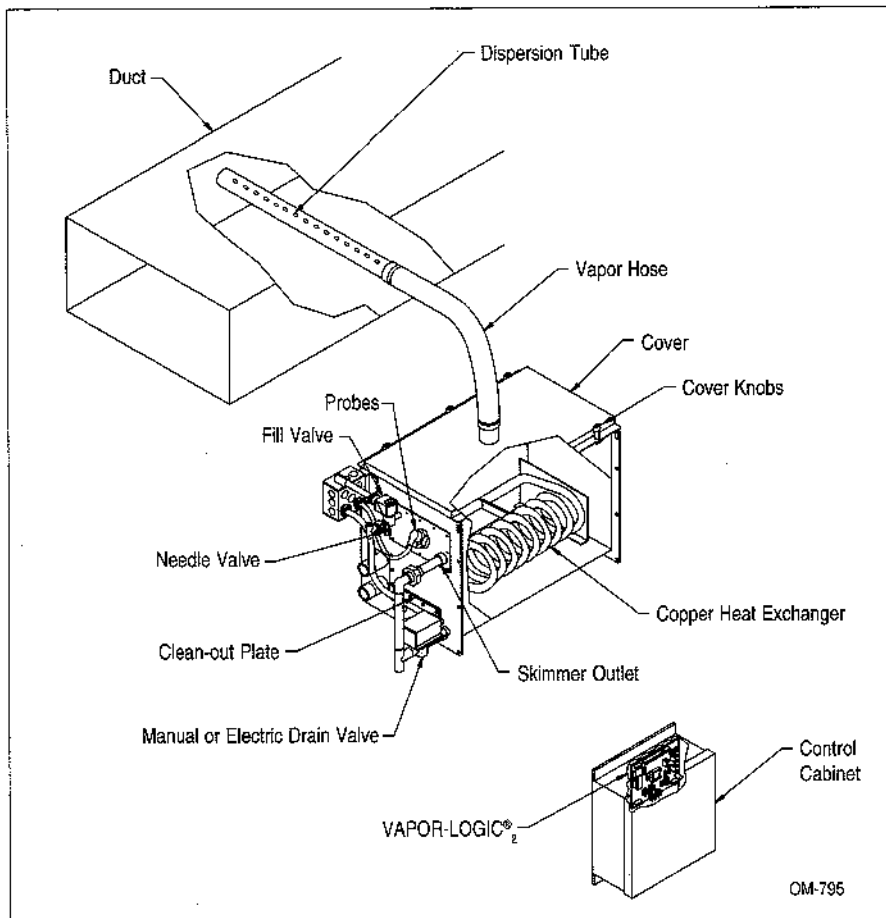
TO THE PURCHASER AND THE INSTALLER

Thank you for purchasing our LTS® humidification equipment. We have designed and built this equipment to give you total satisfaction and many years of trouble-free service. Proper installation and operating practices will assure you of achieving that objective. We therefore urge you to become familiar with the contents of this manual.

DRI-STEEM Humidifier Company

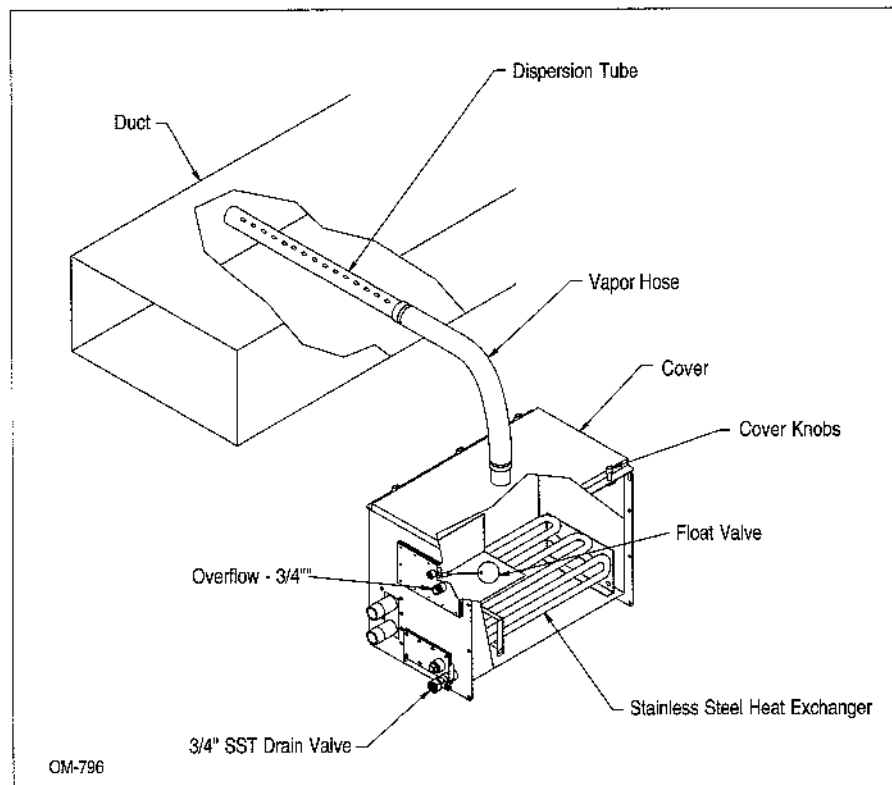
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LTS® AND LTS®-DI HUMIDIFIERS



LTS Humidifier (For use with softened or unsoftened water.)

This humidifier is designed for use with either softened or unsoftened water (preferably softened). The probe-type level control system requires water conductivity of 100 micromhos/cm (2 grains/gal) minimum to function, and therefore will not operate on water treated by reverse osmosis or deionization. However, LTS humidifiers are available for use with these water types. The standard humidifier can be converted in the field to a LTS-DI model. See below.



LTS-DI Humidifier (For use with demineralized or reverse osmosis water.)

For use with deionized or reverse osmosis water. This unit produces chemical-free steam and reliable, accurate humidification control. It is virtually maintenance-free, with no wasted water, heat, or downtime.

CAPACITIES

Table 4-1: Capacities Model LTS-25C

Output (lbs/hr)					
Flow	Hot Water Supply Temperature				Pressure Drop Through Heat Exchanger
	240°F	250°F	260°F	280°F	
GPM					psi
8	25	45	65	100	1.0
12	40	60	85	135	1.5
15	50	75	105	160	2.0
17	60	90	120	170	2.5

Table 4-5: Capacities Model LTS-200S

Output (lbs/hr)					
Flow*	Hot Water Supply Temperature				Pressure Drop Through Heat Exchanger
	240°F	250°F	260°F	280°F	
GPM					psi
15	60	75	105	135	2.5
20	80	110	145	180	4.0
30	90	125	165	205	7.0

Table 4-2: Capacities Model LTS-25S

Output (lbs/hr)					
Flow	Hot Water Supply Temperature				Pressure Drop Through Heat Exchanger
	240°F	250°F	260°F	280°F	
GPM					psi
4	9	13	17	21	3.0
6	11	15	19	23	5.5
7.5	12.5	16.5	21	25	8.0

Table 4-6: Capacities Model LTS-400C*

Output (lbs/hr)					
Flow*	Hot Water Supply Temperature				Pressure Drop Through Heat Exchanger
	240°F	250°F	260°F	280°F	
GPM					psi
24	190	250	310	470	4.0
30	240	300	350	510	6.0
34	260	320	380	540	8.0

* 2 Heat exchangers and 2 valves

Table 4-3: Capacities Model LTS-100C

Output (lbs/hr)					
Flow	Hot Water Supply Temperature				Pressure Drop Through Heat Exchanger
	240°F	250°F	260°F	280°F	
GPM					psi
12	70	90	120	195	3.0
15	85	110	140	230	5.0
17	95	125	155	250	6.5

Table 4-7: Water Heating Systems (Medium and High Temperature)

Properties of Water 212° to 340°F (100° to 171°C)			
Temperature		Pressure	
°F	°C	psia	kPa
212	100	14.7	101.3
220	104	17.2	118.4
230	110	20.8	143.2
240	116	25.0	172.0
250	121	29.8	205.5
260	127	35.4	244.1
270	132	41.9	288.4
280	138	49.2	339.0
290	143	57.6	396.6
300	149	67.0	461.7
310	154	77.7	535.2
320	160	89.7	617.8
330	166	103.1	710.1
340	171	118.0	813.1

Table 4-4: Capacities Model LTS-100S

Output (lbs/hr)					
Flow	Hot Water Supply Temperature				Pressure Drop Through Heat Exchanger
	240°F	250°F	260°F	280°F	
GPM					psi
7.5	33	40	48	59	2.0
10	38	47	56	69	3.0
15	45	55	65	80	6.0

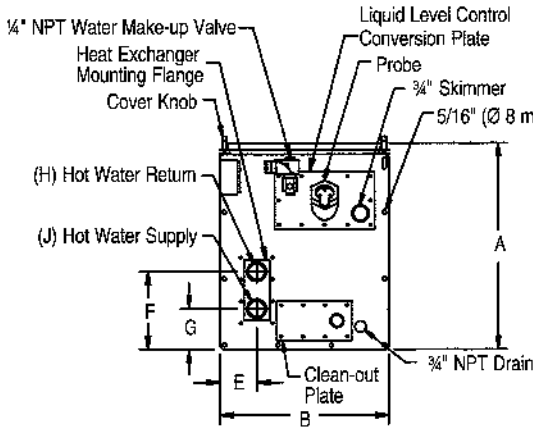
Maximum operating pressure 500 psi.

DIMENSIONS

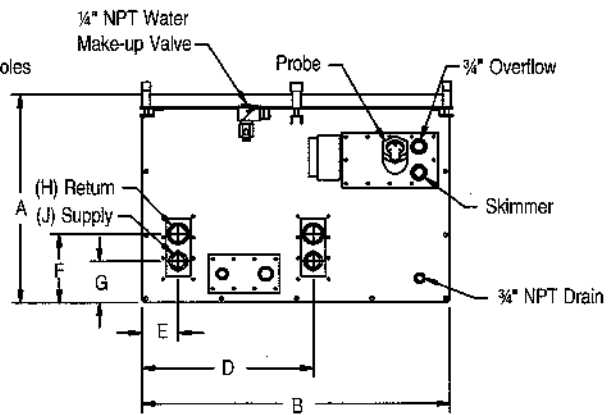
Table 5-1: Dimensions

Model	A		B		C		D		E		F		G		H	J
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	inches
LTS-25C	18.13	460.5	14.75	374.7	23.50	596.9	--	--	3.20	81.28	6.67	169.4	3.67	93.22	1	1
LTS-25S	18.13	460.5	14.75	374.7	23.50	596.9	--	--	3.20	81.28	6.42	163.1	3.92	99.6	¾	¾
LTS-100C	18.13	460.5	19.25	489.0	39.50	1003	--	--	3.20	81.28	6.67	169.4	3.67	93.22	1	1
LTS-100S	18.13	460.5	19.25	489.0	39.50	1003	--	--	3.20	81.28	6.67	169.4	3.67	93.22	1	1
LTS-200S	18.13	460.5	28.25	717.6	55.00	1397	15.50	393.7	3.20	81.28	6.67	169.4	3.67	93.22	1	1
LTS-400C	18.13	460.5	28.25	717.6	55.00	1397	15.50	393.7	3.20	81.28	6.67	169.4	3.67	93.22	1	1

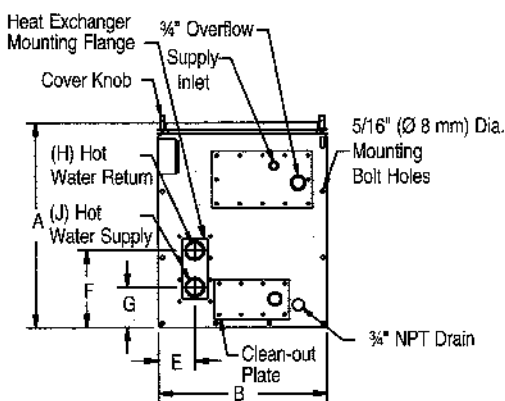
**Front View
(LTS 25C/S and 100C/S)**



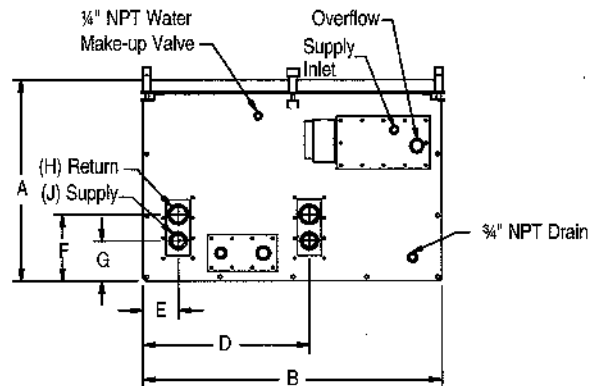
**Front View
(LTS 200S and 400C)**



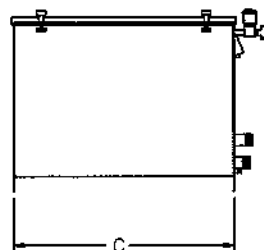
**Front View
(LTS-DI 25C/S and 100 C/S)**



**Front View
(LTS-DI 200S and 400C)**



Side View



Note: For dimensions refer to table 5-1

MOUNTING METHODS

Mounting Notes

1. For the electrode probe water level control and the skimmer system to properly operate, the humidifier must be mounted level in both directions.

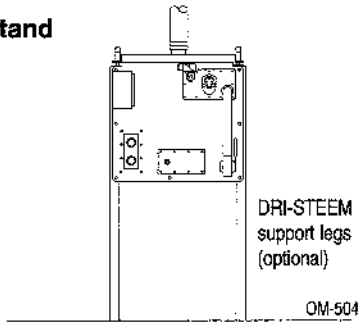
2. Access (18" minimum) for periodic removal of the top cover is recommended. In most cases, scale that forms on the heating elements continuously flakes off as it

forms and the loose scale settles to the bottom. A clean-out tray on the floor of the evaporator may be removed periodically through the front clean-out opening.

3. Due to the size and weight of the STS 200, 400 and 800 units, the trapeze hanger and wall brackets are not recommended.

Figure 6-1: Mounting Support Methods

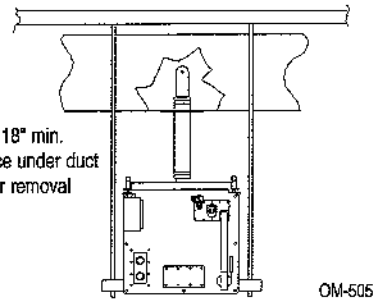
Floor Stand



Trapeze Hanger

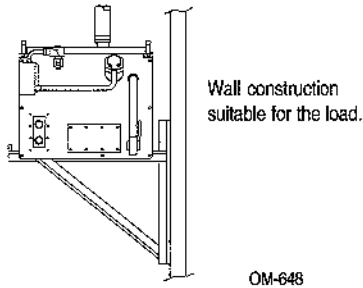
Secure rods to overhead construction suitable for the load.

Provide 18" min. clearance under duct for cover removal



Wall Brackets

Optional wall brackets, two required



Cradle

Models LTS 200S and LTS 400C require cradle.

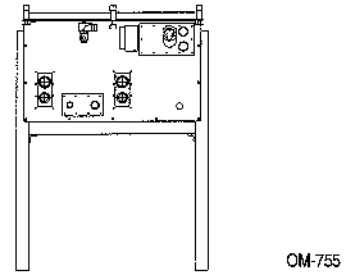
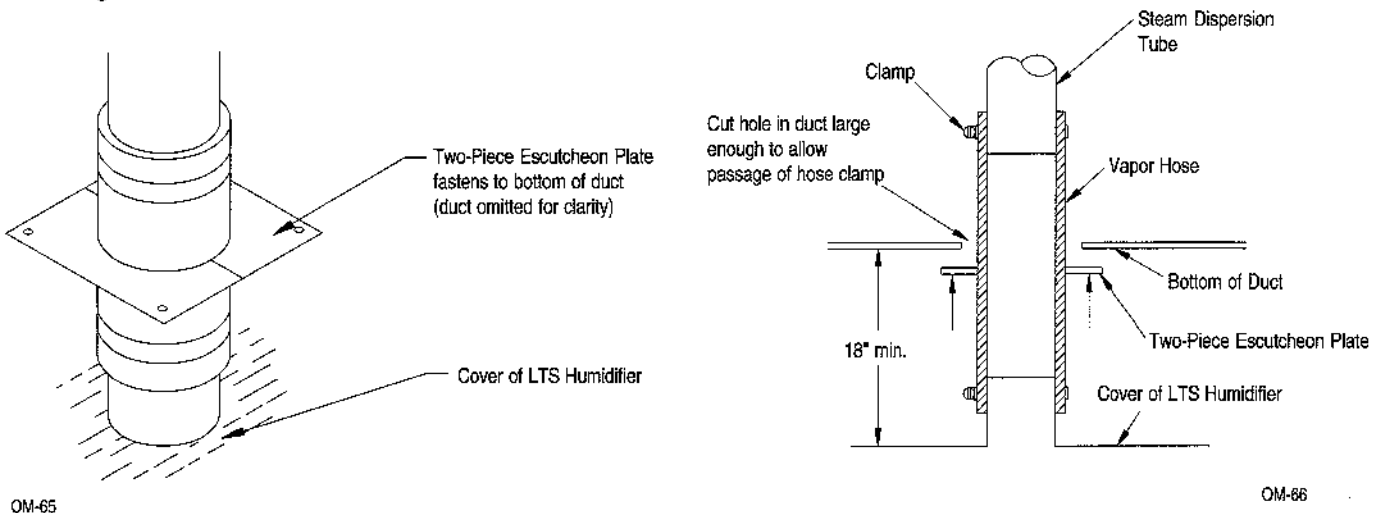


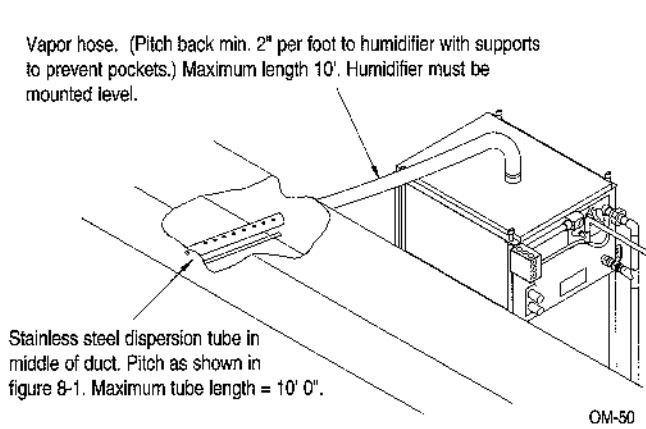
Figure 6-2: Mounting Unit on Underside of Duct

Mounting humidifier 18" below duct recommended to facilitate cover removal.

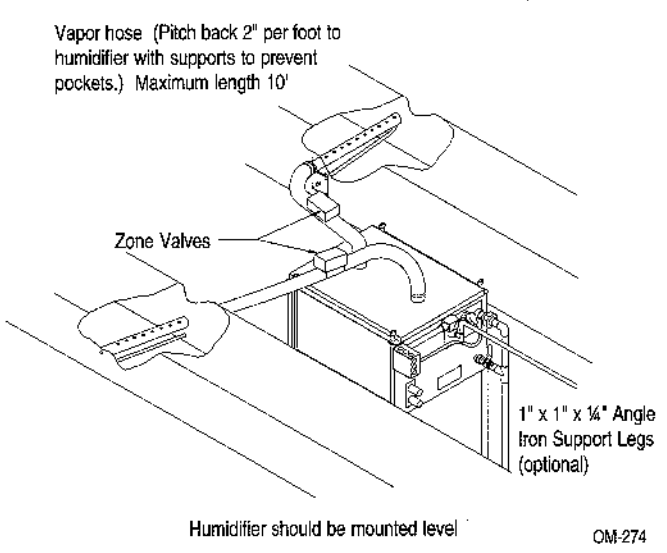


MOUNTING METHODS

Figures 7-1 and 7-2: Mounting Units Away from Duct(s) Using Vapor Hose

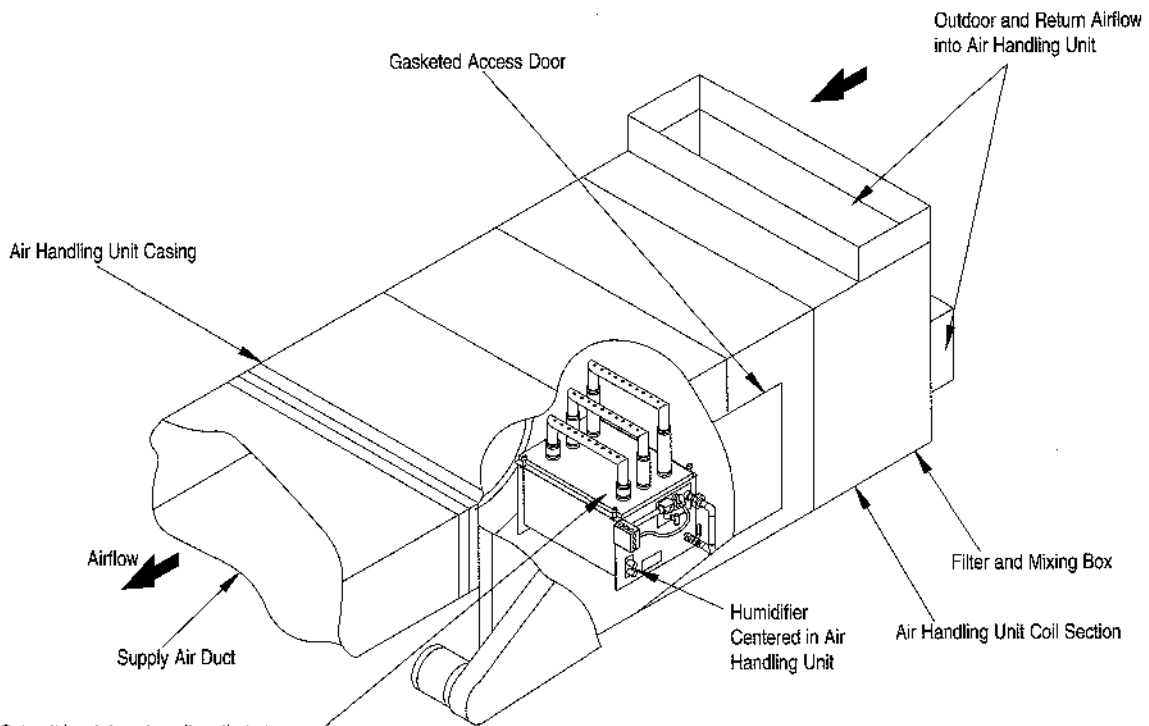


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Figure 7-3: Mounting In Air Handling Unit



Set unit level. Locate unit so that steam dispersion assembly is in the most active part of the air stream.

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INSTALLATION

Dispersion Tube Installation with Condensate Drain

(over 28 pph per dispersion tube)

Vapor Hose

When a vapor hose and stainless steel dispersion tube are used, they should be pitched back to the humidifier. A minimum slope of 2" per foot (with no "low spots") is recommended. Vapor hose should be supported to prevent sags or low spots. When this is not possible due to duct elevation or an obstruction, alternate arrangements should be used as shown in figure 9-3.

Any condensate that forms in the vapor hose must be removed. Preferably, it should be returned to an open drain with a water seal of sufficient height to contain the duct static pressure, as shown in figure 9-1.

The condensate can also be returned to the LTS, as shown in figure 9-2, with an air vent. This method requires a water seal and an air gap to prevent back pressure from the LTS chamber. Excessive back pressures imposed on the humidifier may lead to dispersion tube(s) spitting, lost water seals, or leaking gaskets. When the distance between the humidifier and the dispersion tube(s) exceeds 10 feet, consult factory for special recommendations.

Rigid Piping (when used)

- Vapor piping should have a minimum I.D. of 1½".
- A minimum pitch of 2" per foot back to the humidifier should be maintained.
- 90° elbows are not recommended; use two 45° elbows one foot apart instead.
- Thin-walled tubing will heat up faster and cause less start up loss than heavy-walled pipe.
- Insulating the rigid piping will reduce output loss due to condensation.

Tube Mounting

- Mount dispersion tubes pitched as shown below in figure 8-1.
- Tubelets must discharge perpendicular to air flow.
- ** Return line piping material must be suitable for 212°F (100°C) water.

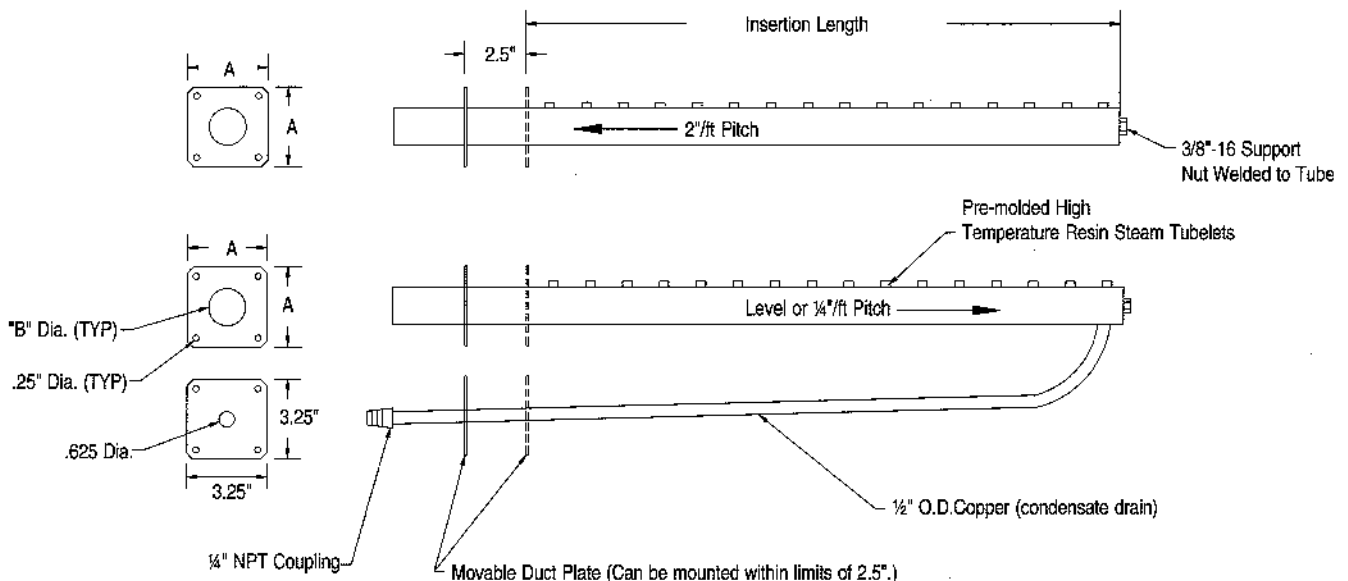
Min. Condensate Drain Line Sizing

- One or two tubes: ¾" I.D.
- Three or more tubes: 1" I.D.

Table 8-1: Dispersion Tube Capacities

Tube Dia.	Capacity		A	B
	Without Drain	With Drain		
1"	10 lbs/hr	N/A	3.25"	1.03"
1½"	28 lbs/hr	57 lbs/hr	3.25"	1.51"
2"	57 lbs/hr	85 lbs/hr	5.00"	2.03"

Figure 8-1: Single Tube



INSTALLATION

Figure 9-1: Multiple Tube with Condensate Wasted to Floor Drain

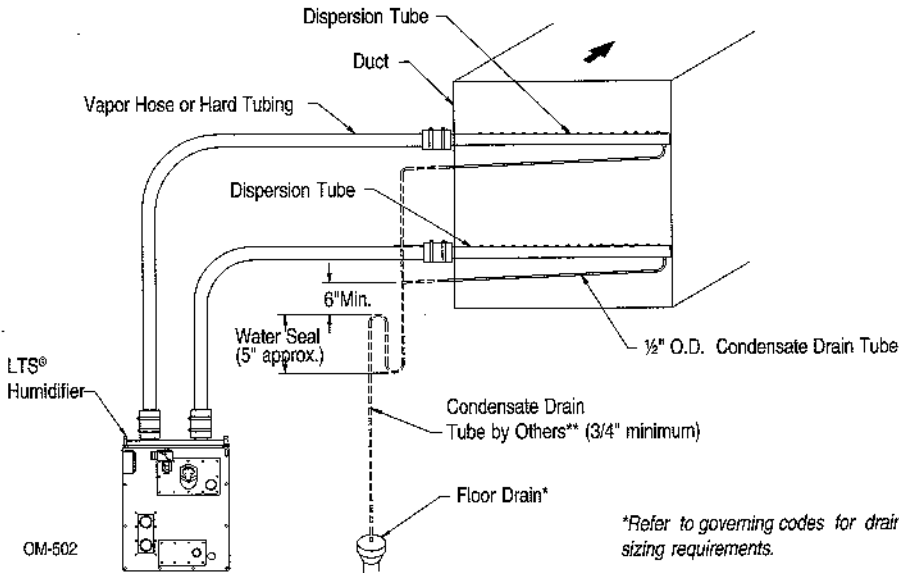


Table 9-1: Water Seal Minimum Height**

Humidifier	Height (inches)
LTS-25S	12
LTS-25C	15
LTS-100S	15
LTS-100C	18
LTS-200S	18
LTS-400C	18

** Height required to overcome humidifier's internal pressure.

*Refer to governing codes for drain pipe sizing requirements.

Figure 9-2: Multiple Tube with Condensate Return to Humidifier

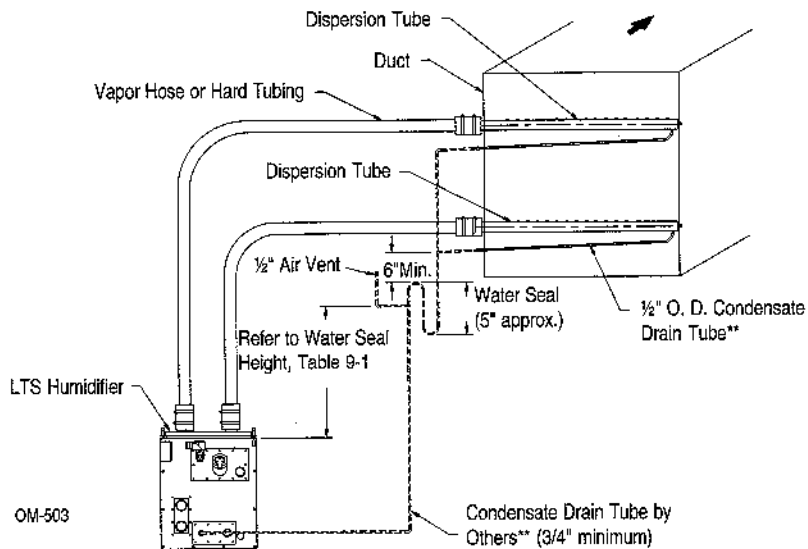
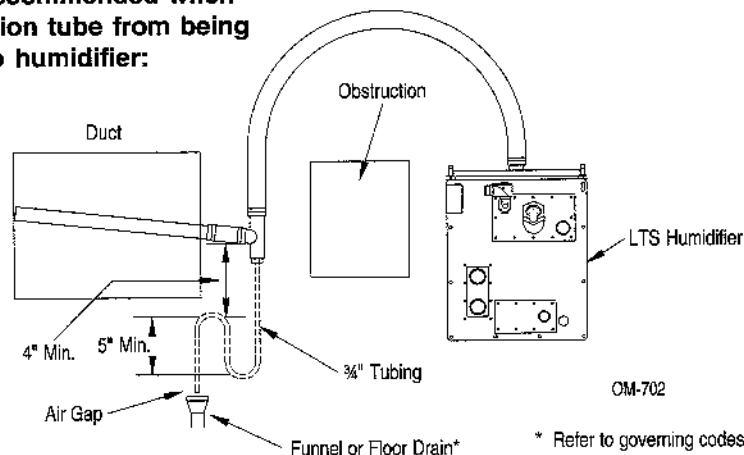


Figure 9-3: Piping method recommended when obstruction prevents dispersion tube from being continuously pitched back to humidifier:



* Refer to governing codes for drain pipe size requirements.

RAPID-SORB™ ASSEMBLY AND INSTALLATION

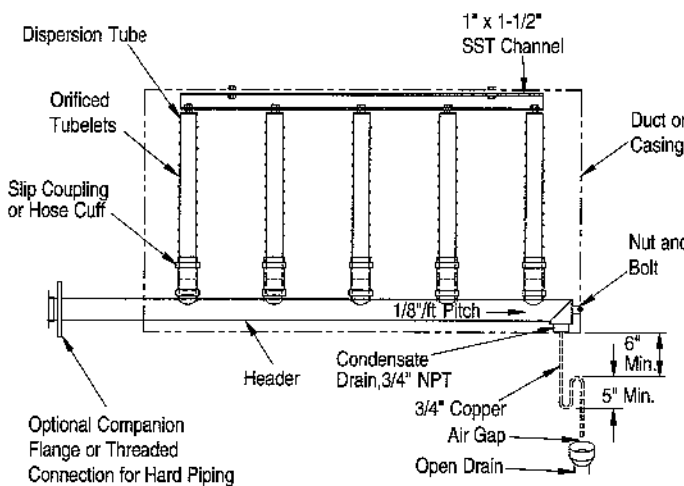
Horizontal Duct Installation

1. Unpack shipment and verify receipt of all RAPID-SORB™ components with packing list. Report any shortages to the DRI-STEEM factory immediately.
2. Provide necessary access in and around duct work.
3. Locate 1" x 1½" stainless steel channel inside the duct. Hang the channel from the top of the duct, centered between duct side walls, with the two mounting holes provided.
4. If hose cuffs are used, slide cuffs over the open end of each tube. Install a pair of hose clamps on each tube.
5. Note direction of air flow within duct, then arrange each dispersion tube so steam will be discharged perpendicular to the air flow. Use the hex bolts provided to attach tubes to overhead 1" x 1½" channel. Do not secure. If the header is outside the duct (see figure 9-2), punch-out necessary clearance holes in the base of the duct to slide dispersion tubes up from bottom.
6. **For a Header Inside the Duct** (See figure 10-1.): Punch or cut out necessary clearance holes for RAPID-SORB header. Slide header into the duct, position header and slide the dispersion tube hose cuffs or slip couplings over the header dispersion tube nipples.

Position the header so vertical dispersion tubes are perpendicular to duct and pitch the header toward condensate drain. Secure header to the mounting bracket. Use escutcheon plates to secure header where it enters the duct.

Check that the dispersion tubes release steam perpendicular to the air flow. Secure tubes to the overhead

Figure 10-1: RAPID-SORB Unit Header Inside Duct



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channel. Secure the channel to the duct, and secure hose cuffs or slip couplings over tube and header tube nipples.

For a Header Outside the Duct (See figure 10-2.): Position header under dispersion tubes, then slide hose cuffs or slip couplings over header dispersion tube nipples.

Position the header so dispersion tubes are perpendicular to duct and pitch the header to condensate drain. Secure dispersion tubes in place with the tube escutcheon plates provided.

Check the position of the tubes for steam release perpendicular to the air flow. Secure tubes to the overhead channel, and secure channel to the duct. With header pitched to condensate drain, slip hose cuffs or slip couplings over tube nipples and secure.

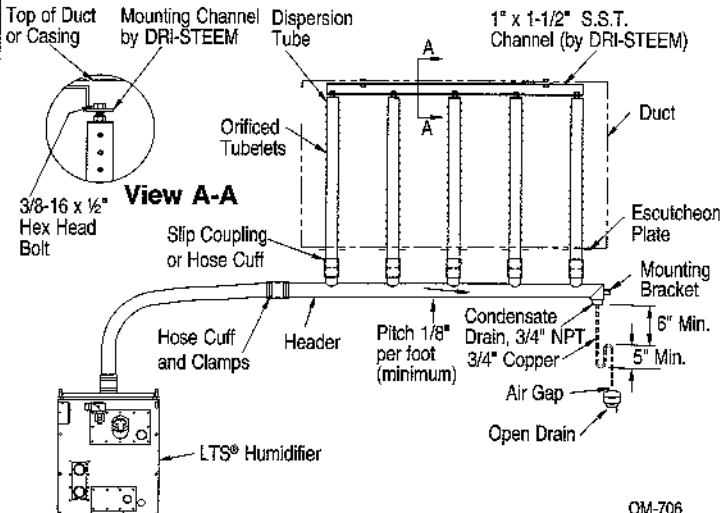
7. Connect a condensate drain to the header, provide the water trap as shown, and run to open drain, sized according to governing codes.

8. Attach the header steam supply connector to main header using the hose cuff and clamps provided, but do not secure.

9. Route the necessary number of vapor hoses or pipes from the humidifier tank, position connector to accept the hoses or pipes and secure.

Note: Refer to page 11 for vapor hose information on routing and for alternate vapor hose installation methods.

Figure 10-2: RAPID-SORB Unit Header Under Duct



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RAPID-SORB™ ASSEMBLY AND INSTALLATION

Vertical Duct Installation

Install the RAPID-SORB™ with dispersion tubes and header pitched to condensate drain as shown in figures 11-1, 11-2, and 11-3.

See "Instructions for Horizontal Duct" for additional information, as applicable.

Figure 11-1: Plan View

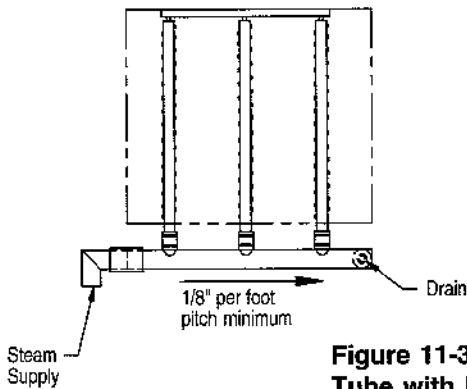


Figure 11-2: Elevation View Tube without Drain

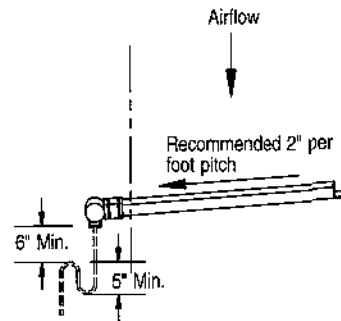
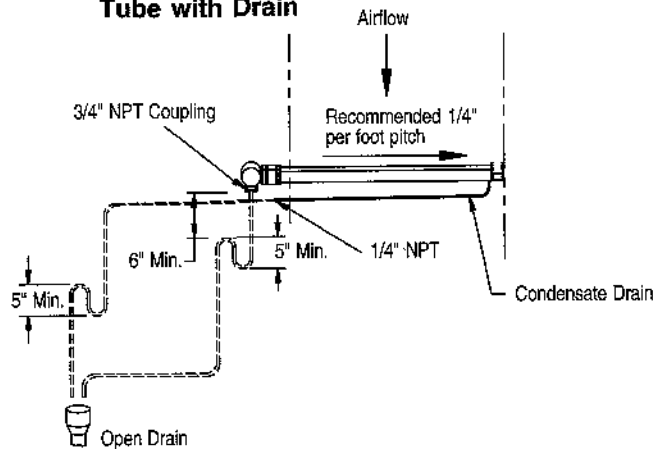


Figure 11-3: Elevation View Tube with Drain



---- Dashed line indicates field piping.

PIPING METHODS

Drain Piping and Material

See illustration on page 13. If non-metallic pipe or hose is used, it must be capable of withstanding temperatures up to 212°F.

To prevent steam from escaping out the drain line, a water seal must be provided in the drain line of sufficient height to contain the pressure developed within the humidifier and steam dispersion system. To determine the proper height of the water seal, see table 13-1.

Make-up Water Piping and Material

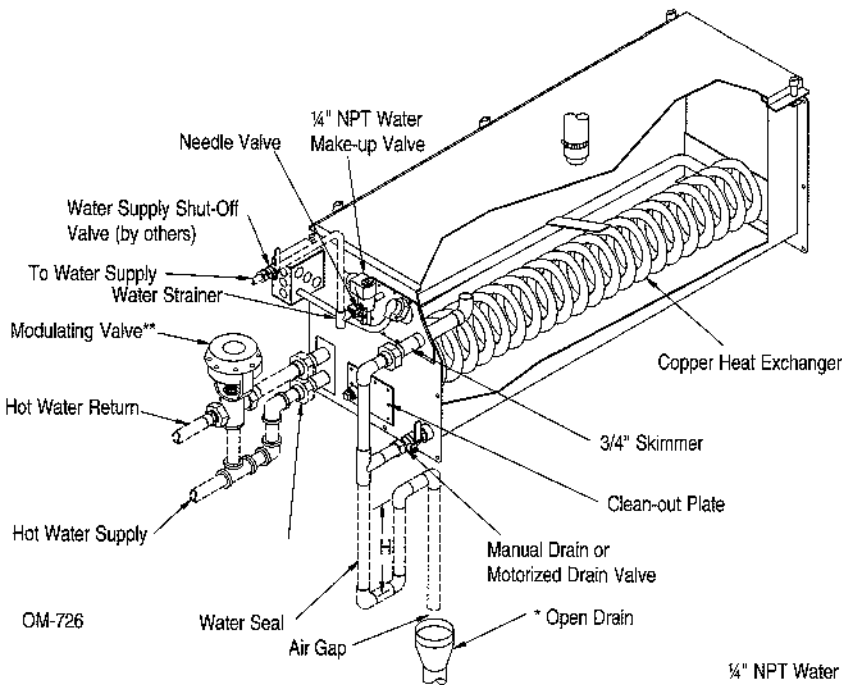
See illustration on page 13. When non-metallic water piping is used, it must be rated to withstand 212°F or greater temperature. If not, the final three feet connected to the humidifier should be metallic and should not be insulated.

As part of the fill valve assembly, the needle valve restricts the rush of cold water entering the evaporating chamber during the fill cycle. Cold water can drop the chamber water temperature and collapse the steam.

The LTS® has a one-inch internal "air gap". However, local codes may require a vacuum breaker.

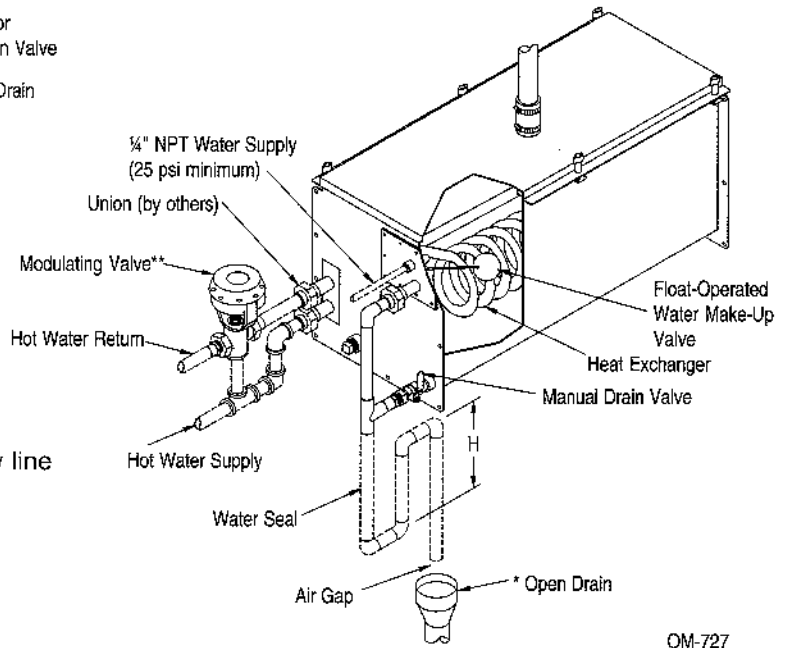
PIPING DIAGRAMS: STEAM, WATER AND DRAIN

LTS-Standard Water



** The piping shown is for the standard 3-way valve piped normally closed to the heat exchanger. The three way valve is recommended for constant system flow. If variable system flow is desired, a two way valve located in the hot water return line is recommended.

LTS-DI Model

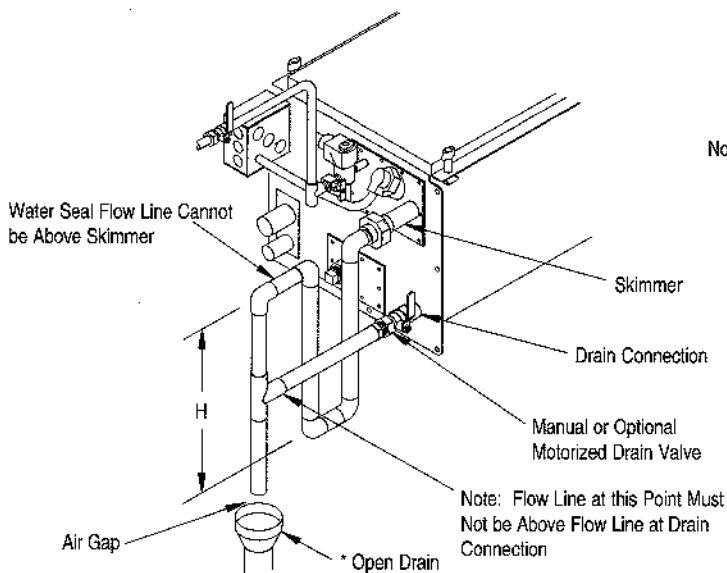


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Note: Drain piping material must be suitable for 212°F (100°C) water.

Alternate Water Seal and Valve Piping

Used when water seal must be elevated above flow line of drain connection (humidifier near floor).



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* Refer to governing codes for drain pipe sizing

Table 13-1: Water Seal Height (H) Recommendations

Humidifier	Height (inches)
LTS-25S	12
LTS-25C	15
LTS-100S	15
LTS-100C	18
LTS-200S	18
LTS-400C	18

ELECTRICAL

The electrical supply needed is 120 volt, single phase. The control cabinet should be mounted in a location for service. Wiring must be in accordance with all governing codes and with the LTS® wiring diagram is located inside the control cabinet. All wiring between the control cabinet and the humidifier must be rated for 105°C minimum.

The basic water level control circuit displayed is common to all LTS standard humidifiers. The LTS standard model is designed for use with either softened or unsoftened

water. The probe type level control system requires water conductivity of at least 100 micromhos/cm (2 grains per gallon) to function, and therefore will not operate with water treated by reverse osmosis or deionization.

Caution: Only qualified personnel should perform electrical installation and start-up procedures.

START-UP PROCEDURE

Introduction

After the system has been properly installed and connected to both electrical and water supplies, it may then be started.

Mounting

Check mounting to see that unit is level and securely supported before filling with water.

Piping

Verify that all piping connections have been completed as recommended and that adequate water pressure is available.

Electrical

Verify that all wiring connections have been made in accordance with all governing codes and the enclosed LTS® wiring diagram.

Caution: Only qualified personnel should perform start-up procedure.

Control System

For your particular humidifier control system, refer to the Operations and Maintenance Manual enclosed with the product shipment (LW310/LW320 control module, VAPOR-LOGIC®, or VAPOR-LOGIC₂®).

Control Circuits (for LTS®-DI Only)

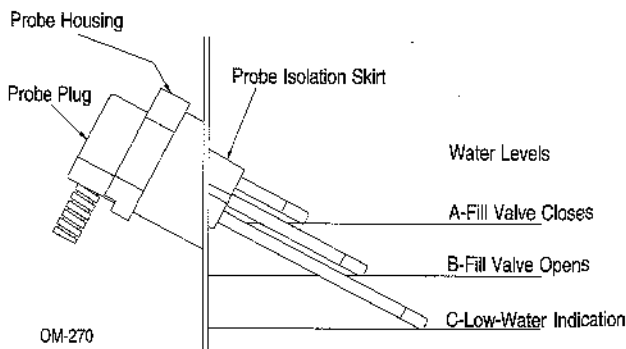
1. Adjust humidistat to "call" setting.
2. Open shut-off valve on water supply line. Water should flow through float valve.
3. After evaporating chamber has filled, turn electric power on to control cabinet.
4. Fill the water seal in drain line by manually opening drain valve for a few seconds.
5. Open field installed service valve. Hot water should be heard passing through the control valve into the humidifier heat exchanger.
6. Check out function of field-installed air flow switch, high limit duct humidistat, and controlling humidistat to ensure they are controlling the control valve.

Caution: Overtightening cover will cause leaks.

All cover knobs are turned down at the factory until the bottom of the knob makes contact with the flange, then one half turn further. If more compression is required, turn all knobs a half turn more. Do not turn knobs more than a half turn before identifying that a leak still exists.

OPERATION

Figure 15-1: Reliable Electronic Probe Control Maintains Water Level



Start-up Procedure for LW310 Level Control Module

1. Mounting - Check mounting to see that unit is level and securely supported before filling with water.
2. Piping - Verify that all piping connections have been completed as recommended and that water pressure is available.
3. Electrical - Verify that all wiring connections have been made in accordance with the LTS wiring diagram.
4. Control circuits
 - a) Adjust humidistat to "call" setting.
 - b) Open shut-off valve on water supply line.
 - c) Set control module switch of LW310 to "standby" position.
 - d) Set main disconnect switch to "on" position; control module "power" lamp should now light.
 - e) Set control module switch in "normal op." position. (For unit with LW320, set module switches to "auto" and "normal op." positions.) The "fill" lamp should now light and the make-up valve should now open.
 - f) When water level reaches point C, the "ready water" lamp should light. Filling should continue until the uppermost electrode (point A) has been in contact with water for two seconds. At that point, the fill lamp should go out.
 - g) Fill water seal in drain line by setting control module switch in "skimmer blowdown" position until water flows from drain pipe, then reset to "normal op." The unit is now ready to operate. Open shut-off valve on steam line.
 - h) Check out the function of field-installed safety controls, such as the high limit humidistat, and the fan proving switch. The steam valve should close.

- i) Inspect installation for leaks by operating the LTS. Any steam or air leaks should be sealed.

Note: The probe type level control system requires water conductivity of at least 100 micromhos/cm (2 gr/gal) to function, and may not operate in water treated by the reverse osmosis or deionizing process. Specially designed LTS-DI humidifiers are available for use with these water types.

Timer-Operated Drain/Flush Operation (Optional LW320 Level Control Module)

This option, in addition to the features of the standard control module, provides a drain and flush sequence at preset intervals. This feature effectively reduces the frequency of cleaning associated with LTS humidifiers. It is recommended when the water supply contains a large quantity of dissolved minerals and when softened water for make-up is not available.

An integral electronic timer accumulates the "on" or "humidifying" time of the unit. When this accumulated time reaches the hours pre-selected by the user (field adjustable between 5 and 50 hours), an electronic programmer automatically activates the drain/flush cycle.

When this cycle, which is also field adjustable (between 1 and 30 minutes), is activated, the drain valve opens, and allows the water in the chamber to drain. When 50% of the pre-set drain duration time has elapsed, the fill valve opens for the remainder of the time, completing the flushing action.

At the end of the flushing time, the control module closes the drain valve and keeps the fill valve open, which refills the unit, restarts the cumulative timer, and allows the humidifier to resume normal operation.

When draining the humidifier prior to servicing, the "manual drain" feature of this control module is used. Placing the three-position switch in the "manual drain" position deactivates the fill valve and opens the drain valve.

Table 16-1 shows recommended hours of operation for various water hardness. Refer to table 16-2 for recommended drain duration settings.

OPERATION

Testing the Optional Drain/Flush System

As a part of final checkout, the installer should always verify the operation of the drain/flush system. To test:

1. Set the "drain interval" timer dial to "0" hours or fully counter clockwise.
2. Set the "drain duration" timer dial to "10" minutes. In 30 to 45 minutes, the drain valve should open; five minutes later, the fill valve should open to create the flushing action. After an additional five minutes, the drain valve should close. The fill valve should remain open until the unit is refilled to the level of the top probe (see figure 15-1 on page 15).

If all of the above takes place as described, the drain/flush system is functioning correctly. The drain interval timer dial (hours) should then be returned to "20 hours" and the drain duration timer dial (minutes) should be set to agree with table 16-2. The unit will then be ready to resume humidifying.

For operating the VAPOR-LOGIC® or VAPOR-LOGIC₂® microprocessor, refer to the manual enclosed with the product shipment.

Table 16-1: Water Hardness and Recommended Hours of Operation

Grains/Gallon	Hours of Operation Time*	Grains/Gallon	Hours of Operation Time*
14	24	24	14
16	22	26	13
18	19	28	12
20	18	30	11
22	16	32	10

*Note: Due to various waters, these are starting points. Field adjustments may be made to suit a particular water condition.

Table 16-2: Drain Duration

Total (Lbs/Hr)	Drain Duration (minutes)
6-24	5
27-72	10
84-120	15
126-180	20
192-240	25
240 and higher	30

MAINTENANCE

Model LTS®

Using softened water will significantly reduce mineral build-up in the humidifier. When softened water is not available, the LTS is designed to deal with water hardness in one of two ways depending on the degree of hardness. For light to moderate hardness (up to 10 grains per gallon), using the surface water skim time feature with annual cleaning is recommended. For high mineral content water (above 10 grains per gallon), a periodic drain and flush through the motorized drain valve, in addition to the surface water skim time feature, is recommended. The frequency of cleaning will depend on water condition and evaporation load.

The humidifier should be inspected for leaks at least annually. All safety devices in the control circuit should be cycled on and off to verify that they are functioning.

Caution: When performing maintenance on the LTS, always set control module switch to STBY position, place main disconnect in OFF position, and close manual water shut-off valve.

Seasonally or as Required

1. Cleaning Tank - Slide the clean-out tray out and dispose of any loose scale that has collected in the tray. This should be done before the build-up reaches the underside of the heat exchanger(s).

2. Cleaning Probes - Disconnect the plug and cable assembly and unscrew the probe holder from the LTS unit. The scale will easily flake off from the sensing portion. The sensing portion (bottom 3/8") of the probe should be brushed clean with stainless steel wool.

3. Cleaning Skim Overflow Fitting - Loosen deposits with a long tool, such as a screwdriver. Proper skimmer drainage should be verified by a weekly visual inspection. Water should drain from skimmer drain pipe after each fill cycle. (For cleaning piping, disconnect and flush out. If mineral deposits have restricted the flow, replace piping.)

Summer Maintenance

After the humidification season, a complete inspection and cleaning of the heaters, probe control, skimmer, and water chamber is recommended. After cleaning, the unit should remain empty until humidification is required. **On units with TEFLON® coated heat exchangers, do not use a sharp object when cleaning the TEFLON®-coated heat exchanger.** Cuts or scratches on the heat exchanger will impair its ability to shed scale during operation, and could cause the TEFLON to separate from the metal surface.

Adjusting the Surface Skimmer

The elevation of the lip of the skimmer tube with respect to the water line determines the quantity of "skimming" that takes place with each fill cycle. The height is field adjustable by slightly rotating the tube.

As evaporation takes place, a portion of the dissolved minerals precipitate out and float on the water surface. Each time the LTS refills, it fills to an elevation above the lip of the skimmer tube. A portion of the refill water then flows to drain, carrying the floating material with it. This action constantly reduces both the mineral concentration of the water and the frequency of cleaning needed.

The heated water that flows to drain is a cost of operation. Cleaning the humidifier is also a cost, as well as an inconvenience. Therefore, it is recommended that the user, at the time of the initial start-up, observe and adjust the skimming quantity. By doing so, a balance between minimized mineral build-up and water conservation can be achieved.

The quantity of skimming water drained off per fill cycle is adjusted by rotating the skimmer tube. This alters the height of the overflow lip. It is factory set to skim about 5 to 10% of the total evaporating capacity of the unit.

To adjust, loosen the union nut and rotate the tube to the desired percentage of skimming rate. Markings on the unit indicate the following:

50%	25%	15%	7%	0%
-----	-----	-----	----	----

Allow the LTS to operate five or ten days and then inspect it. If a mineral build-up is evident, increase the skim amount. If not, it should be reduced. Repeat the above process until the proper skim amount has been attained.

Adjusting the Surface Skim Bleed-Off Quantity (VAPOR-LOGIC® microprocessor control option only)

The skim time determines the quantity of water skimmed with each fill cycle. The skim time is field adjustable using the VAPOR-LOGIC keypad.

MAINTENANCE

Model LTS®-DI Only

The humidifier should be inspected for leaks at least annually. All safety devices in the control cabinet should be cycled on and off to verify that they are functioning.

Make-up Water Piping

Either cold or hot make-up water may be used. If the water pressure is above 60 psi and/or water hammer would be objectionable, a pressure-reducing valve or shock arrester should be installed. Although the LTS-DI

humidifier has an internal 1" air gap, some local codes may require a vacuum breaker.

Caution: Minimum water supply pressure is 25 psi.

Cleaning the Evaporating Chamber

As long as mineral-free water is used in the LTS-DI humidifier, no cleaning or flushing of the evaporating chamber should be necessary.

TROUBLE-SHOOTING GUIDE

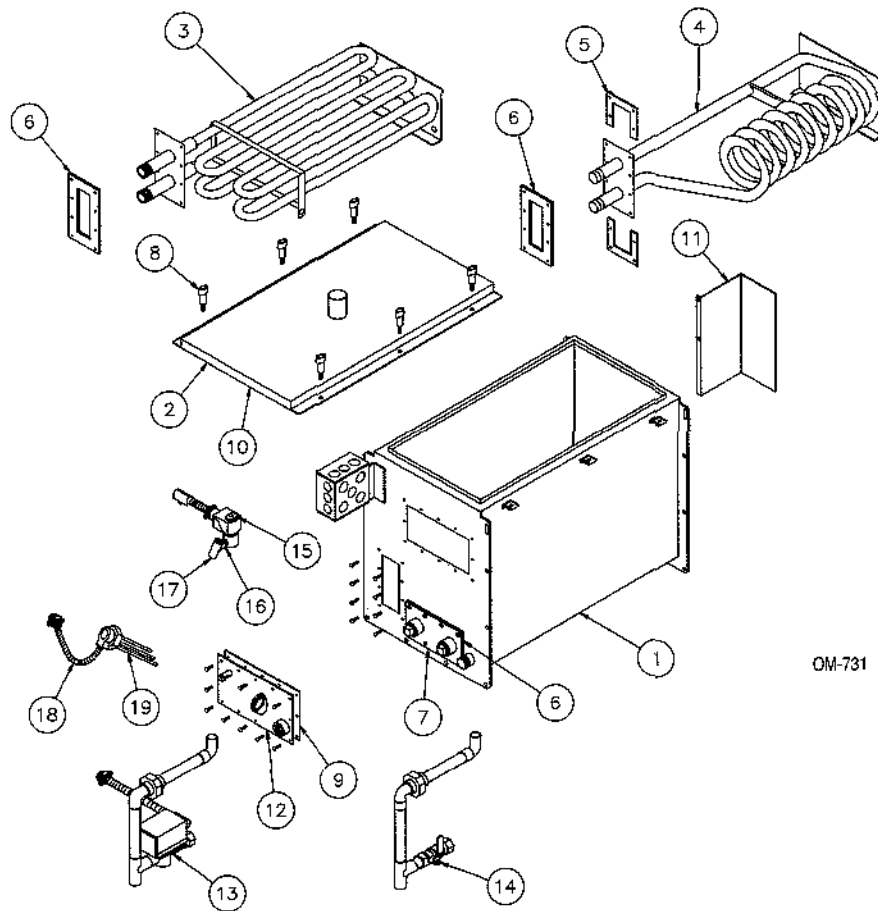
Symptom	Possible Cause	Recommended Action
Humidifier Will Not Heat	<p>No control transformer output. Humidistat is not calling.</p> <p>Safety controls open (high limit, air proving, etc...) Faulty level control board.</p> <p>Probe corrosion. Field installed service valve closed. Strainer plugged.</p>	<p>Verify control voltage. Set humidistat to "call". Inspect for faulty humidistat.</p> <p>Check safety controls.</p> <p>Verify control voltage and probe wires are connected correctly.</p> <p>Replace probes*. Verify valve is opened. Clean strainer.</p>
Humidifier Will Not Fill	<p>No water pressure.</p> <p>Faulty water fill valve.</p> <p>Plugged water strainer. Plugged valve. Faulty level control board.</p>	<p>Verify manual water supply valve is open.</p> <p>Verify action of fill solenoid valve, verify control voltage present at coil. Audible click should be heard as solenoid operates.</p> <p>Open strainer. Clean valve. Verify control voltage.</p>
Humidifier Does Not Stop Filling	<p>Lack of tank-to-probes continuity. Water conductivity under 100 micromhos/cm (2 grains per gallon).</p> <p>Manual drain is not fully closed.</p> <p>Fill valve is stuck open.</p> <p>Fill valve installed backwards.</p>	<p>Jumper terminals 1 & 3 if water stops, verify tank ground to term 3; check water supply conductivity; then consult factory.</p> <p>Close manual ball valve.</p> <p>Check valve for foreign matter.</p> <p>Check for correct water flow, through valve, note arrow.</p>
Low Output	<p>Automatic drain valve not seating.</p> <p>Manual drain is not fully closed.</p> <p>Excessive skimming amount.</p> <p>Fill valve is stuck open.</p> <p>Low water temperature.</p> <p>Control valve not fully opening.</p> <p>Steam trap.</p> <p>Scale coated heat exchanger.</p>	<p>Clean ball and seat of valve.</p> <p>Close manual ball valve.</p> <p>Reduce skimmer drain amount.</p> <p>Check valve for foreign matter.</p> <p>Check supply water temperature.</p> <p>Check control signal to valve.</p> <p>Not passing condensate.</p> <p>Clean heat exchanger.</p>
Makeup Water Valve Short Circuits	<p>Electrode probes may be incorrectly wired.</p> <p>Probes are scale coated.</p>	<p>Confirm that wiring agrees with diagram.</p> <p>Clean probes.</p>

*Although the three electrode probes may eventually corrode, they are usually functional for up to approximately 5000 hours of operation.

For additional trouble-shooting information, refer to the manual enclosed with the product shipment (LW310/LW320 control module, VAPOR-LOGIC®, or VAPOR-LOGIC₂®).

REPLACEMENT PARTS

Figure 20-1: LTS® Humidifier



OM-731

Table 20-1: LTS Humidifier (1)

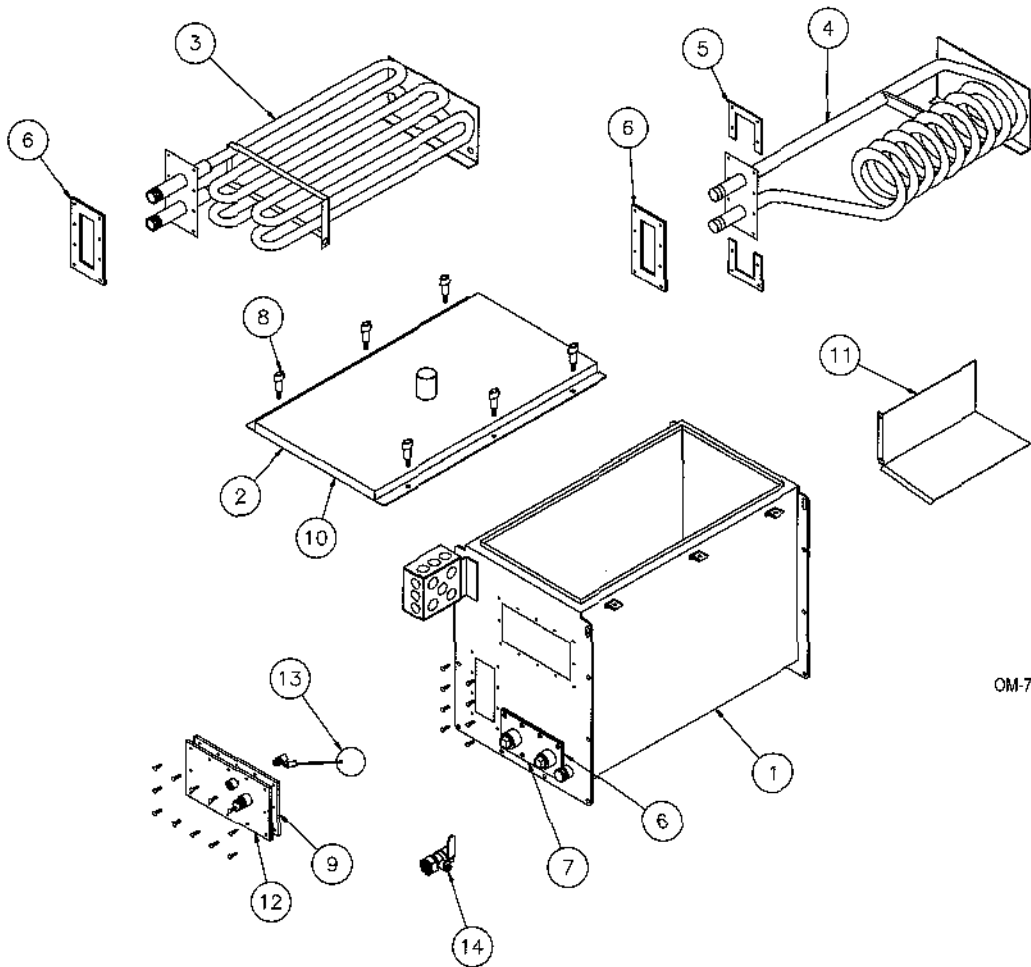
No.	Description	Part No.
1	Tank, LTS-25C/S	164404-025
1	Tank, LTS-100C/S	164404-100
1	Tank, LTS-200S and 400C	164404-400
2	Cover, LTS-25C/S	165359 (1)
2	Cover, LTS-100C/S	165365 (1)
2	Cover, LTS-200S and 400C	165369
3	Heat Exchanger, LTS-25S	164440-101
3	Heat Exchanger, LTS-100S	164440-102
3	Heat Exchanger, LTS-200S (qty: 2)	164440-103
4	Heat Exchanger, LTS-25C	164452-101
4	Heat Exchanger, LTS-100C	164452-103
4	Heat Exchanger, LTS-400C (qty: 2)	164452-104
5	Support, Heat Exchanger MTG Plate	124437

No.	Description	Part No.
6	Gasket, Clean Out/MTG Plate	308220
7	Clean Out Plate	165470 (1)
8	Knob, T-Handle Utility	700725 (1)
9	Gasket, Probe/Float Plate	308220-001
10	Gasket, Cover	160690 (1)
11	Baffle, Probe Plate	124443
12	Plate, Probe	164411 (1)
13	Valve, 3/4" Electric Drain (3)	505400-001
14	Valve, 3/4" Ball (2)	505010
15	Valve, 1/4" Solenoid	505080 (1)
16	Valve, Needle 1/4" NPT	505070-001 (1)
17	Stainer, 1/4" NPT Sediment	300050
18	Probe Plug Wire Assembly	408050-002
19	Probe Assembly	406060

- (1) Specify humidifier model and serial numbers when ordering.
 (2) With manual drain only.
 (3) With automatic timer drain option only.

REPLACEMENT PARTS

Figure 21-1: LTS®-DI Humidifier



OM-732

Table 21-1: LTS-DI Humidifier (1)

No.	Description	Part No.
1	Tank, LTS-25C/S	164404-025
1	Tank, LTS-100C/S	164404-100
1	Tank, LTS-200S and 400C	164404-400
2	Cover, LTS-25C/S	165359 (1)
2	Cover, LTS-100C/S	165365 (1)
2	Cover, LTS-200S and 400C	165369
3	Heat Exchanger, LTS-25S	164440-101
3	Heat Exchanger, LTS-100S	164440-102
3	Heat Exchanger, LTS-200S	164440-103
4	Heat Exchanger, LTS-25C	164452-101
4	Heat Exchanger, LTS-100C	164452-103
4	Heat Exchanger, LTS-400C	164452-104

No.	Description	Part No.
5	Support, Heat Exchanger MTG Plate	124437
6	Gasket, Clean Out/MTG	308220
7	Clean Out Plate Weld	165470 (1)
8	Knob, T-Handle Utility	700725 (1)
9	Gasket, Probe/Float Plate	308220-001
10	Gasket, Cover	160690 (1)
11	Baffle, Float Plate	124442
12	Plate Weld, Float	164410 (1)
13	Float Valve Assembly, Straight	(1)
14	3/4" Ball Valve, Stainless Steel	505000-001

(1) Specify humidifier model and serial numbers when ordering.

MAINTENANCE SERVICE RECORD

DATE INSPECTED	PERSONNEL	OBSERVATION	ACTION PERFORMED

TWO-YEAR LIMITED WARRANTY

DRI-STEEM Humidifier Company ("DRI-STEEM") warrants to the original user that its products will be free from defects in materials and workmanship for a period of two (2) years after installation or twenty-seven (27) months from the date DRI-STEEM ships such product, whichever date is the earlier.

If any DRI-STEEM product is found to be defective in material or workmanship during the applicable warranty period, DRI-STEEM's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DRI-STEEM's election. DRI-STEEM shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or re-installation of any defective product.

DRI-STEEM's limited warranty shall not be effective or actionable unless there is compliance with all installation and operating instructions furnished by DRI-STEEM, or if the products have been modified or altered without the written consent of DRI-STEEM, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Any warranty claim must be submitted to DRI-STEEM in writing within the stated warranty period.

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By purchasing DRI-STEEM's products, the purchaser agrees to the terms and conditions of this limited warranty.

DRI-STEEM[®] **HUMIDIFIER COMPANY**

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