


READ AND SAVE THESE INSTRUCTIONS







LOW-MAINTENANCE HUMIDIFIER

Installation, Operation,
and Maintenance Manual



Warnings and Cautions

 WARNING	CAUTION
<p>Indicates a hazardous situation that could result in death or serious injury if instructions are not followed.</p>	<p>Indicates a hazardous situation that could result in damage to or destruction of property if instructions are not followed.</p>

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	WARNING
	<p>Attention installer Read this manual before installing, and leave this manual with product owner. This product must be installed by qualified HVAC and electrical contractors and in compliance with local, state, federal, and governing codes. Improper installation can cause property damage, severe personal injury, or death as a result of electric shock, burns, or fire.</p> <p>DriSteeM Technical Support: 800-328-4447</p> <p>Read all warnings and instructions Read this manual before performing service or maintenance procedures on any part of the system. Failure to follow all warnings and instructions could produce the hazardous situations described, resulting in property damage, personal injury, or death.</p> <p>Failure to follow the instructions in this manual can cause moisture to accumulate, which can cause bacteria and mold growth or dripping water into building spaces. Dripping water can cause property damage; bacteria and mold growth can cause illness.</p> <p>If the IOM is missing, go to www.dristeem.com to download a replacement.</p>
	<p>Shut down the energy source Before performing service or maintenance procedures on any part of the system, verify that all energy sources are off. Failure to shut down the energy source could result in fire, explosion, electrical shock, and other hazardous conditions. These hazardous conditions could cause property damage, personal injury, or death.</p> <p>Contact with energized circuits can cause property damage, severe personal injury or death as a result of electrical shock or fire. Do not remove electrical panel cover/door or access panels until electrical power is disconnected.</p> <p>Follow the shutdown procedure in the system IOM before performing service or maintenance procedures on any part of the system.</p>
	<p>Hot surfaces and hot water This steam humidification system has extremely hot surfaces. Water in tanks, steam pipes, and dispersion assemblies can be as hot as 212 °F (100 °C). Discharged steam is not visible. Contact with hot surfaces, discharged hot water, or air into which steam has been discharged can cause severe personal injury. To avoid severe burns, follow the cool-down procedure in this manual before performing service or maintenance procedures on any part of the system.</p> <p>mc_011909_1130</p>

Warnings and Cautions

⚠ WARNING	
	<p>Disconnect electrical power</p> <p>Disconnect electrical power before installing supply wiring or performing service or maintenance procedures on any part of the humidification system. Failure to disconnect electrical power could result in fire, electrical shock, and other hazardous conditions. These hazardous conditions could cause property damage, personal injury, or death.</p> <p>Contact with energized circuits can cause property damage, severe personal injury, or death as a result of electrical shock or fire. Do not remove humidifier electrical panel cover, heater terminal cover, or subpanel access panels until electrical power is disconnected.</p> <p>Follow the shutdown procedure in this manual before performing service or maintenance procedures on any part of the system.</p> <p>mc_052410_1510</p>
	<p>Electric shock hazard</p> <p>If the humidifier starts up responding to a call for humidity during maintenance, severe bodily injury or death from electric shock could occur. To prevent such start-up, follow the procedure below before performing service or maintenance procedures on this humidifier (after the tank has cooled down and drained):</p> <ol style="list-style-type: none">1. Use Vapor-logic® keypad/display to change control mode to Standby.2. Shut off all electrical power to humidifier using field-installed fused disconnect, and lock all power disconnect switches in OFF position.3. Close field-installed manual water supply shut-off valve. <p>mc_050808_1540</p>

CAUTION	
<p>Hot discharge water</p> <p>Discharge water can be as hot as 212 °F (100 °C) and can damage some drain plumbing materials not rated for hot drain water. To prevent such damage, make sure drain water tempering is selected, and supply water is not heated. Do not shut off supply water to the cylinder before it is drained.</p> <p>Excessive supply water pressure</p> <p>Supply water pressure greater than 80 psi (550 kPa) can cause the humidifier to overflow.</p>	

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ATTENTION INSTALLER

Read this manual before installing. Leave manual with product owner.

DriSteem Technical Support
800-328-4447

Where to find more information

On our Web site:

The following related documents can be viewed, printed or ordered from our web site, www.dristeem.com

- Catalogs:
 - Vapormist® humidifier
 - Water treatment
- Installation, Operation, and Maintenance manuals:
 - Vapormist® humidifier
 - Vapor-logic® (includes sensor placement recommendations and troubleshooting information)
- DriSteem Design Guide (includes steam loss tables and general humidification information)

In DriCalc:

DriCalc® is our humidification system sizing and selection software, which can be ordered from our website.

DriCalc includes a comprehensive library of installation guide documents, including:

- Rapid-sorb installation instructions for vertical airflows
- Recommended dispersion placement within a duct or air handler
- Recommended sensor placement

Or call us at 800-328-4447

While obtaining documents from our web site or from DriCalc is the quickest way to review our literature, we will also mail to you any literature you need.

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Keypad/display and troubleshooting

The *Vapor-logic Installation and Operation Manual*, which was shipped with your humidifier, is a comprehensive operation manual. Refer to it for information about using the keypad/display and Web interface, and for troubleshooting information.

Download DriSteem literature

Most DriSteem product manuals can be downloaded, printed, and ordered from our web site: www.dristeem.com

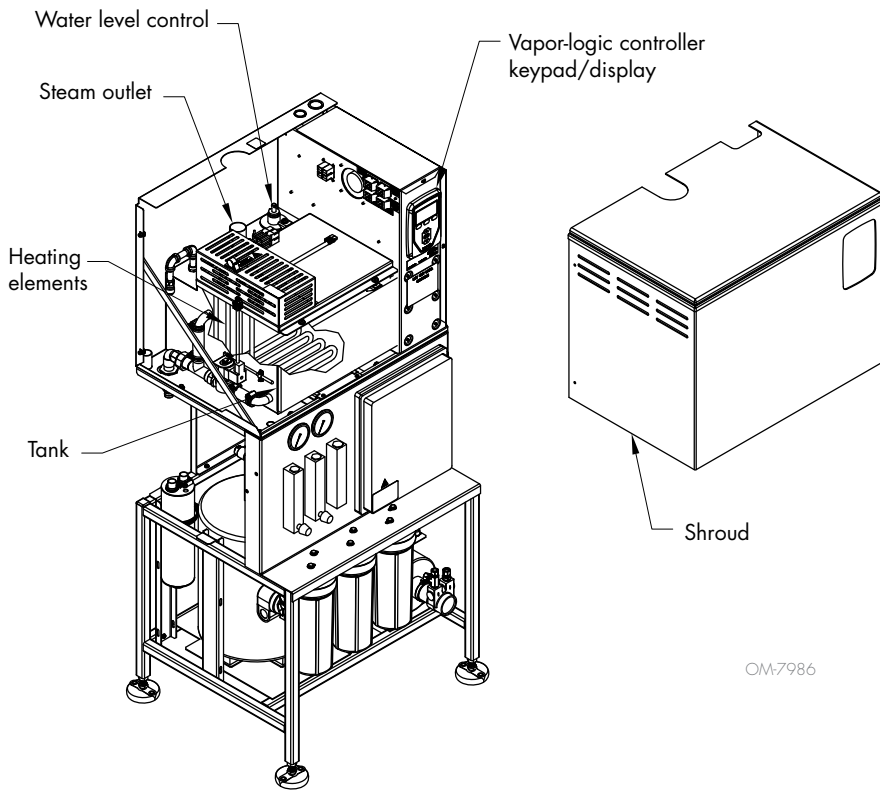
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Product overview

DriSteem delivers this near-zero maintenance steam humidification system through the integration of two proven products, the 200 Series reverse osmosis system and the Vapormist® electric humidifier, on a single skid mount.

The low-maintenance humidification system produces high purity water removing over 98% of dissolved solids. This prevents chalky scale build-up from overtaking the humidifier’s water tank, thereby extending intervals between humidifier maintenance by 10x or more, virtually eliminating downtime.

FIGURE 6-1: LOW-MAINTENANCE HUMIDIFIER



Important: Troubleshooting information for this humidifier is located in the *Vapor-logic Installation and Operation Manual* shipped with your humidifier. If you do not have this manual, go to www.dristeem.com to download or order a copy.

Supply water guidelines

Supply water quality is an important component of humidifier reliability and maintenance.

Examples:

- Corrosive water can decrease the service life of the humidifier.
- Excessive water hardness can increase the humidifier maintenance requirements.

To maximize humidifier service life and minimize humidifier maintenance, DriSteem has established guidelines for supply water. See Table 6-1.

Table 6-1: DriSteem's low-maintenance humidification system supply water guidelines	
Chlorides	See Table 8-2
Total hardness Tap water	Softened water only
pH RO, DI, or softened water	7 to 8
Tap water	6.5 to 8.5
Silica	< 15 ppm
You may wish to take action to mitigate potential negative effects to your humidifier. Supply water outside of these guidelines may void your DriSteem warranty. Please contact your DriSteem Representative or DriSteem Technical Support if you need advice.	

Product overview

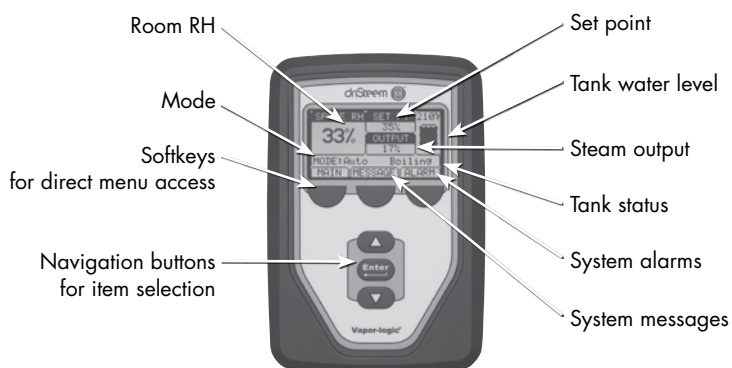
CONTROLLER

The Vapor-logic controller in the Low-maintenance humidifier provides menus for all humidifier functions, with a Web interface for Ethernet access (see Figure 7-1).

The Vapor-logic Installation and Operation Manual ships with the Low-maintenance humidifier. Refer to it for information on using the keypad/display and Web interface, and for troubleshooting information.

FIGURE 7-1: VAPOR-LOGIC KEYPAD/DISPLAY AND WEB INTERFACE

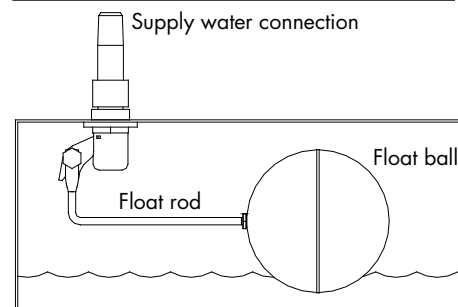
KEYPAD/DISPLAY



Static IP addresses

See the Vapor-logic Controller Installation and Operation Manual shipped with the Low-maintenance humidifier for more information about configuring IP addresses.

FIGURE 7-2: WATER LEVEL CONTROL



water levels are controlled by using a float valve and low-water cutoff switch.

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WEB INTERFACE

System Status

SPACE RH	SET POINT	OUTPUT
33%	35%	12.3%

RUN MODE: **Auto**

TANK STATUS: **Boiling**

Alarms: 0 active alarms
[View Alarms](#)

Messages: 0 active messages
[View Messages](#)

TANK STATUS:

Run Mode	Auto	CHANGE
Space RH	33%	
RH set point	35%	CHANGE
Input signal	9.3 mA	
Steam output	12.3%	
Steam production	37.4 lbs/hr	
Duct HL switch	Closed	
Tank temperature	194°F	
Tank temp signal	1637 Ohms	
High water probe	Water	
Mid water probe	Water	
Low water probe	Water	
Fill valve	Closed	
Drain valve	Closed	
Airflow switch	Flow	
Interlock switch	Closed	
H2O until drain/flush	9120 lbs	
H2O until service	304000 lbs	
High probe signal	1	
Mid probe signal	1	
Low probe signal	1	

Models, capacities, electrical specifications, and weights

Table 8-1:
Low-maintenance humidifier capacities, electrical specifications, and weights

Model	Maximum steam capacity		Current draw (amps)											Weights ‡			
			Single-phase						Three-phase					Shipping		Operating	
			kW	lbs/hr	kg/h	120V	208V*	240V*	277V	480V†	600V†	208V*	240V†	277V	480V†	600V†	lbs
2	6	2.7	22.3	12.4	11.1	10	5.8	4.55	—	—	—	—	—	241	109	299	136
4	12	5.4	38.9	22	19.5	17.2	9.9	7.95	19.5	17.2	15.3	8.8	7.05	241	109	299	136
6	18	8.2	—	31.6	27.8	24.5	14.1	11.25	27.8	24.5	21.6	12.4	9.95	249	113	326	148
8	24	10.9	—	41.3	36.1	31.7	18.3	14.55	36.1	31.7	27.8	16	12.75	249	113	326	148
10	30	13.6	—	—	44.5	38.9	22.4	17.95	31.9	28.1	24.7	14.2	11.35	254	115	343	156
12	36	16.3	—	—	—	46.1	26.6	21.25	36.1	31.7	27.8	16	12.75	254	115	343	156
14	42	19.1	—	—	—	—	30.8	24.55	41.7	36.5	32	18.4	14.75	254	115	343	156
16	48	21.8	—	—	—	—	34.9	27.95	47.2	41.3	36.1	20.8	16.65	254	115	343	156
21	63	28.6	—	—	—	—	45.4	36.25	—	—	46.6	26.9	21.45	256	116	356	161
25	75	34.0	—	—	—	—	—	42.95	—	—	—	31.7	25.35	256	116	356	161
30	90	40.9	—	—	—	—	—	—	—	—	—	37.7	30.15	262	119	360	163
34	102	46.3	—	—	—	—	—	—	—	—	—	42.5	33.95	262	119	360	163

* On 208V/240V/single-phase/three-wire and on 208V/three-phase/four-wire supplies, the neutral line provides a separate 120V circuit for the SDU fan unit.
 ** For wire sizing, the highest leg draw is shown due to current imbalance.
 † Add the following to Vapormist weights if using an SDU option (these weights are for additional control components housed within the Vapormist cabinet):
 – SDU-I: 12 lbs (5.5 kg) (SDU-I operating weight is 58 lbs [26 kg])
 – SDU-E: 9 lbs (4 kg) (SDU-E operating weight is 51 lbs [23 kg])
 ‡ Add the following if using the SSR option:
 – For single-phase or three-phase models drawing less than 21.7 amps, add 2 lbs (1 kg)
 – For three-phase models drawing more than 21.7 amps, add 4 lbs (2 kg)
 All Vapormist models operate at 50/60 Hz.

Table 8-2:
Pounds of water until ADS based on supply water chloride level

Supply water chloride	Low-maintenance humidifier			
ppm	Models 2-4	Models 6-8	Models 10-16	Models 21-34
5	17,500	31,700	40,600	49,200
10	8,800	15,800	20,300	24,600
20*	4,400	7,900	10,100	12,300
30	2,900	5,300	6,800	8,200
40	2,200	4,000	5,100	6,200
50	1,800	3,200	4,100	4,900
60	1,500	2,600	3,400	4,100
70	1,300	2,300	2,900	3,500
80	1,100	2,000	2,500	3,100
90	1,000	1,800	2,300	2,700
100	900	1,600	2,000	2,500
110	800	1,400	1,800	2,200

* default ADS setting

To ensure <5ppm chloride enters the evaporating chamber, adjust the Automatic Drain Sequence (ADS) if needed based on supply water chloride levels. See Table 8-2 for setting recommendations.

Refer to the Vapor-logic Controller Installation, Operation, and Maintenance manual for adjustment instructions.

Dimensions

FIGURE 9-1: LOW-MAINTENANCE HUMIDIFIER DIMENSIONS AND PLUMBING CONNECTIONS

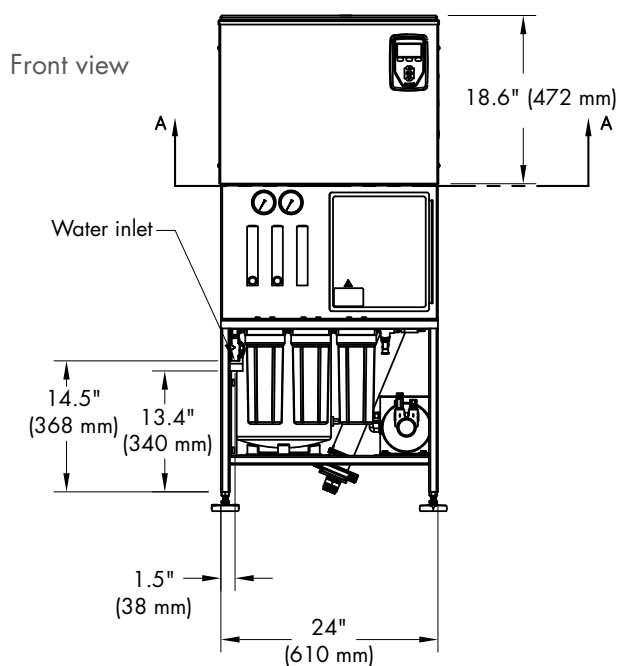
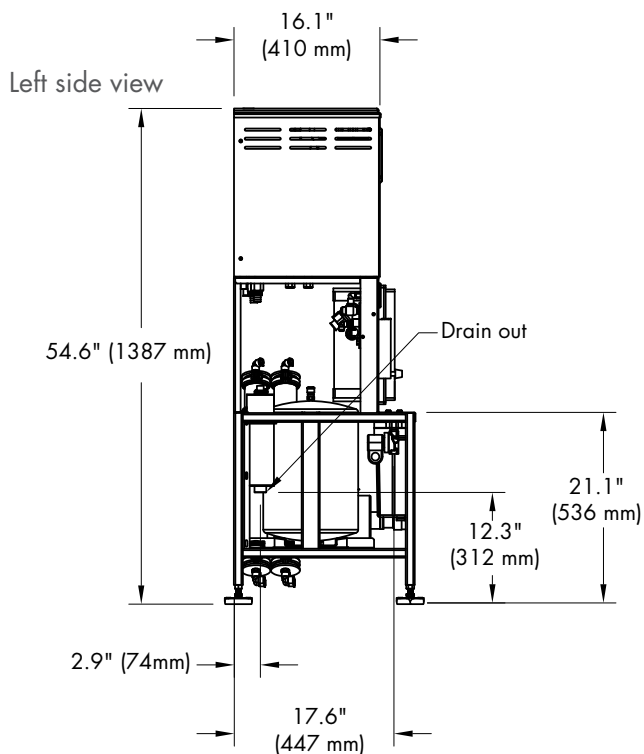
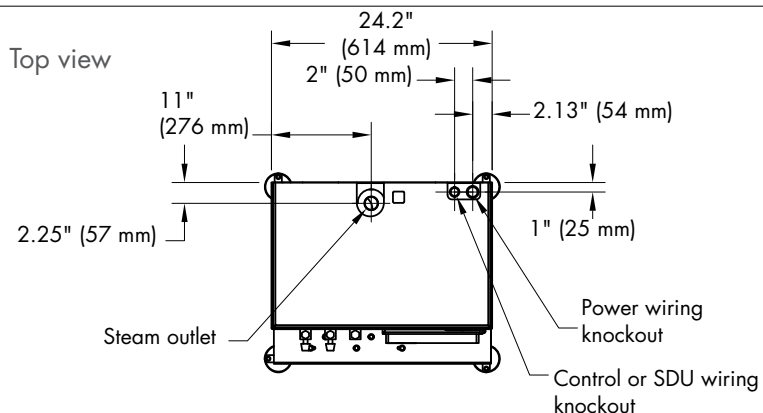
Water supply line:

- ½" NPT (DN15) connection size
- 25 to 80 psi (175 to 550 kPa) required water pressure.

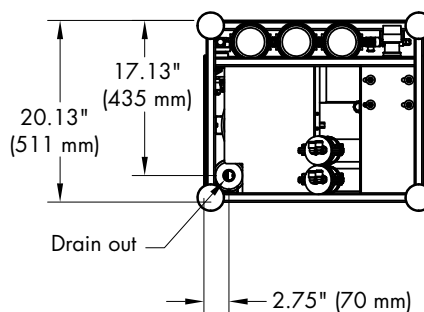
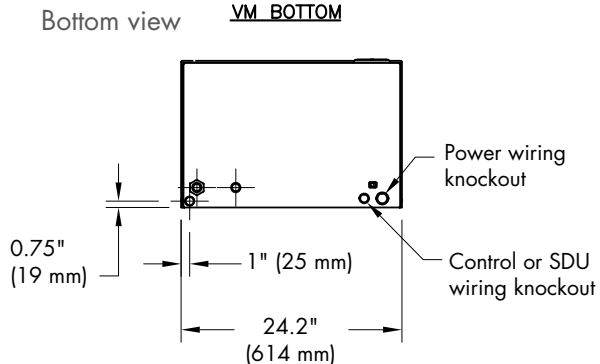
Drain line:

- ¾" NPT (DN20) connection size

Note: Use only softened source water. Although tank maintenance is significantly enhanced with the Low-maintenance humidifier, if hard water is used, tank maintenance will be necessary. Check humidifier tank annually for sediment buildup and float function.



**SECTION A-A
VM BOTTOM**



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Steam outlet connections

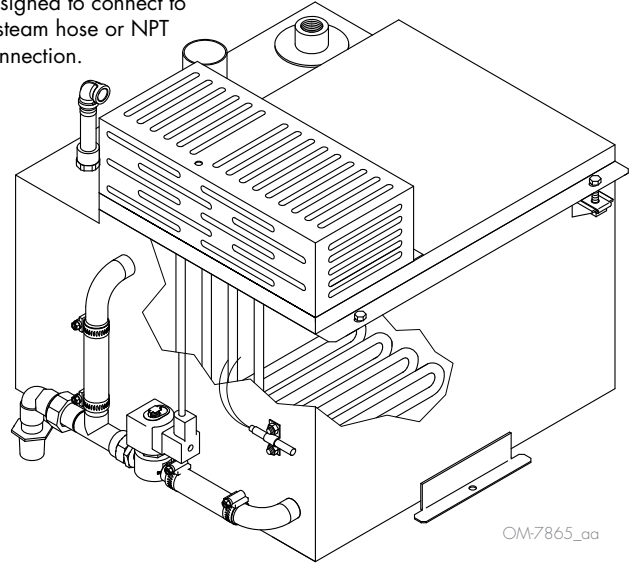
Table 10-2:
Steam connection sizes

Low-maintenance humidification model	Steam outlet
2, 4, 6, 8	1½" hose or NPT connection
10*, 12*, 14*, 16*	1½" or 2" hose or NPT connection
21, 25, 30, 34	2" hose or NPT connection

* If using with an SDU-E (Space Dispersion Unit External Absorption), the Low-maintenance steam outlet must be 2" to match the SDU-E steam inlet.

FIGURE 10-1: STEAM OUTLET CONNECTIONS

The steam outlet is designed to connect to a steam hose or NPT connection.



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Selecting a location

HUMIDIFIER

When selecting a location for the humidifier, consider the following:

- **Proximity to the duct**

Install the humidifier near the air duct system where the dispersion assembly will be located. The maximum recommended length for steam hose connecting a single humidifier to a dispersion assembly is 10' (3 m). The maximum recommended developed length for tubing connecting a single humidifier to a dispersion assembly is 20' (6 m).

For more information about installing dispersion assemblies, see the "Dispersion," document.

- **Elevation of the installed dispersion assembly**

The recommended installation location for the dispersion assembly is at an elevation higher than the humidifier. However, if the dispersion assembly must be installed at an elevation lower than the humidifier, install a drip tee and drain.

Before installing a dispersion assembly or interconnecting piping, review all pitch requirements in the "Dispersion" section of this manual.

- **Required clearances (see Figure 12-1)**

- **Electrical connections**

Electrical power supply connections are at the lower or upper right rear corner of the unit. See "Wiring" on Pages 18 and 19.

- **Supply water and drain piping connections**

Water supply piping is at the lower right front corner of the unit. Drain connection is at the lower left rear corner of the unit. See the piping illustrations and instructions starting on Page 13.

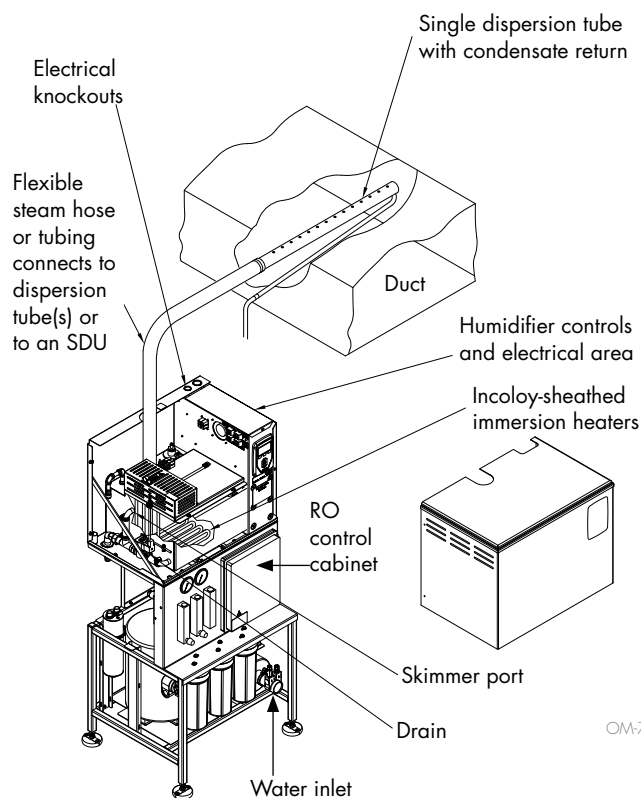
- **Exterior wall insulation**

Install the humidifier on an exterior wall only if the wall is properly insulated.

DISPERSION CONTROL DEVICES

See the Dispersion instructions for recommended installation locations for the dispersion assembly and associated control devices.

FIGURE 11-1: INSTALLATION OVERVIEW



Mounting

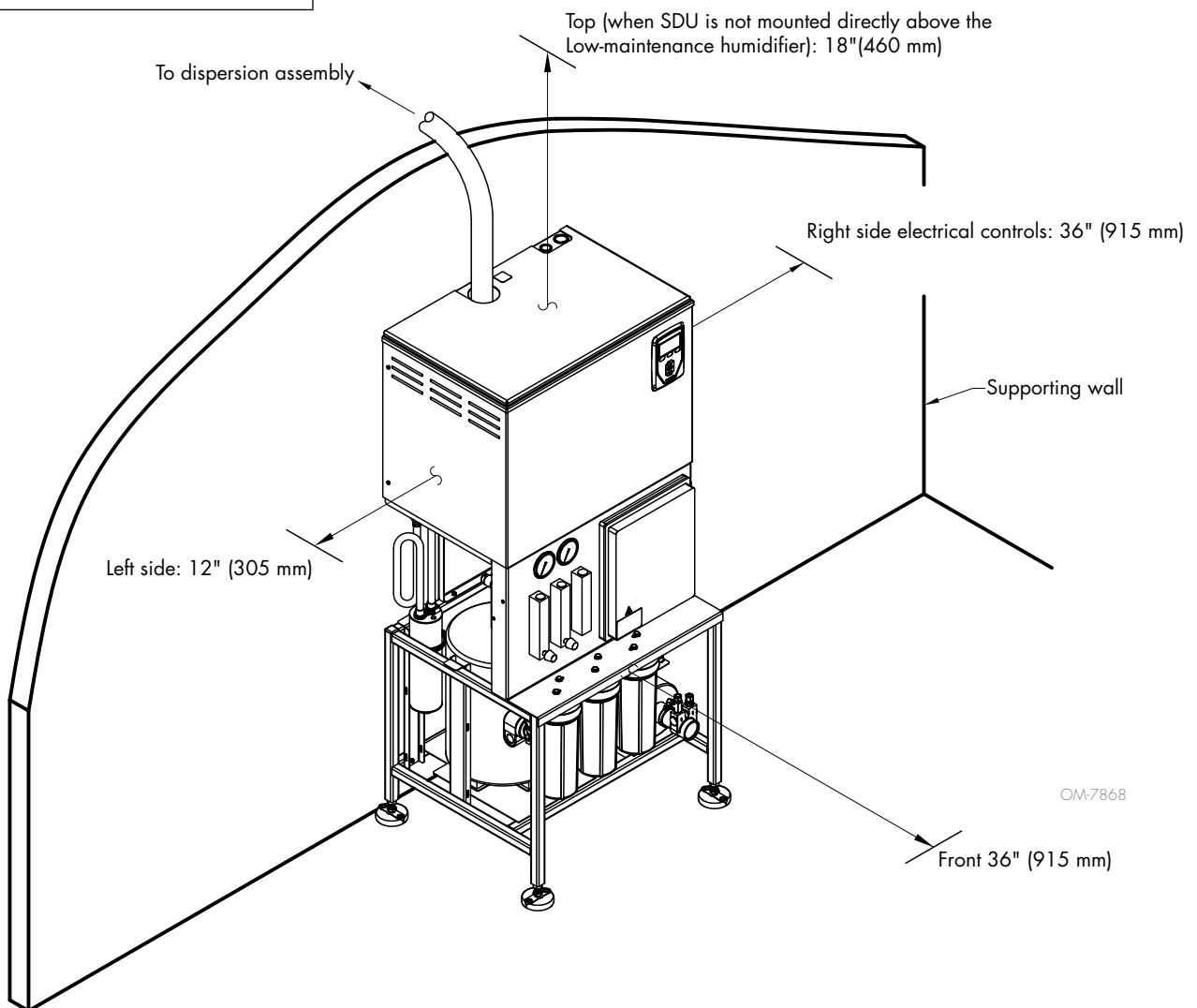
FIGURE 12-1: LOW-MAINTENANCE HUMIDIFIER CLEARANCE RECOMMENDATIONS

! WARNING

Mounting hazard
 Mount humidifier per the instructions in this manual and to a structurally stable surface. Improper mounting of the humidifier can cause it to fall or tip, resulting in severe personal injury or death.

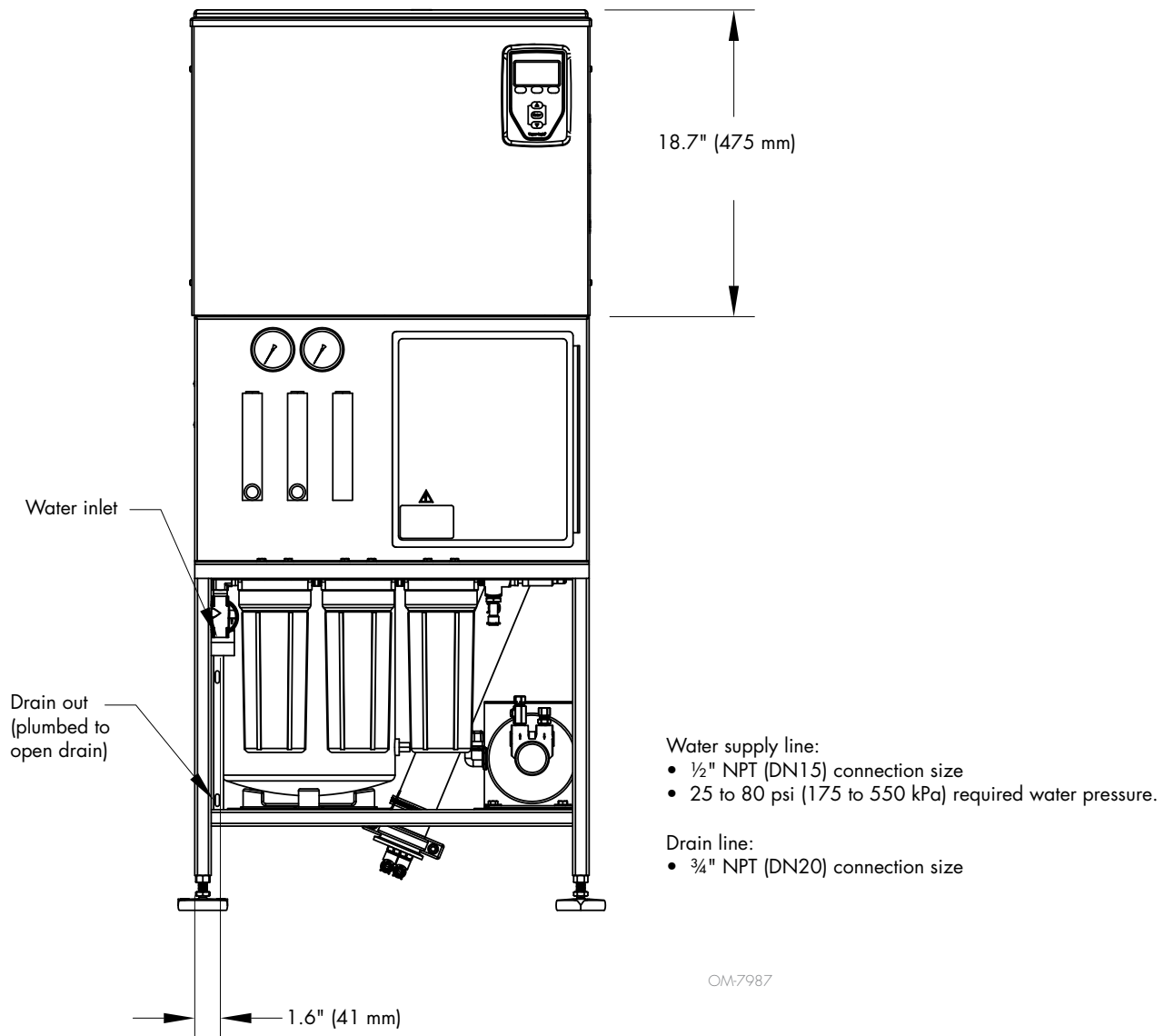
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Maintain these clearances for service and maintenance.



Piping: Tap/softened water

FIGURE 13-1: LOW-MAINTENANCE HUMIDIFIER (TAP/SOFTENED WATER) FIELD PIPING OVERVIEW



Use only softened source water. Although tank maintenance is significantly enhanced with the Low-maintenance humidifier, if hard water is used, tank maintenance will be necessary. Check humidifier tank annually for sediment buildup and float function.

Piping: Supply water and drain piping

SUPPLY WATER PIPING

Use only copper for supply water piping; do not use rubber or plastic. The standard supply water connection before the fill valve is a 1/4" FIP strainer.

Note: The supply water connection size is 3/8" BSP [DN10] in Europe.

In cases where water hammer may be a possibility, consider installing a shock arrester. Water pressure must be 25 to 80 psi (175 to 550 kPa).

DRAIN PIPING

Drain piping must be code-approved, 3/4" (DN 20) ID material rated for 212 °F (100 °C) minimum.

The drain cup has an integral grounding plate and requires a field-installed 1" (25 mm) air gap to a drain funnel to prevent conduction of electricity in the drain line.

The Low-maintenance humidification system features user-selectable drain water tempering. When drain water tempering is selected, the humidification system tempers drain water by opening the fill valve whenever the drain valve is energized, which automatically cools drain water before it enters the drain. Drain water tempering is intended to keep water entering the drain line no hotter than 140 °F (60 °C). Manually energizing the drain valve when the supply water is shut off can allow 212 °F (100 °C) water to enter the drain line.

Important: Thoroughly flush supply water piping to remove pipe residue and stagnant water before connecting piping to humidifier. Pipe residue and stagnant water in water supply piping can cause foaming, preventing humidifier from reaching required steam capacity.


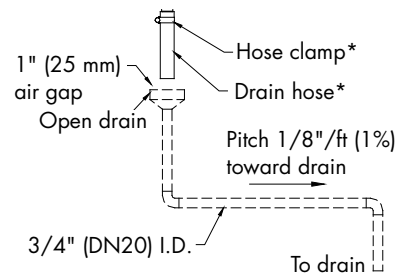
 WARNING
<p>Hot drain pipes Drain piping surface may be hot. Touching or contact with hot pipe may cause severe personal injury.</p>

FIGURE 14-1: DRAIN PIPING DETAIL



* Ship with humidifier, and can be ordered from DriSteem.

Piping: Supply water and drain piping

Observe the following precautions when selecting and installing drain piping to ensure personal safety and material integrity:

- When using copper or other metallic drain piping, ground the drain piping to the earth ground lug in the humidification system.
- Chlorinated polyvinyl chloride (CPVC) piping is a non-metallic alternative for drain piping. It is rated up to 212 °F (100 °C) for intermittent-use, low-pressure applications.

The connection size for the steam cylinder drain is 1" (DN25) hose. Do not reduce this connection size. If drainage by gravity is not possible, use a reservoir pump rated for 212 °F (100 °C) water.

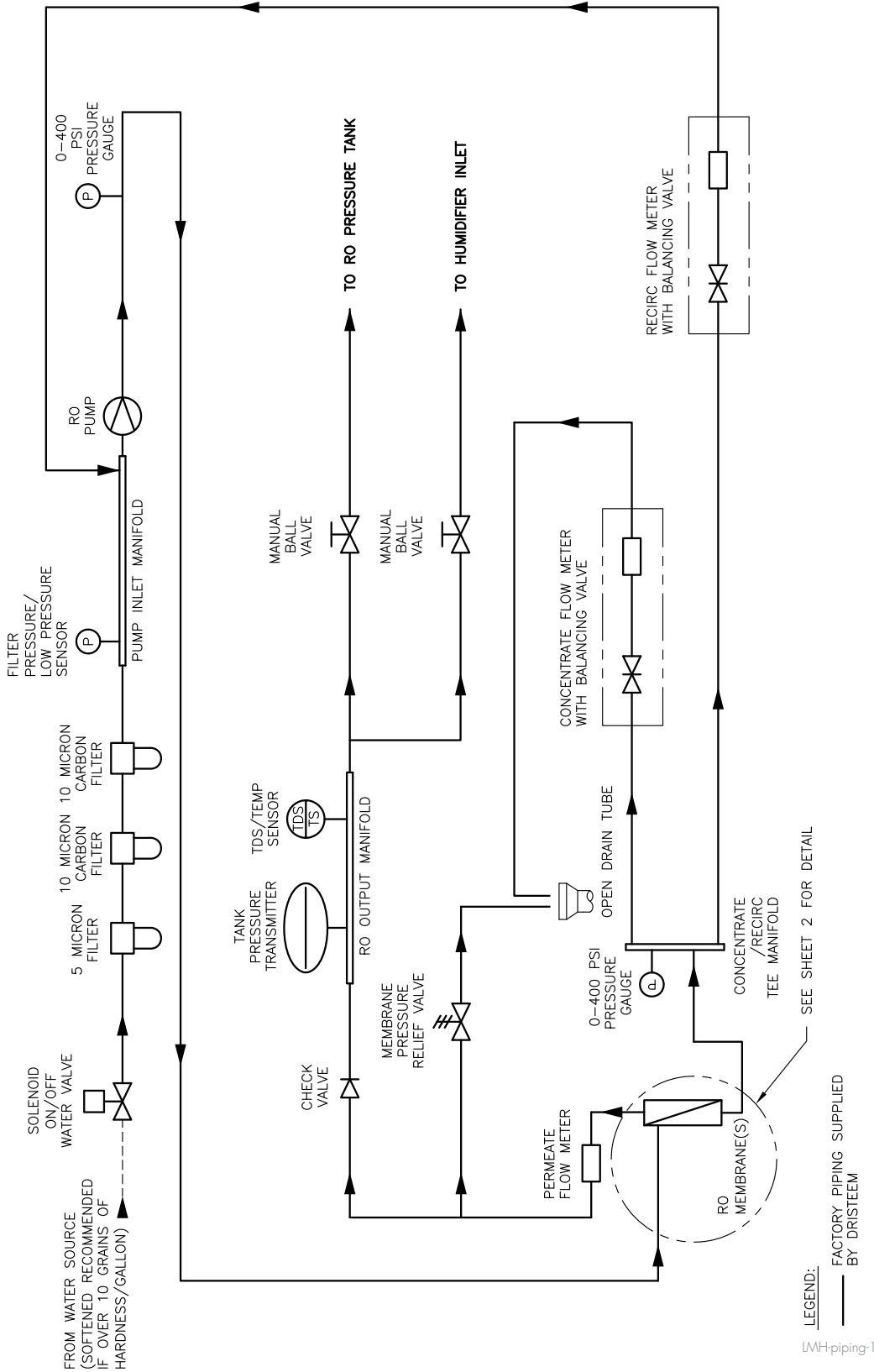
A drain hose is provided to function as the flexible connection from the drain cup to the field-installed open drain. See Figure 15-1.

AUTOMATIC DRAIN WATER TEMPERING

The Low-maintenance humidification systems are shipped with drain water tempering set to OFF. To activate automatic drain water tempering see the *Vapor-logic Installation and Operating Manual*.

Piping: Schematics

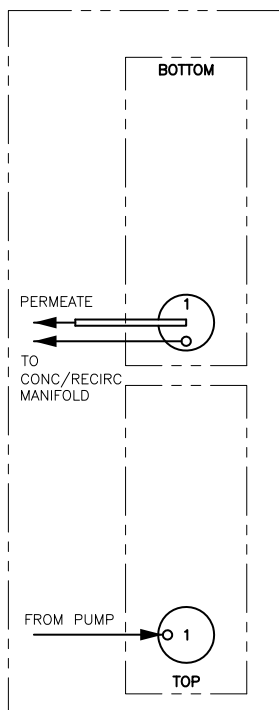
FIGURE 16-1: PIPING SCHEMATIC



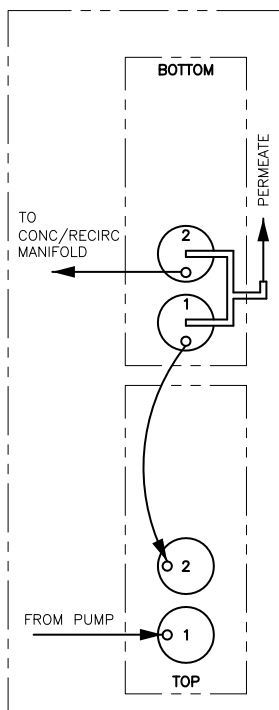
Piping: Schematics

FIGURE 17-1: PIPING SCHEMATIC



MODELS: LMH-2 TO LMH-8



MODELS: LMH-10 TO LMH-34



LEGEND:

-  FACTORY SUPPLY/CONDENSATE PIPING
-  FACTORY PERMEATE PIPING

LMHpiping:1a

Wiring

HUMIDIFIER FIELD WIRING

All wiring must be in accordance with all governing codes, and with the humidifier wiring diagrams. The diagrams are located inside the removable humidifier controls and electrical area and the RO control cabinet on the right side of the humidifier cabinet. Power supply wiring must be rated for 220 °F (105 °C).

When selecting a location for installing the humidifier, avoid areas close to sources of electromagnetic emissions such as power distribution transformers.

The fill valve, drain valve, probes, and temperature sensors use Class 2, 24 VAC power.

The use of semiconductor fusing sized per the National Electric Code is recommended with the SSR option.

GROUNDING REQUIREMENTS

The approved earth ground must be made with solid metal-to-metal connections and must be a good conductor of radio frequency interference (RFI) to earth (multistranded conductors).

Ground wire should be the same AWG (mm²) size as the power wiring or sized per NEC requirements (in Europe, IEC 60364 requirements).

PROPER WIRING TO PREVENT ELECTRICAL NOISE

Electrical noise can produce undesirable effects on electronic control circuits, which affects controllability. Electrical noise is generated by electrical equipment such as inductive loads, electric motors, solenoid coils, welding machinery, or fluorescent light circuits. The electrical noise or interference generated from these sources (and the effect on controllers) is difficult to define, but the most common symptoms are erratic control or intermittent operational problems.

Important:

- For maximum EMC (electromagnetic compatibility) effectiveness, wire all humidity, high limit, and airflow controls using multicolored shielded/screened plenum-rated cable with a drain wire for the shield/screen. Connect the drain wire to the shield/screen ground terminal with wire less than 2" (50 mm) in length.
- Do not ground shield at the device end.

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WARNING

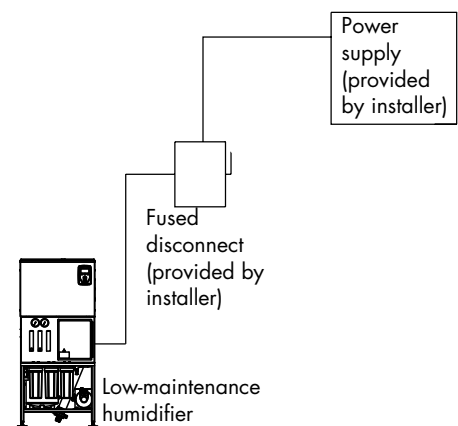
Electric shock hazard

Only qualified electrical personnel should perform field wiring installation procedures. Improper wiring or contact with energized circuits can cause property damage, severe personal injury, or death as a result of electric shock and/or fire.

Do not remove the humidifier electrical panel cover or the heater terminal cover until electrical power is disconnected. Contact with energized circuits can cause property damage, severe personal injury, or death as a result of electrical shock.

mc_062310_0629

FIGURE 18-1: FIELD WIRING REQUIREMENTS



OM-1007_LMH

Notes:

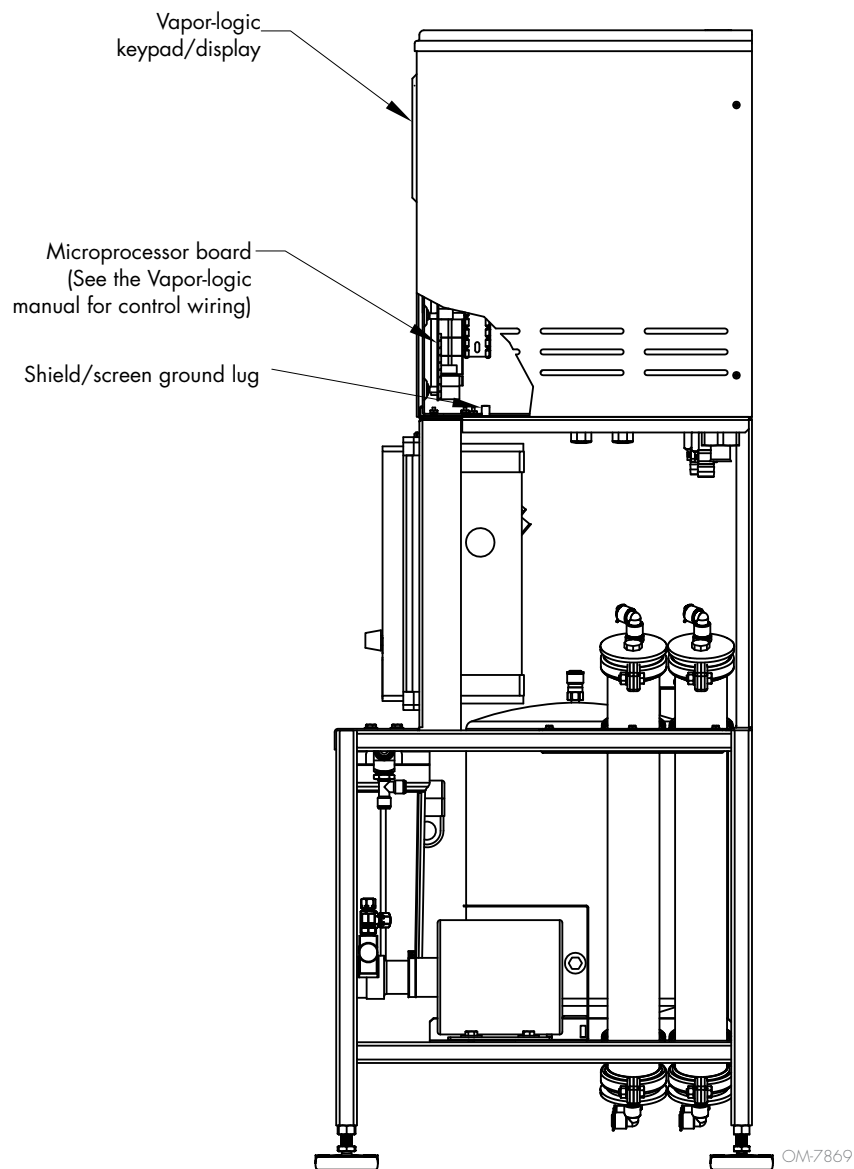
- Control wiring and power wiring must be run in dedicated or separate earthed metal conduit, cable trays, or trunking.
- Separate the line voltage wiring from low voltage control circuit wiring when routing electrical wiring inside the humidifier cabinet.
- Do not use chassis or safety grounds as current-carrying commons. Never use a safety ground as a conductor or neutral to return circuit current.

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Wiring

FIGURE 19-1: SHIELDED/SCREENED CABLE DRAIN WIRE CONNECTION TO LUG

Humidifier side view



Note:

For maximum EMC effectiveness, all humidity, temperature, and airflow controls should be wired using multicolored shielded/screened plenum-rated cable with a drain wire for the shield/screen. The drain wire should be connected to the shield/screen ground terminal with its length kept to less than 2" (50 mm).

Sensor placement

SENSOR LOCATION IS CRITICAL

Sensor location has a significant impact on humidifier performance. See the recommendations below and Figure 21-1.

Note: DriSteem recommends that you do not interchange room and duct humidity devices. Room humidity devices are calibrated with zero or little airflow, whereas duct humidity devices require air passing across them.

Recommended humidity control (transmitter/humidistat) locations:

- A. Ideal. Ensures the best uniform mix of dry and moist air with stable temperature control.
- B. Acceptable, but room environment can affect controllability, such as when sensor is too close to air grilles, registers, or heat radiation from room lighting.
- C. Acceptable. Provides uniform mixture of dry and moist air. If extended time lag exists between humidity generation and sensing, extend sampling time.
- D. Acceptable (behind wall or partition) for sampling entire room if sensor is near an air exhaust return outlet. Typical placement for sampling a critical area.
- E. Not acceptable. These locations might not represent actual overall conditions in the space.
- F. Not acceptable. Do not place sensors near windows, door passageways, or areas of stagnant airflow.

Recommended safety (airflow and high limit) sensor location:

- G. Best sensing location for high limit humidistat or humidity sensor and airflow proving switch.

Other factors affecting humidity control

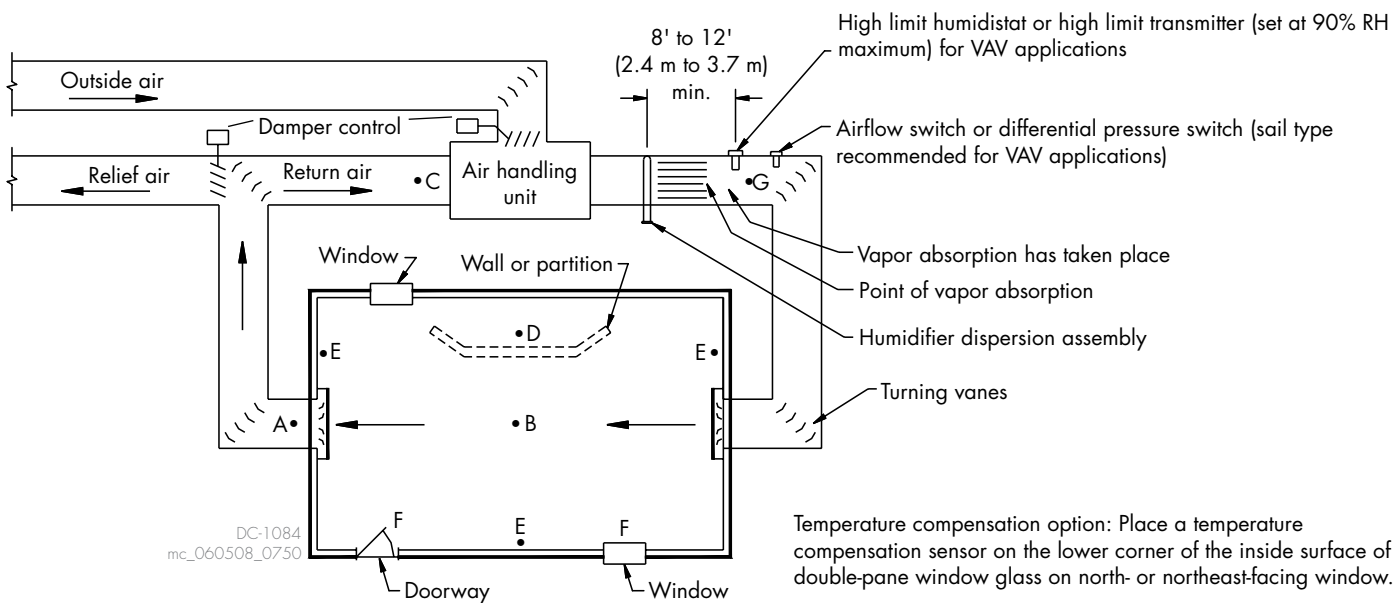
Humidity control involves more than the controller's ability to control the system. Other factors that play an important role in overall system control are:

- Size of humidification system relative to load
- Overall system dynamics associated with moisture migration time lags
- Accuracy of humidistats and humidity transmitters and their location
- Dry bulb temperature accuracy in space or duct
- Velocities and airflow patterns in ducts and space environments
- Electrical noise or interference

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Sensor placement

FIGURE 21-1: RECOMMENDED SENSOR LOCATIONS

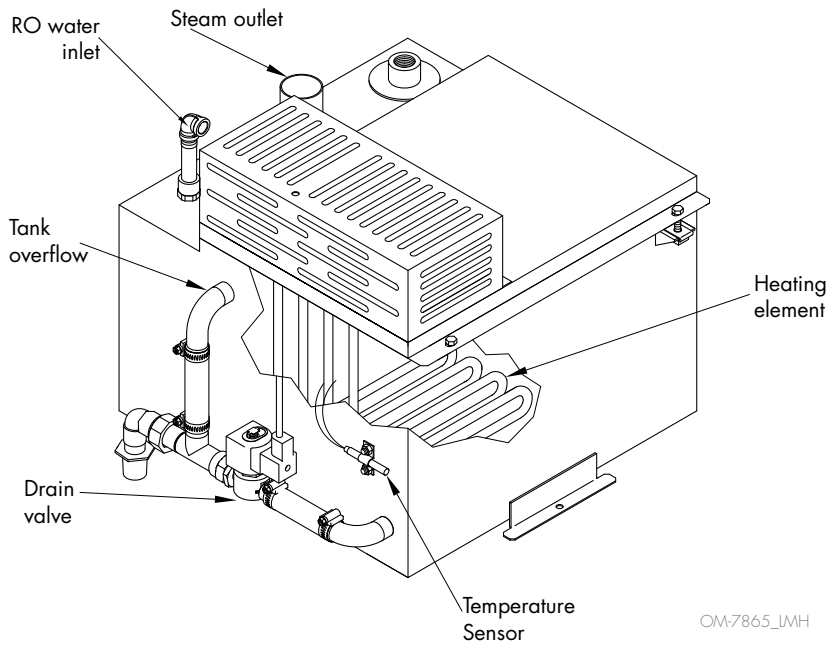


Principle of operation

FIGURE 22-1: LOW-MAINTENANCE HUMIDIFIER COMPONENTS

CAUTION

To prevent concentrate from precipitating and causing irreversible fouling of the RO membrane, do not operate the system with the concentrate to drain control valve completely closed.



Principle of operation

The Low-maintenance humidifier produces water that has been treated using reverse osmosis and does not require skimming.

1. When the system is first activated, the RO system activates and the evaporating chamber fills with RO water to the operating level.
2. On a call for humidity, the heating elements are energized, causing the water to boil. The float valve opens and closes as needed to maintain the operating water level.
3. Steam created in the evaporating chamber flows through vapor hose or piping to the dispersion assembly, where it is discharged into the airstream.

SHUTDOWN

1. Put the system in 'Standby' mode or remove power. Close the isolation valve if it is installed on the feed line.
2. If the unit is to be shut down for more than one week, an automatic system flush will occur every 168 hours (adjustable) to prevent bacterial growth.
3. When the system is restarted after an extended shutdown, follow initial system start-up procedures.

FIGURE 23-1: CONTROL VALVES



Start-up checklist

The following checklist is to be completed one at a time, from top to bottom, in order to ensure proper installation. If an item in the Start-up checklist below does not apply to your system, skip to the next item and continue the process.

- Read this manual and all other information that was provided with your system.
- Verify that all field wiring is done according to the instructions in this manual and in the unit wiring diagram.
- Confirm that proper grounding and an approved earth ground are provided.
- Confirm that the input signal is consistent with the Vapor-logic controller's expected input signal. Input signals are listed in the Vapor-logic Setup menu. See "Installation Step 2: Setup" in the Vapor-logic Installation and Operation Manual.
- Make sure valve on manifold that supplies the pressure tank is closed.
- Verify precharge on pressurized RO storage tank is between 26 and 28 psi (179 and 194 kPa). Do not precharge over 28 psi (194 kPa).

Note: This precharge pressure is to maximize download volume for integrated pressurized RO storage tank cut-in and cut-out switch points at 30 and 50 psi (27 and 345 kPa) respectively.

- Check to make sure the wiring diagrams and other items shipped in control cabinet(s) have been removed and stored in a safe location.
- Open concentrate and recirculation control valves slightly (about ½ counterclockwise rotation).
- Inspect to insure that no flexible plumbing lines have been kinked or damaged during installation.
- Turn on supply water and confirm that there are no leaks.
- Turn on power to the unit, and confirm the Main menu is displayed on the keypad/display. The display may take several seconds to appear as the controller powers up.

Start-up checklist

- Change/confirm mode in the Vapor-logic controller in the Main Menu to "Auto" and that status is "Filling."
(Main > Status > Mode > Auto > Home)
Note: A non-audible low inlet pressure alarm indicator will need to be manually cleared on the Vapor-logic controller. To clear a fill alarm, press the flashing alarm button, select "Clear". Repeat until all fill alarms are clear. If fill alarms continue, confirm the water inlet valve is open. Contact DriSteem Technical Support at 800-328-4447 if problem continues. The process can take about 15 minutes to complete.
- When "Filling" appears in main menu, confirm that the system inlet pressure is at least 40 psi (276 kPa) on the display and that the humidifier tank is filling with water.
- Make sure the tank has filled with water. See the "Damage from dry startup" Caution on Page 26.
With sufficient water in the tank, airflow switch closed, high limit switch closed, and the humidifier getting a call for humidity, verify the heater outputs are activated. This is indicated by the mode change from "Auto Filling" to " Auto Heating".
- Check the amp draw of the heaters. Refer to the humidifier wiring diagram for the proper rating.
- With sufficient water available, the system in Auto mode, and the storage tank pressure is between 26 and 28 psi (179 and 195 kPa), verify that the pump is activated and the heater outputs are activated.
- In the Status screen, confirm that the high limit humidistat input is closed or the high limit transmitter is connected.
- Set permeate flow and recirculate flow meter to desired setting. (See Table 28-1).
- In the Status screen, confirm that the Duct Airflow Switch is closed.
- If you experience difficulties, have the keypad/display information available along with the serial number and unit Model, and call DriSteem Technical Support at 800-328-4447.

Start-up procedure

After the system is installed and connected properly:

1. Verify that the humidifier, controls, piping, electrical connections, steam supply, and dispersion units(s) are installed according to the following:
 - Installation instructions in this manual
 - Vapor-logic Installation and Operation Manual (shipped with unit)
 - Installation section
 - Pre-installation checklist
 - Ladder style wiring diagram (inside humidifier electrical panel cover)
 - External connections wiring diagram (inside control cabinets). Remove from humidification system before start-up.
 - All governing codes
2. Verify that all electrical connections are secure before applying power.
3. Make sure all electrical covers are in place and secure. See Warning at right.
4. Verify that the humidifier is mounted level. See operating weights in Table 8-1.
5. Verify that the humidifier is level front to back and side to side after it is full of water.
6. Read the "Operation" section of the Vapor-logic Installation and Operation Manual.

Note: During start-up, do not leave the humidifier unattended.
7. Perform all applicable "Start-up checklist" items. See Page 24.
8. Monitor humidifier operation through multiple fill cycles. The humidifier operating status appears on the keypad/display.

The Vapor-logic Installation and Operation Manual is a comprehensive operation manual. Refer to it for information regarding the following features:

- Keypad/display setup and menu information
- Control input signals and functions
- Drain, flush, and skim features
- Safety features
- Alarm screens and fault messages

The manual was shipped with your humidifier and is available at our Web site: www.drsteem.com

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WARNING

Electric shock hazard

Only qualified electrical personnel should perform start-up procedure.

Contact with energized circuits can cause property damage, severe personal injury or death as a result of electrical shock or fire.

Make sure that all electrical covers are in place and secure before turning on electrical power. These include the heater terminal cover, electrical panel cover, and subpanel access panels.

CAUTION

Damage from dry startup

In the event the humidifier tank does not contain water and the heaters are energized, turn main power off. Operation of the heaters without water will cause damage to the humidifier. Before turning main power on, verify that all wiring has been completed per the wiring instructions in this manual and the unit wiring diagrams.

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Start-up procedure

OPERATING DO'S AND DONT'S

DO

1. Change the cartridge filters regularly.
2. Monitor the system and keep a log daily.
3. Adjust the system to the recommended value. (See Table 28-1).
4. Run the system as much as possible, on a continuous basis.
5. Confirm chlorine level in permeate water to assure there is no pass through. Once detected, change the carbon filter based on timing determined.

DON'T

1. Permit chlorine in the feed water.
2. Shut down the system. If the system is shut down for more than one month, the system must be treated with a membrane preservation.
3. Close the condensate valve completely.
4. Operate the system with insufficient feed flow.
5. Modify or cut the humidifier tank and frame drain hoses (see Figure 27-1) as this can decrease the performance and/or cause damage to the Low-maintenance humidifier.

Important

If the system is not in operation within six months of shipment, it is strongly recommended to use an organic cleaning cartridge prior to performing the start-up checklist to ensure proper operation. See page 44 for information and part number.

CAUTION

Do not operate the system with the control valve closed.

Important:

By setting the feed pressure as low as possible to meet the application requirement, the service life of the pump and RO elements will be optimized. The system should be run continuously when possible, rather than go through frequent start/stop cycles.

CAUTION

Damage to pump

Do not close the valve. Do not operate the pump below minimum combined flow rate (permeate + concentrate + recirculating).

FIGURE 27-1: DRAIN HOSE



Start-up procedure

Table 28-1:
Low-maintenance humidification RO station specifications

Model	Low-maintenance humidifier Models 2 - 8 1 membrane	Low-maintenance humidifier Models 10 - 34 2 membranes
Rated capacity, permeate		
Gallons/minute	0.2	0.4
Concentrate flow (reject)		
Gallons/minute	1.1	1.2
Recirc (adjustable as needed)		
Gallons/minute	0 - 1.0	0 - 1.0
System pressure, psi	100 - 150	100 - 150
°F (°C)	10/50	10/50
Pre-filters		
Sediment cartridge - 5 micron	1	1
Carbon cartridge - 10 micron	2	2
Pressure switch settings		
Low pressure (for pump protection)	8 psi	8 psi

Notes:

Adjusting the recirc and concentrate flow rates is a balancing act that affects overall system efficiency.

While holding permeate (RO-treated water) flow constant, the following adjustments and corresponding results can be expected:

Increasing concentrate flow & decreasing recirculation flow

- Maintains system pressure
- Increases drain/waste/concentrate water flow rate
- Promotes membrane life

Decreasing concentrate flow & increasing recirculation flow

- Maintains system pressure
- Reduces drain/waste/concentrate water flow rate
- Decreases expected membrane life

The flow rates of your system can be adjusted to better fit your needs but DriSteem recommends targeting the flow rates listed in Table 28-1.

Maintenance information

Low-maintenance humidifiers produce and use RO water. Because RO water is nearly mineral free, cleaning the evaporating chamber should not be necessary (See Figure 41-1). However, there are some maintenance steps that should be followed to ensure all parts of the unit are in working order.

Important: Verify regularly that water processing equipment is operating correctly. The presence of chlorides in water will eventually cause pitting and failure of the humidifier tank and its components. Damage caused by chloride corrosion is not covered by your DriSteem warranty. The Low-maintenance humidifier has an automatic drain sequence (ADS) set based on default supply concentration of 20 ppm. Adjust ADS to actual supply water chloride concentration.

COOL DOWN HUMIDIFIER

If the tank is hot, cool it down by using the Vapor-logic controller to open the drain valve. The float valve will open allowing cool water to run into the tank until it is cool enough to handle. Then shut off the water supply, and allow the tank to drain completely.

WARNING

Electric shock hazard

Do not remove humidifier electrical panel cover, heater terminal cover, or subpanel access panels until electrical power is disconnected. Improper wiring or contact with energized circuits can cause property damage, severe personal injury, or death as a result of electric shock and/or fire.

Only qualified electrical personnel should perform maintenance procedures.

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Maintenance information

INSPECTION AND MAINTENANCE

1. Remove the evaporating chamber:

- If the tank is hot, follow the instructions in “Cool down humidifier” above before proceeding.
- Remove the two fasteners on each side of the cover enclosure.
- Remove the enclosure. See “Electric shock hazard” Warning.

Note: If the humidifier has an SDU mounted directly above it, remove the SDU cover before removing the humidifier cover.

- Shut off the water supply.
- Using the Vapor-logic controller, allow the tank to drain completely.
- Shut off the electrical supply.
- Disconnect the fill line at the fill fitting.
- Disconnect the electrical plugs between the tank components and the back of the electrical panel (includes: power plug, low water switch plug, tank temperature sensor plug and thermal trip plug).

Important: Disconnect by pulling on plug housing. Do not disconnect by pulling on cord or wires.

- Disconnect the drain union on the back left corner of the frame.
- Disconnect the steam supply hose from the top of the tank.
- Lift the tank foot above the frame flange and slide the tank assembly forward to remove.

WARNING

Electric shock hazard

Contact with energized circuits can cause severe personal injury or death as a result of electric shock. To prevent shock, disconnect electrical power before performing service or maintenance procedures on an part of the humidification system.

When performing maintenance on the humidifier:

- Always switch the keypad control mode to Standby.
- Place all power disconnects in OFF position and lock in OFF position.
- Close the field-installed manual supply water shut-off valve.

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WARNING

Hot surface and hot water hazard

Do not touch the tank or drain piping until the unit has had sufficient time to cool, or serious injury can occur.

Opening the drain valve when the tank is hot can discharge water with a temperature up to 212 °F (100 °C) into the plumbing system. This can cause damage to the plumbing system if the humidifier is not properly connected to a water tempering device such as a DriSteem Drane-kooler™ device.

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Maintenance information

2. Loosen the four cover bolts and remove the cover assembly from the tank.
3. Inspect the tank interior for debris or pitting.
4. Inspect the valve inlet for debris.
5. Check the operation of the float valve and the condition of the float seat.
6. Check the low water switch to make sure the float slides freely on the stem.
7. Secure the chamber cover making sure the cover gasket is seated and the chamber is sealed.
8. Reinstall the evaporating chamber.
 - Reconnect the fill line.
 - Reconnect electrical plugs (the plugs are color coded).
 - Reconnect drain union.
 - Reconnect steam hose.
9. Verify electrical connections:
 - Verify that all DIN rail-mounted components are securely fastened to DIN rail.
 - Verify that all power terminal screws and lugs are tight from power block to heaters.
 - Verify that all plugs under the humidifier cover are completely plugged in.
10. Close the drain valve.
11. Turn on the water supply.
12. Turn on the electrical power.

OFF-SEASON SHUT-DOWN PROCEDURE

Do not shut-off the Low-maintenance humidifier during off-season. To prevent stagnant water or bacterial growth, the Low-maintenance humidifier will flush the system once weekly if there is no call for humidity.

Maintenance information

MAINTENANCE TIPS

Maintain proper operating conditions:

- Do not exceed 90 psi (620 kPa) on the filter inlet pressure reading.
- Do not over use recirculation valve flow. This can cause premature scaling of the membrane. A proper concentrate flow is required for a long membrane life. See page 28 for maximum recirculation valve flow.
- To ensure no chlorine reaches the RO membranes, test the water from your dechlorinator periodically for chlorine break through.

WHEN TO CHANGE SEDIMENT AND CARBON FILTERS

Sediment and carbon filters should be changed regularly to maintain proper pressure and flow and water quality.

Change the carbon filter when chlorine from supply water starts to pass through. The carbon filter removes chlorine. Check regularly for chlorine pass through. To check for chlorine, obtain a water sample from the concentrate drain line and test the water. If chlorine is present, change the carbon filter and record the interval to estimate the next carbon filter change.

Change the sediment filter when the difference between filter inlet pressure and filter outlet pressure increases by 10 psi over the initial pressure difference. For example, if initial readings are 60 psi in and 58 psi out, the difference is 2 psi. Therefore, when that difference reaches 12 psi, it is time to replace the sediment and carbon cartridges.

CHANGING CARTRIDGE FILTERS

1. Put the system into 'Standby' mode and shut down the Low-maintenance humidifier.
2. Close inlet supply valve.
3. Un-assemble the filter housing (twist the sump counter-clockwise).
4. Remove and inspect the cartridge. Replace as needed.
5. Before replacing housing, insure that O-ring seal is lubed and placed in groove of housing. Inspect seal and replace as needed.
6. Assemble housing (turn the sump clockwise into the cap until tight).

FIGURE 32-1: SEDIMENT FILTER



DriSteem replacement part
 • 2.5" x 10" - (part number: 550030-002)

FIGURE 32-2: CARBON FILTER



DriSteem replacement part
 • 2.5" x 10" - (part number: 550030-003)

CAUTION

Chlorine can damage the membrane. A carbon pre-filter is installed to remove chlorine from feed water. Care must be taken to change this carbon filter as needed to accomplish effective chlorine removal. Excessive chlorine in feed stream may require additional pre-filtration. The feed stream should be tested for chlorine at least once a week. Always follow proper maintenance procedures.

Maintenance continued

WHEN TO CLEAN OR REPLACE MEMBRANES

In normal operation, the membrane in reverse osmosis elements can become fouled by mineral scale, biological matter, and grime. These deposits build up during operation until it causes loss in water output or loss of salt rejection, or both. Elements should be cleaned or replaced whenever the water output rate drops by 10 percent from its initial flow rate (the flow rate established during the first 24 to 48 hours of operation) or when TDS in the product water (permeate) rises above 50. This is indicated through a message on the Vapor-logic controller (above 75 will alarm).

It should be noted that the water output rate will drop if feed water temperature decreases (about 1.5% per °F). This is normal and does not indicate membrane fouling. A malfunction in the pretreatment, pressure control or pump can cause a drop in feed water delivery pressure, feed water flow, product water output, or an increase in salt passage. If such adjustments are needed, the element may not require cleaning.

FIGURE 33-1: PRE-FILTER



1. Carbon filter:
Primarily to remove chlorine; also removes organics and sediments down to 10 microns.
2. Sediment filters:
Removes sediments and particles down to 5 micron size.

Maintenance continued

REPLACING MEMBRANES

TOOLS

- Rubber mallet
- Flat blade screwdriver
- Open end wrench, 7/8 inch
- Food grade RT-111 silicone
- Safety glasses

PROCEDURE

1. Turn OFF the Low-maintenance humidifier system.
2. Relieve pressure on the membrane by opening the supply valve.
3. Remove all lines from the top of the pressure vessel(s). Make sure the fittings are marked so the fittings go back to the correct locations after replacing.
Note: Membranes on the Low-maintenance humidification system are removed and inserted from the top.
4. Remove u-pins from the vessel. Slowly and carefully pull the end plugs out from the fitting with a channel lock. See Figure 34-1.
5. Remove end plugs by pulling carefully. See Figure 34-2.

FIGURE 34-1: USE WRENCH AND RATCHET TO REMOVE CLAMP



FIGURE 34-2: REMOVE MEMBRANE TUBE CAP



FIGURE 34-3: REMOVE MEMBRANE



Maintenance continued

MEMBRANE CLEANING IN THE LOW-MAINTENANCE HUMIDIFIER

Membrane cleaning cartridges:

- Clean membranes without having to remove them from the Low-maintenance humidifier
- Reduce downtime
- Maintain the system performance at a higher level
- Prolong membrane life by regular use of cleaning cartridges

HOW DOES IT WORK?

NOTE: Clean monthly to obtain optimum results.

1. Exchange the system's sediment filter with a cleaning cartridge.
2. Follow the instructions.
3. Restart the system.
4. Repeat the process if required.

SCALE CLEANING CARTRIDGE

The scale cleaning cartridge is for removal of mineral scale and build-up.

CLEANING PROCEDURE

1. Put the system into 'Standby' mode and shutdown the Low-maintenance humidifier.
2. Disconnect permeate line and divert to drain before any cleaning cartridge is installed.
3. Remove the sediment filter from the pre-filter housing.
4. Replace the sediment filter with the cleaning cartridge and assemble into the filter housing.
5. Turn the system ON and put into 'Auto' mode. After 30-40 seconds, shut down the system.

OPTIONAL: Instead of time, use one of the following criteria:

 - a. Run the system until the pH of the concentrate is almost the same as the cleaning solution (pH=3)
 - b. Permeate rate for the system drops to a very low value.
6. Let the membrane(s) soak in the cleaning solution overnight.
7. Remove the empty cleaning cartridge and replace it with the original filter.
8. Restart the system. Direct the permeate to drain for five minutes.
9. Go back to normal operations.

FIGURE 35-1: 10 INCH SCALE CLEANING CARTRIDGE



DriSteem replacement part
 • 2.5" x 10" - (part number: 550045-401)

CAUTION

Handle all chemicals with care. Wear protective clothing and eye protection.

CAUTION

The system must be flushed thoroughly between acid and alkaline cleaning.

Maintenance continued

ORGANIC CLEANING CARTRIDGE

The organic cleaning cartridge is for removal of organics/fouling.

CLEANING PROCEDURE

1. Put the system into 'Standby' mode and shutdown the Low-maintenance humidifier.
2. Disconnect permeate line and divert permeate to drain during cleaning.
3. Remove the sediment filter from the filter housing.
4. Replace the sediment filter with the cleaning cartridge and assemble into the filter housing.
5. Turn the system ON. After 30-40 seconds, shut down the Low-maintenance humidifier.

OPTIONAL: Instead of time, use one of the following criteria:

 - a. Run the system until the pH of the concentrate is almost the same as the cleaning solution (pH=10-12)
 - b. Permeate rate for the system drops to a very low value.
6. Let the membrane(s) soak in the cleaning solution overnight.
7. Remove the empty cleaning cartridge and replace it with the original filter.
8. Restart the system. Direct the permeate to drain for five minutes.
9. Go back to normal operations.

FIGURE 36-1: 10 INCH ORGANIC CLEANING CARTRIDGE



DriSteem replacement part
 • 2.5" x 10" - (part number: 550045-501)

CAUTION

Handle all chemicals with care. Wear protective clothing and eye protection.

CAUTION

The system must be flushed thoroughly between acid and alkaline cleanings.

System monitoring and record keeping

The system should be monitored and all pertinent data recorded on a daily basis. This includes cartridge filter pressure in/out, system pressure in/out, flow and water quality (TDS) in/out. Data is needed to determine operating efficiency and for performing system maintenance. The latter includes cleaning of the membranes, adjusting the operating conditions as well as replacement of cartridge filters and RO membranes.

Table 37-1: Troubleshooting		
Issue	Possible Cause	Solution
Inlet pressure low	Low supply pressure	Correct incoming supply pressure
	Cartridge filters plugged	Change filters
	Solenoid valve malfunction	Replace solenoid valve and/or coil
Permeate flow low	Low water temperature	Adjust water temperature
	Low system pressure	Adjust concentrate control valve
	Membranes fouled	Clean membranes
Pump noisy	Low inlet flow	See "Inlet pressure low"
Permeate quality poor	Low inlet flow	Adjust concentrate control valve
	Low system pressure	See "Inlet pressure low"
	Recovery too high	Reduce recirculation control valve
	Membranes fouled	Clean membranes
	Membranes damaged	Replace membranes

System operating log

Table 38-1:
System operating log

Date							
Time							
Chlorine							
Cartridge in psi							
Cartridge out psi							
Water temperature							
TDS in							
TDS out							
System psi							
Concentrate psi							
Cartridge filter change							
Membrane change							
Recorded by							

Notes

Water quality test strips

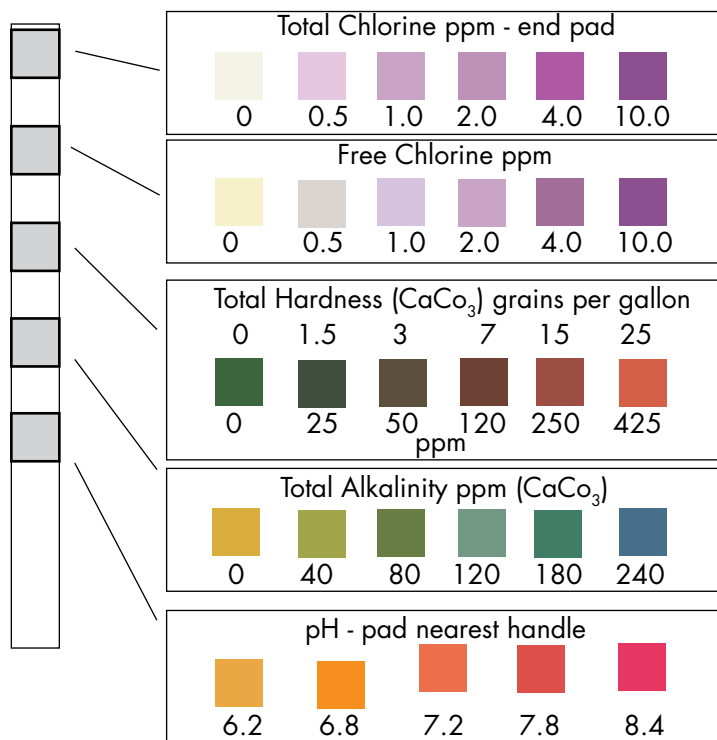
Carbon filters in the low-maintenance humidification system should be changed regularly to maintain proper pressure and flow and water quality.

The carbon filter removes chlorine. Change the carbon filter when chlorine from supply water starts to pass through. Check regularly for chlorine pass through.

To check for chlorine, obtain a water sample from the concentrate drain line and test the water. If chlorine is present, change the carbon filter and record the interval to estimate the next carbon filter change.

For best results, test water chlorine every two weeks.

To order more Water Quality Test Strips, contact your local DriSteem rep, or call 1-800-328-4447.



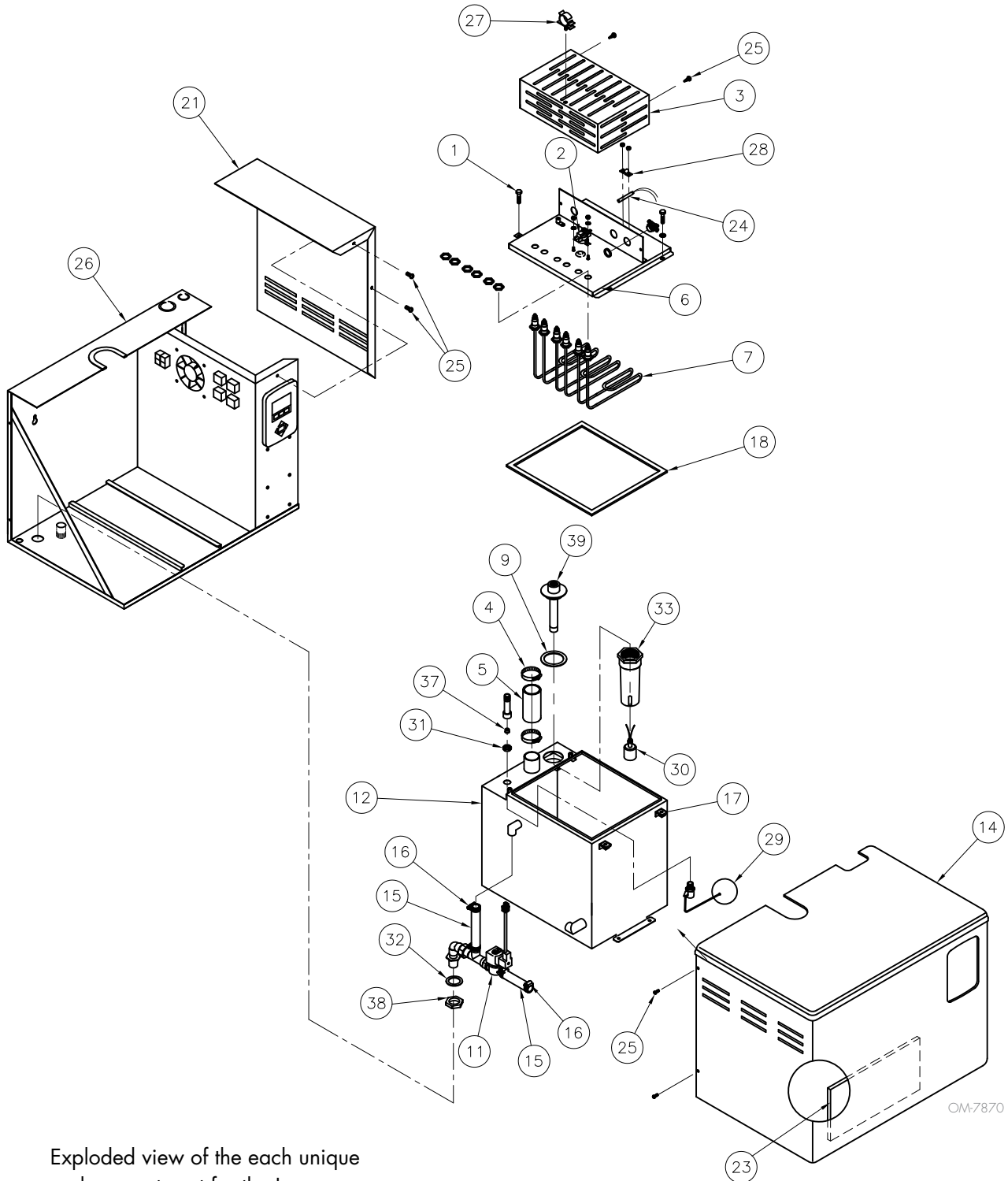
DIRECTIONS:

1. Dip entire strip into water for 1 second (or pass under water stream), remove. Do not shake excess water from the test strip. Hold the strip for 30 seconds.
2. Compare TOTAL HARDNESS, TOTAL ALKALINITY and pH pads to color chart to the left.
3. Dip strip into the water again and move back and forth for 30 seconds (or hold two chlorine pads under water stream for 10 seconds).
4. Compare CHLORINE pads to color chart to the left.
5. Track results in the chart below.
6. Change the carbon cartridge filter once chlorine is detected in the concentrate water of the low-maintenance humidification system (see page 32).

Water quality test log

Date tested	Total Chlorine ppm	Free Chlorine ppm	Total Hardness	Total Alkalinity	pH
Week 1 _____					
Week 3 _____					
Week 5 _____					
Week 7 _____					
Week 9 _____					
Week 11 _____					
Week 13 _____					
Week 15 _____					
Week 17 _____					
Week 19 _____					

Low-maintenance humidifier

FIGURE 41-1: LOW-MAINTENANCE HUMIDIFIER REPLACEMENT PARTS


OM-7870

Exploded view of the each unique replacement part for the Low-maintenance humidifier.

Low-maintenance humidifier

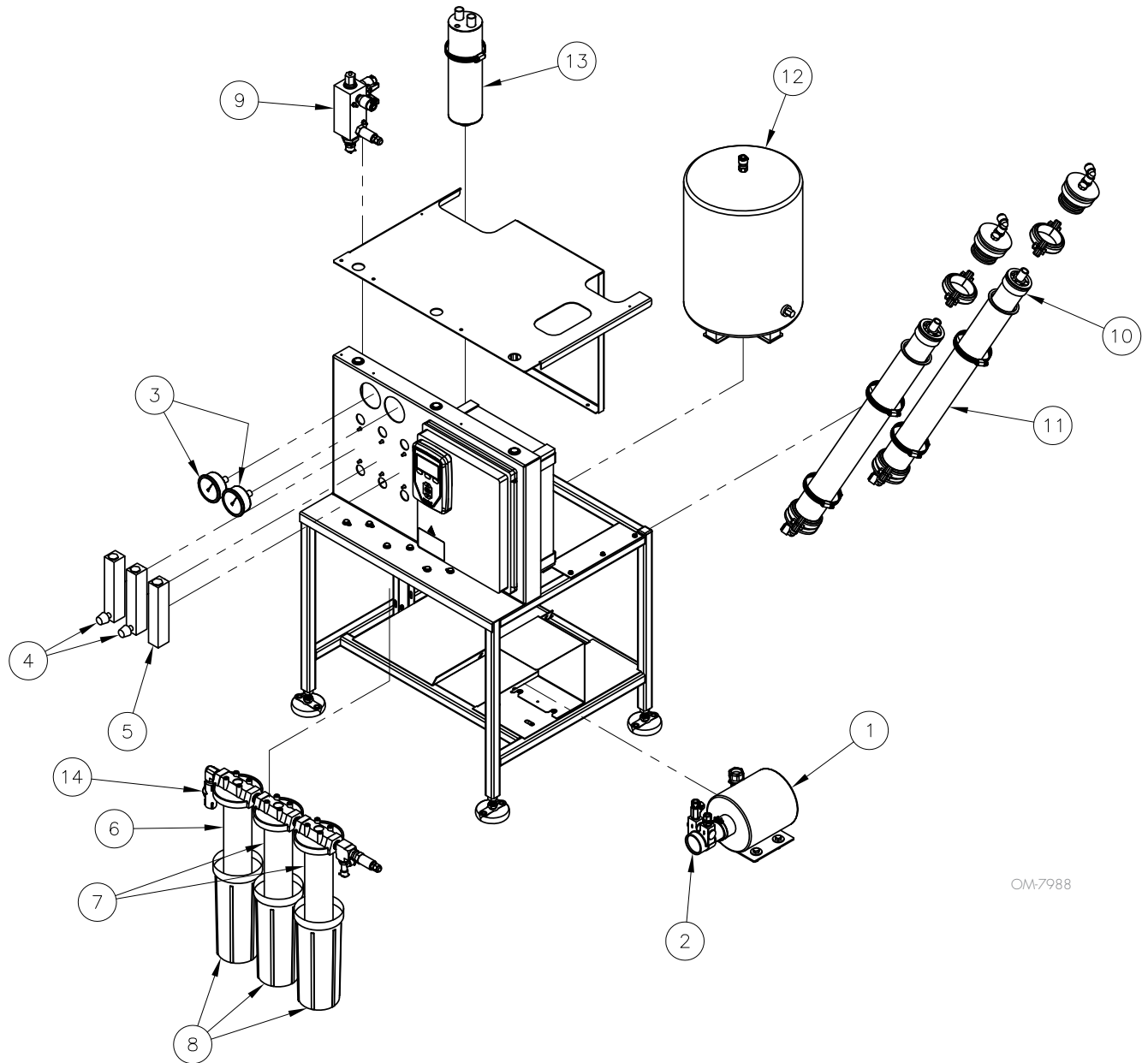
Table 42-1:
Low-maintenance humidifier replacements parts

No.	Description	Qty.	Part No.	No.	Description	Qty.	Part No.
1	Head bolt, large Phillips, ¼ - 20 x 1"	4	700300-013	21	Cover, humidifier electrical panel	1	120277
2	Thermo cut-out	1	409560-001	23	Insulation, panel	1	309845-003
3	Cover, heater terminal	1	160755-*	24	Sensor, temperature	1	197000-025
4	Hose clamp, 1½"	2	700560-150	25	Screw #8, 32x½", zinc		700170-007
	Hose clamp, 2"	2	700560-200	26	Frame assembly, chassis	1	165541-001
5	Hose cuff, 1½"	1	305390-*	27	Clip cable	1	405892-001
	Hose cuff, 2"	1	305391-*	28	Clip, temperature sensor	1	408251
6	Cover, tank	1	165619-*	29	Valve assembly, float	1	505310
7	Heater element	*	409600-*	30	Switch, float, 1/8" NPT	1	408420-002
9	Gasket, 2.50" OD x 1.90" ID	1	309750-004	31	Ring, seal, ¼"-18 NPT	1	306365
11	Valve, ¼" electric, 24V	1	505086-003	32	Gasket, bulkhead, 1.60 OD x 1.15 ID	1	309750-005
12	Tank weldment (evaporating chamber)	1	160013-*	33	Probe housing, nylon	1	308500
14	Cabinet enclosure	1	330001-001	37	DI orifice, LMH-2 through LMH-16	1	160229-041
15	Hose, ¾" ID	2	307020-002		DI orifice, LMH-21 through LMH-34	1	160229-052
16	Hose clamp, ¾"	4	700560-075	38	Bulkhead nut	1	162721-002
17	Nut assembly, ¼-20	4	700650	39	Tube weld, low water, short, LMH-2 through LMH-4	1	167787
18	Cover, tank gasket, LMH-2 through LMH-4	1	160695-001		Tube weld, low water, long, LMH-6 through LMH-34	1	167788
	Cover, tank gasket, LMH-6 through LMH-34	1	160695-002				

* Specify humidifier model and serial numbers when ordering.

Low-maintenance humidifier

FIGURE 43-1: LOW-MAINTENANCE HUMIDIFIER REPLACEMENT PARTS



OM-7988

Exploded view of the each unique replacement part for the Low-maintenance humidifier.

Low-maintenance humidifier

Table 44-1:
Low-maintenance humidifier replacements parts

No.	Description	Qty.	Part No.
1	Pump motor 1/3 hp, 100-120/200-240V	1	400292-001
2	Pump rotary vane brass 95 gph	1	400294-001
	Pump rotary vane brass 105 gph	1	400294-002
3	Gauge liquid filled 400 psi pnl mnt kit	2	260004-400
4	Meter 2GPM flow w/needle valve 1/4" FNPT	2	501907-402
5	Meter 2GPM flow 1/4" FNPT	1	501907-302
6	Sediment filter 2.5" X 10" 5 micron	1	550030-002
7	Carbon filter 2.5" X 10" 10 micron	2	550030-003
8	Housing filter 2.5" X 10"	3	550030-001
9	Manifold assy output RO-200 W/LMH	1	187714-001
10	Membrane RO 2.5" X 21" extra low energy	Varies	550035-025
11	Membrane vessel assy 2.5" X 23-5/16"	Varies	550038-025
12	Tank water pressure 4.4 gal	1	550029-004
13	Drain weld 3" LMH RO	1	165103-002
14	Valve 1/2" solenoid two-way N.C. 3.35 CV	1	505107-050

* Specify humidifier model and serial numbers when ordering.

Subpanel

FIGURE 45-1: LOW-MAINTENANCE HUMIDIFIER SUBPANEL WITH SSR

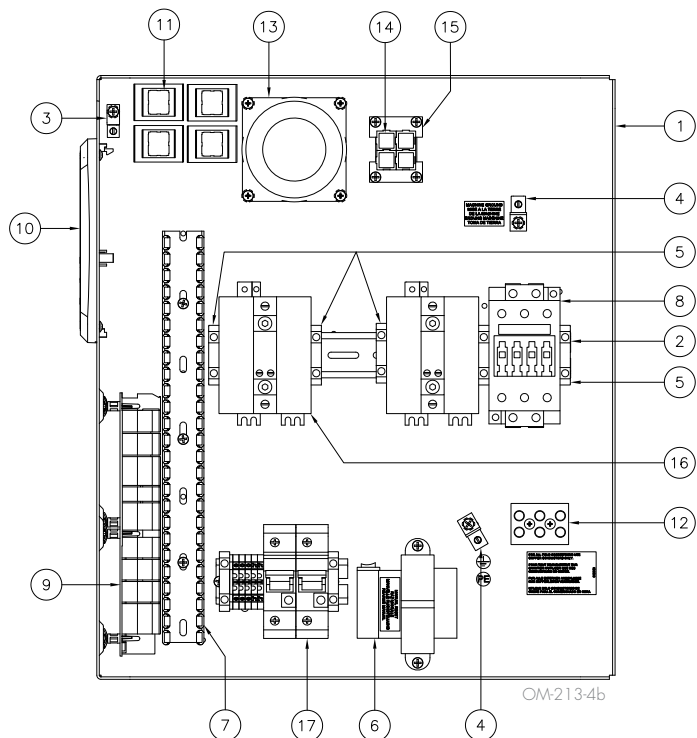


Table 45-1:
Low-maintenance humidifier subpanel with SSR

No.	Description	Qty.	Part No.	No.	Description	Qty.	Part No.
1	Subpanel, barrier	1	120801	9	Board, Vapor-logic main microprocessor	1	183504-015
2	DIN rail, 11" long	1	167765-011	10	Board, Vapor-logic keypad/display	1	408495-002
3	Lug wire	2	409250-003	11	Plug, 4-prong female	4	409585-008
4	Ground lug, medium	2	409250-027	12	Terminal block, 3-pole	1	408300-002
5	Block, DIN rail terminal end	3	408252-006	13	Fan, cooling	1	408677-001
6	Transformer 120/208/240/480 V	1	408965-001	14	Housing, 75 Amp white connector	4	409585-001
	Transformer 600 V	1	408986	15	Plate, plug retainer	2	409585-009
7	Wire channel, 1" x 1"	12.5"	408999-001	16	SSR, 50 Amp, 1-pole	*	408679-001
	Wire channel cover	12.5"	408999-002		SSR, 50 Amp, 2-pole	*	408679-003
8	Contactor	1	407010-*	17	Circuit breaker	*	406775-*

* Refer to model for correct selection and quantity.

Subpanel

FIGURE 46-1: LOW-MAINTENANCE HUMIDIFIER SUBPANEL WITH SDU

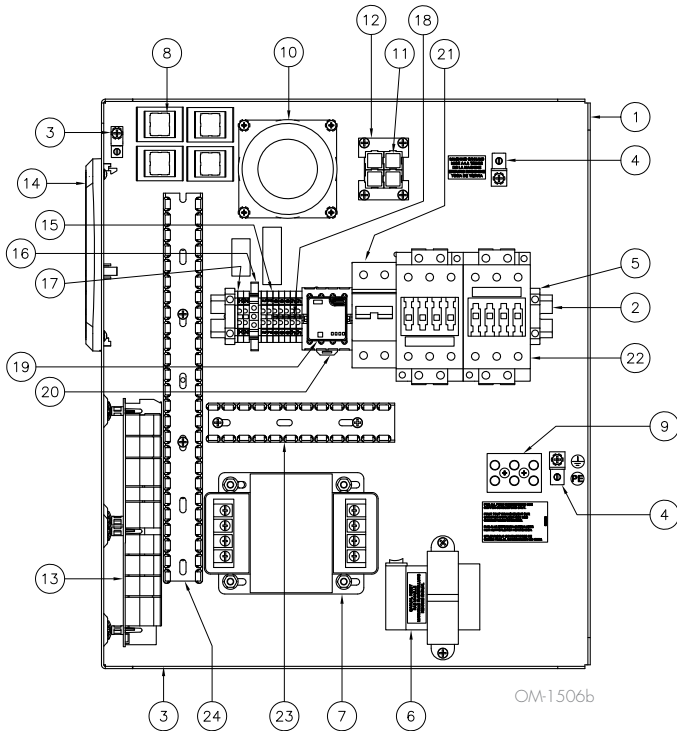


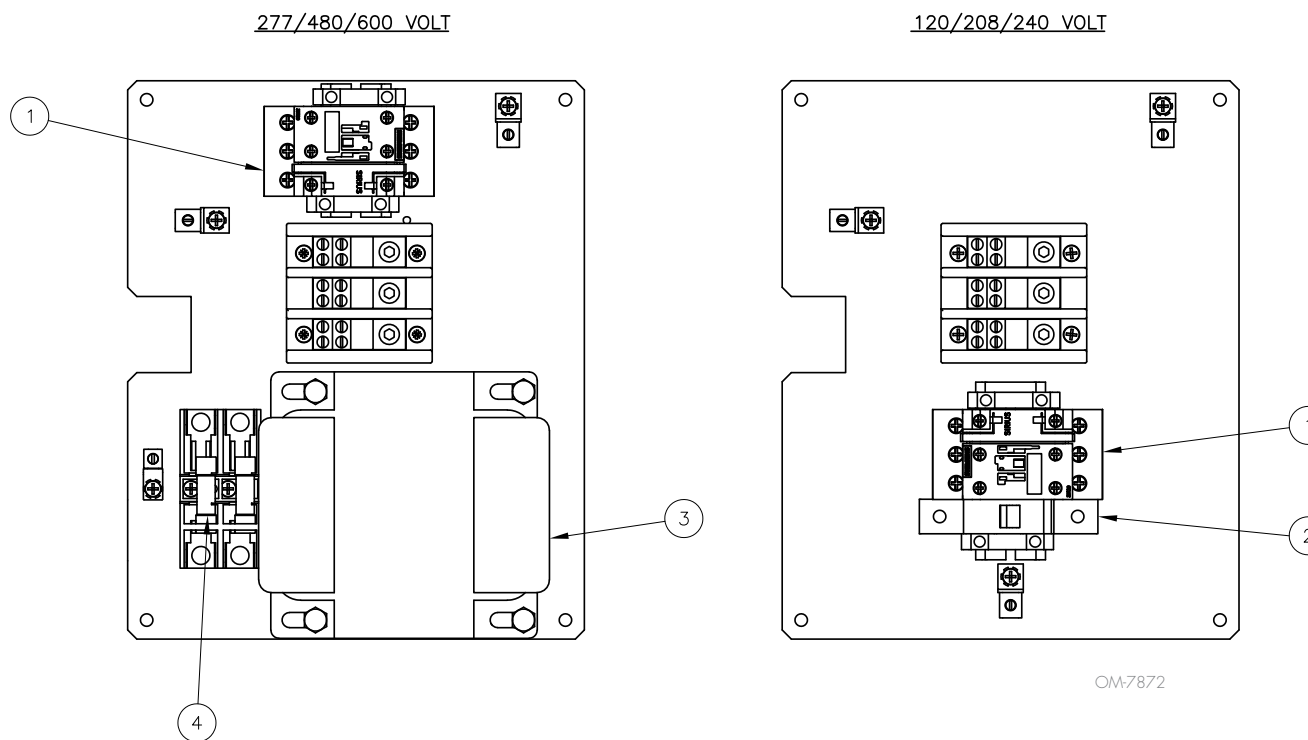
Table 46-1:
Low-maintenance humidifier subpanel with SDU

No.	Description	Qty.	Part No.
1	Subpanel, barrier	1	120801
2	DIN rail, 11" long	1	167765-011
3	Lug wire	2	409250-003
4	Ground lug, medium	2	409250-027
5	Block, DIN rail terminal end	2	408252-006
6	Transformer 120/208/240/480 V	1	408965-001
	Transformer 600 V	1	408986
7	Transformer, 240/480 V, 300 VA	1	408991
	Transformer, 230/460/575 V, 300VA	1	408992
	Transformer, 480 V, 500 VA	1	408996-008
	Transformer, 600 V, 500 VA	1	408996-009
8	Plug, 4-prong female	4	409585-008
9	Terminal block, 3-pole	1	408300-002
	Terminal block, 4-pole	1	408300-003
10	Fan, cooling	1	408677-001
11	Housing, 75 Amp white connector	4	409585-001
12	Plate, plug retainer	2	409585-009
13	Board, Vapor-logic main microprocessor	1	183504-015
14	Board, Vapor-logic keypad/display	1	408495-002
15	Terminal, DIN rail mount	9	408252-001
16	Terminal, ground	1	408252-010
17	End cap, DIN rail mount	2	408252-005
18	Jumper, marathon terminal	2	408252-009
19	Relay, 24V DPDT finder	*	407900-016
20	Relay socket	*	407900-019
21	Circuit breaker	*	406775- *
22	Contactors	1	407010- *
23	Channel, wire cover	6"	408999-002
	Channel, wire	6"	408999-001
24	Channel, wire cover	12.5"	408999-002
	Channel, wire	12.5"	408999-001

* Refer to model for correct selection and quantity.

Subpanel

FIGURE 47-1: LOW-MAINTENANCE HUMIDIFIER SUBPANEL



OM-7872

Table 47-1: Low-maintenance humidifier subpanel			
No.	Description	Qty.	Part No.
1	Contactors	1	407010-*
2	Breaker circuit 4A 480V 1 pole K	1	406775-002
	Breaker circuit 10A 480V 1 pole K	1	406775-011
3	Transformer 240V/480V to 120V/240V 750 VA	1	408976-001
	Transformer 277V to 120V 750VA	1	408976-002
4	Fuse 2.5A 600 VAC ATDR	2	406725-0025

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EXTENDED WARRANTY

The original user may extend the term of the DriSteem Limited Warranty for a limited number of months past the initial applicable warranty period and term provided in the first paragraph of this Limited Warranty. All the terms and conditions of the Limited Warranty during the initial applicable warranty period and term shall apply during any extended term. An extended warranty term of an additional twelve (12) months or twenty four (24) months of coverage may be purchased. The extended warranty term may be purchased until eighteen (18) months after the product is shipped, after which time no extended warranties are available. When a DriSteem humidifier is purchased with a DriSteem RO system, an extended twenty-four (24) month coverage is included.

Any extension of the Limited Warranty under this program must be in writing, signed by DriSteem, and paid for in full by the purchaser.