INDOOR AIR QUALITY
HCSTEAM
Healthy Climate®
Residential Whole-Home Steam Humidifier

Bulletin No. 210605
May 2013
Supersedes July 2012

PRODUCT SPECIFICATIONS

MODEL NUMBER IDENTIFICATION

HCSTEAM - 16

Unit Type
HCSTEAM = Healthy Climate® Steam Humidifier

Nominal Capacity
16 = 15 US Gallons per day
35 = 35 US Gallons per day

FEATURES

WARRANTY

All covered components - limited five-year warranty in residential applications, one year in non-residential applications.

Refer to the Lennox Equipment Limited Warranty certificate included with the unit for additional details.

APPROVALS

All models are ETL/Intertek listed.

APPLICATIONS

The HCSteam humidifier is designed to directly add desired humidity levels to a duct distribution system for improved comfort.

The humidifier produces non-pressurized steam which is then used to humidify the air.

Water quality can affect the operation of this unit, the humidifier water supply should be untreated potable water from the cold water supply, not softened or demineralized.

The water converted into steam is automatically replaced through an electric fill valve. Periodically, based on the water quality, the unit will also drain and add some water to dilute the build−up of minerals in the Steam Generator Cylinder.

The humidifier has been designed for installation on a wall. Since it is an atmospheric steam humidifier, it should be placed close to the point where the steam will be used to minimize the steam hose length and the amount of condensate.

Included with the humidifier:

• Steam nozzle

• Steam hose (10 ft.)

• Steam nozzle condensate drain hose (10 ft.)

• Water fill hose (4.9 ft.)

• Air proving pressure switch (required)
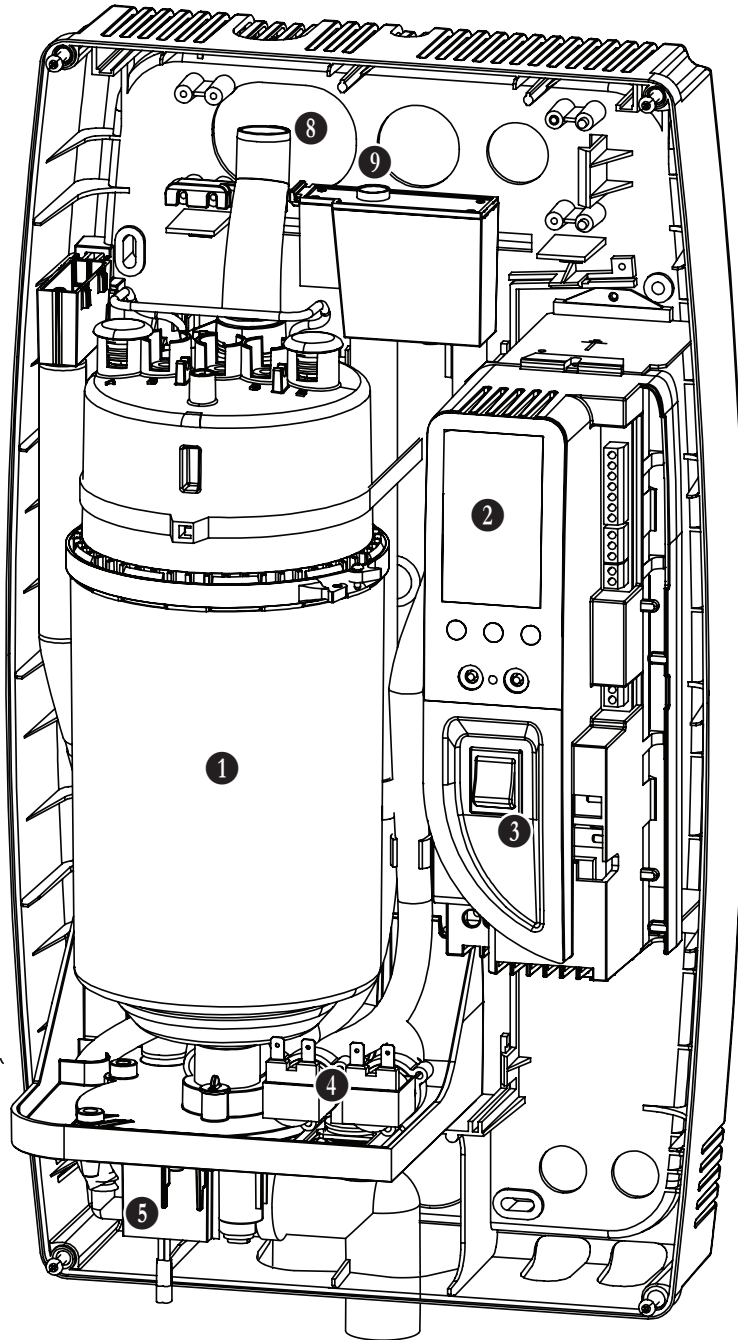
1. Steam Generator Cylinder

2. Humidifier Controller

3. Power Button

4. Fill and Tempering Valves

5. Drain Pump

6. Water Drain

7. Water Inlet and Filter Screen

8. Steam Hose Connection

9. Condensate Drain Connection
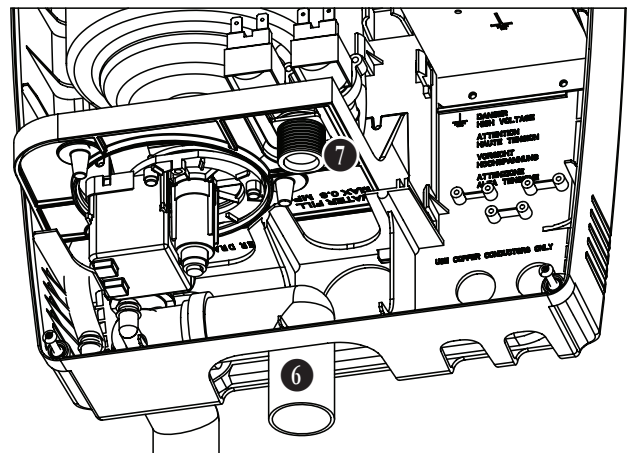
INSTALLATION CONSIDERATIONS

This product must be installed by qualified HVAC and electrical contractors and in compliance with local, state, and federal governing codes.

Humidifier is mounted on a wall and should be located in a conditioned space close to the ductwork to minimize the length of the steam hose for maximum performance.

The steam hose length between the humidifier and the ductwork varies depending on the type of installation. See Installation Instructions.

Steam nozzle must be mounted in a supply duct. Nozzle must be installed downstream in a straight section of duct with 3 ft. of straight metal ductwork free of elbows or obstructions.

The preferred installation for the steam hose and nozzle is higher than the humidifier for proper condensate drainage.

Provisions to an open drain for periodic water draining from steam cylinder must be provided.

Air proving switch is required for proper operation and must be mounted close to the humidifier and ductwork to ensure that the blower is operating prior to humidifier operation. Pressure tap must be installed in supply duct. A second tap may be used in the return air duct for differential pressure applications.

Water for humidification should have the following characteristics:

*   Water pressure between 20 and 110 psi
*   Water temperature between 33 and 104°F
*   Flow rate 0.21 GMP (minimum)
*   Water hardness less than 400 ppm[3] of calcium carbonate ($CaCO_3$)
*   Water conductivity from 125 to 1250 microsiemens per centimeter (µS/cm) for HCSteam-16
*   [1] Water conductivity from 350 to 1250 microsiemens per centimeter (µS/cm) for HCSteam-35
*   Absence of organic compounds

DO NOT use with hot water or softened water.

DO NOT use any thread sealant on fill hose connections.

Refer to the Installation Instructions for detailed information.

When a condensate pump is required, it must be able to pump at least 7.1 gal./min. at the installed lift and rated for pumping water up to 140°F. The Hartell A5 series condensate pumps are capable of meeting these requirements.

Required Items

1/2 inch water line.

25 Amp dedicated electrical circuit.

1-1/4 inch drain tube extension (plumbed from the humidifier to an open drain, water drain receiver or a condensate pump capable of holding one gallon of 140º F water then plumbed into a 3/4 inch drain line).

[1] For HCSteam-35 model with low conductivity water conditions (125-350 µS/cm range) order optional Steam Generator Cylinder. See Optional Accessories.

FEATURES
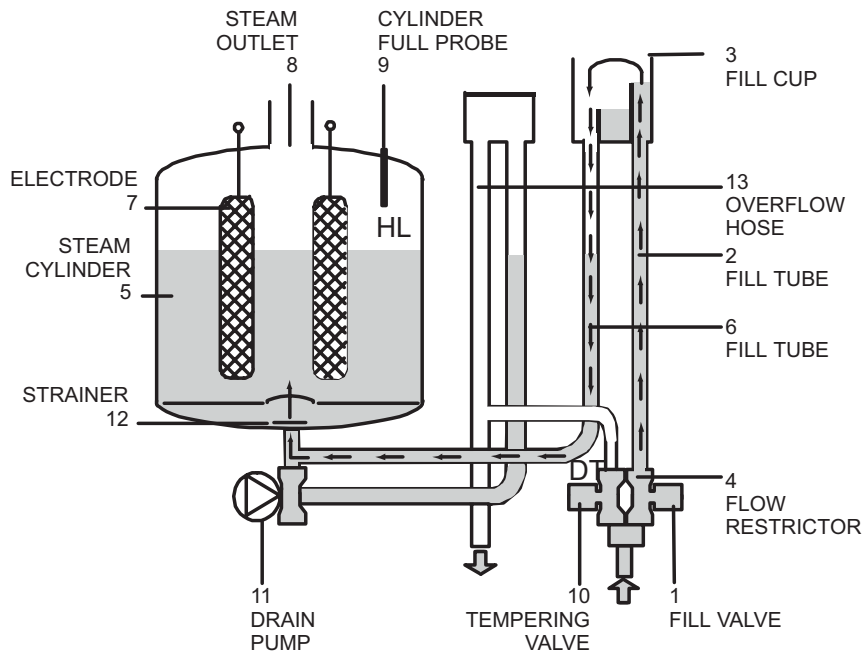
SEQUENCE OF OPERATION

The HCSteam steam humidifier is an electrode humidifier. It produces steam for humidification by passing electric current through metal electrodes (7) immersed in water inside a plastic steam cylinder (5). There are no heating elements.

Steam output is directly proportional to the conductivity of the water, and the amount of electrode immersed in the water.

On a call for humidity, the humidifier controller will open the water fill valve (1) and allow water to enter the cylinder. A flow restrictor (4) prevents the unit from filling too quickly or with too much pressure. Water flows up the fill tube (2) and into the fill cup (3). Water then flows over the dam in the fill cup (3), which creates a 1-inch air gap to prevent backflow of contaminated water into the feed lines, it then flows through the fill tube (6) and into the bottom of the steam cylinder (5). Any backflow or overflow of water travels through the overflow hose (13) to the drain.

As the water fills the cylinder, it will reach the electrodes (7) and current will begin to flow. As the water continues to fill the cylinder, the current will increase. This is monitored by an amperage transformer connected to one of the power wires and located on the electronic controller. When the desired current is reached, the fill valve closes (1) and the water will begin to warm and produce steam. If the water reaches the cylinder full probe (9) or if current rises too much, the drain pump (11) will be activated to drain away excess water, reducing the water level in the cylinder and reducing the current flow to acceptable levels. Note that, any time the drain pump is activated, the tempering valve (10) will be opened for tempering the hot drained water down to 140ºF in accordance with local and national standards.

Periodically, based on the incoming water conductivity, the unit will run the drain pump (11) to drain and add some water to reduce the mineral concentration. A filter screen (12) in the cylinder helps to prevent mineral debris from blocking the drain pump (11).

In case the humidifier remains powered, but idle for more than 48 hours (without producing steam), the cylinder will automatically be emptied to eliminate stagnant water inside.
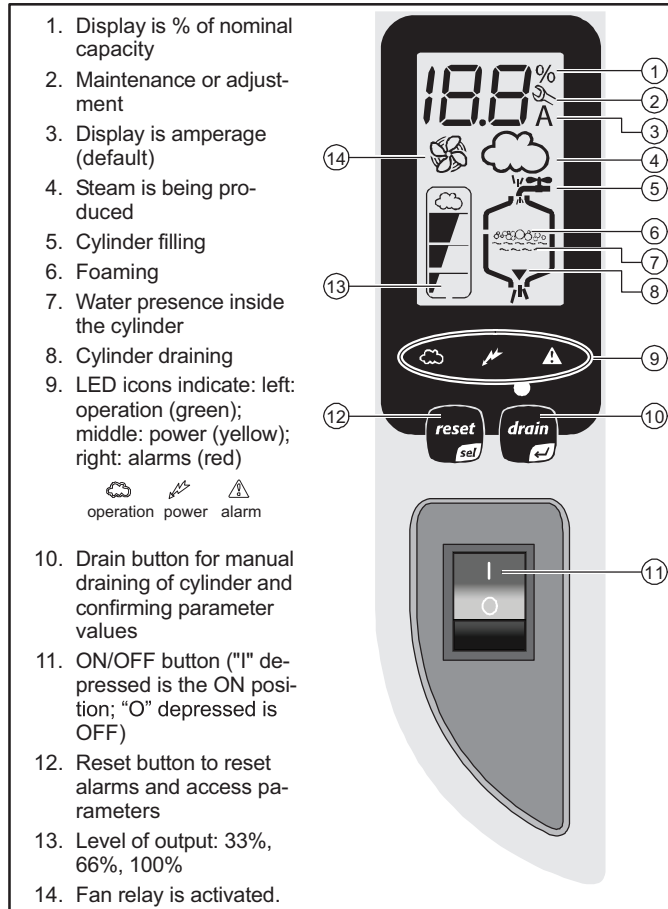
If there is no water in the cylinder, there will be no current flow and no steam production. The electrodes do not burn out, but they will eventually become coated with mineral deposits and the cylinder will require replacement.

NOTE - Field installed air proving switch (furnished and required) allows humidifier to operate only when indoor blower is operating.

HUMIDIFIER CONTROLLER

Microprocessor Humidity Controller automatically manages all the functions of the unit, and includes a self-diagnostic system with easy-to-read indicators (numeric and icons). A comprehensive information display shows the operation of the system at a glance.

1. Display is % of nominal capacity
2. Maintenance or adjustment
3. Display is amperage (default)
4. Steam is being produced
5. Cylinder filling
6. Foaming
7. Water presence inside the cylinder
8. Cylinder draining
9. LED icons indicate: left: operation (green); middle: power (yellow); right: alarms (red)

    operation power alarm

10. Drain button for manual draining of cylinder and confirming parameter values
11. ON/OFF button ("I" depressed is the ON position; "O" depressed is OFF)
12. Reset button to reset alarms and access parameters
13. Level of output: 33%, 66%, 100%
14. Fan relay is activated.

Controller Features

Controller features a field programmable reduction in maximum unit capacity (in 5% increments), allowing the unit to adapt to the size of the area being humidified.

Includes an ON/OFF switch and a proportional input function, a remote enabling input function for required air proving switch (furnished), alarm relay contacts for field supplied alarm, flow sensor input and 24V power supply output (for optional Healthy Climate® humidistat).

Ambient humidity control is managed by an external humidistat (not furnished).

Steam production can be programmed for a specific output capacity of 20% to 100% (in 5% increments). Factory default settings:
HCSteam-16 - 100%, HCSteam-35 - 70%.

The optional *Healthy Climate® Digital Automatic Humidistat* includes an on/off setting and a fully proportional mode for steam output.

Water level is controlled by two valves (fill and tempering) and the drain pump.

Automatic monitoring and flushing of the steam generating cylinder is based on conductivity of the electrode current draw.

Humidifier automatically controls the amount of mineral salts in the water by activating the fill valve and drain pump. This reduces the amount of current flow between the electrodes in the cylinder and eliminates current leakage through the drain.

Drain button allows manual drain/refill cycle for maintenance.

Automatic monitoring and periodic drainage to handle unacceptable water conditions.

Programmable to allow for a modulating hi-limit humidity sensor or outdoor temperature sensor for automatic trimming of the output to avoid condensation.

Hour counter keeps a record of operating hours and has programmable maintenance alarm schedules.

Digital LCD Display

1. Instant current (default) / Steam production % / Hour counter (hold Reset button to scroll values)
2. Active alarm
3. Electric current draw in amps
4. Steam production in progress
5. Cylinder filling in progress
6. Foam detected in cylinder
7. Water in cylinder
8. Cylinder drain in progress

Alarm and Pre-Alarm Functions

Controller panel has a green LED ☁ (operation), a yellow LED ⚡ (power) and a red alarm LED ⚠

LCD Display will show an error code related to the following:

- Internal memory error
- Control board configuration not valid
- High current alarm
- Low production, low supply water conductivity or excessive foam/lime scale in the Steam Generator Cylinder
- Steam Generator Cylinder almost exhausted, already used for 2000 hrs
- Fill alarm, unable or slow fill (current does not increase within time-out)
- Drain alarm, unable to drain (current does not decrease within time-out)
- Steam Generator Cylinder exhausted (critical performance detected)
- Foam detected
- Steam Generator Cylinder lifetime expired (2000 hours)
- High controller temperature (above 176°F)

FEATURES

STEAM HEATING SYSTEM

Heating Electrodes

Designed for long life.

Immersion type.

Constructed of expanded low carbon steel, zinc-plated and dynamically formed for precise current control.

Wiring to electrodes is secured by lock washer and nut.

Steam Generator Cylinder

Plastic cylinder is UL listed.

Single cylinder full electrode operates as an independent circuit from the main power electrodes.

Full cylinder sensor detects foaming of the water and end of cylinder life.

Power Drain Pump

Drain pump is used for flushing the system and for maintaining proper water and current levels.

Pump drains water if there is excess water in the steam generator cylinder and during steam generation process to provide proper water level and minerals mix.

If the current generated in the water reaches excess levels the humidifier controller activates the drain pump to drain a quantity of water to restore the current to acceptable levels.

Tempering valve reduces the water temperature to 140°F before draining.

Drain connection can be from the bottom (vertical) or rear (horizontal) of unit.

Anti-Foaming System

Automatic detection and correction of water foaming.

Steam Hose

Embedded steel spiral.

FDA approved (220°F, tested for 5000 hr).

Water Fill Hose

3/4 in. NPT female hose connection at each end 90° angle on one end.

Air Proving Switch (Required)

Allows humidifier to operate only when indoor blower is operating.

CABINET

Rugged, corrosion resistant molded plastic.

Removable front cover (4 Phillips head screws) for easy access for servicing and maintenance.

OPTIONAL ACCESSORIES

icomfort Wi-Fi® Thermostat (part of the icomfort™ Residential Communicating Control System)

The **icomfort Wi-Fi® Thermostat** recognizes and connects to all icomfort™-enabled products to automatically configure and control the heating/cooling system (based on user-specified settings)

for the highest level of comfort, performance and efficiency. Also recognizes model and serial number information for icomfort™-enabled products to simplify system setup.

Wi-Fi remote temperature monitoring and adjustment through a home wireless network for desktop PCs, laptops and apps for smartphones or tablets. Service alerts and reminders sent via text message or e-mail.

Dealer Dashboard features online real-time monitoring of installed icomfort systems.

A simple easy-to-use touchscreen allows complete system configuration. Scheduled maintenance alerts, system warnings and troubleshooting are also displayed on thermostat screen.

Easy to read 7 inch color screen (measured diagonally).

Conventional products (not icomfort™-enabled) can easily be added and controlled by the icomfort Wi-Fi™ Thermostat. NOTE - HCSteam humidifiers are not icomfort™-enabled.

(NOTE - An icomfort™-enabled indoor unit (furnace or air handler) or the optional icomfort™ Equipment Interface Module (EIM) is required for proper operation with a conventional outdoor unit.)

icomfort™-enabled Equipment (Indoor and Outdoor Units only)

Installer setup screens allow quick and simple system configuration without a manual, Installer can also run tests on complete system or individual components for easy maintenance and troubleshooting.

Serial communications bus (RSBus), with less wiring than a conventional heating/cooling system, allows system communication. Uses 4-wire, 18-gauge standard thermostat wiring.

See the icomfort Wi-Fi® Thermostat Product Specifications bulletin in the Controls section for more information.

OPTIONAL ACCESSORIES (CONTINUED)

icomfort™ Equipment Interface Module (EIM)

Allows the icomfort Wi-Fi® Thermostat to be used with most non-communicating HVAC systems (24VAC).

The EIM emulates an icomfort-enabled™ communicating indoor unit (with reduced communication features).

See the Equipment Interface Module (EIM) Product Specifications bulletin for additional information.

ComfortSense® 7000 Touchscreen Thermostat

Electronic 7-day, universal, multi-stage, programmable, touchscreen thermostat.

4 Heat/2 Cool.

Auto-changeover.

Controls humidity during cooling mode.

Offers enhanced capabilities including humidification / dehumidification / dewpoint measurement and control, Humiditrol® control, and equipment maintenance reminders.

Easy-to-use, menu-driven thermostat with a back-lit, LCD touchscreen.

Remote outdoor temperature sensor (optional) allows the thermostat to display outdoor temperature. Required in dual-fuel and Humiditrol® applications.

See the ComfortSense® 7000 Product Specifications bulletin in the Controls section for more information.

Healthy Climate® Digital Automatic Humidistat

Basic humidity control (on/off or proportional) and temperature display.

Control Buttons:

- **Power** button
- **°F/°C** display
- **Set** button for changing humidity setpoints.
- **SLEEP** button for changing day/night modes.
- **PRG** button for programming timed settings and setting the clock.
- **Up/Down** buttons to change humidity setpoint and time.

Built-in humidity sensor.

Outdoor temperature sensor furnished.

24VAC powered directly by the humidifier.

LCD with alphanumeric characters and icon graphics for Humidity and Temperature (indoor/outdoor),

Humidity Mode, Sleep Mode, Auto Mode, Lock Mode, Program Timer On.

Large LCD display shows humidity (or temperature) setpoint while the small display shows temperature (or time) setpoint.

Built-in clock (with backup) for automatic humidity control. Two time settings per day.

Error code display.

Lock mode indicates a parameter has been set.

Dimension (H x W x D): 3-3/8 x 5-1/2 x 1-3/8 in.

Healthy Climate® Water Conductivity Test Kit

A conductivity meter is recommended for testing the water.

Measures total dissolved solids (TDS) and temperature.

Automatic Temperature Compensation (ATC).

Water-resistant housing

Measurement Range: 0-5000 ppm

Digital Calibration (Push button)

Auto-off function, data-hold function and low-battery indicator.

Display: large and easy-to-read LCD screen includes simultaneous temperature reading.

Factory-calibrated with a 342 ppm NaCl solution. The meter can be recalibrated with digital calibration using the Push buttons, rather than a screwdriver.

Includes cap and CR2032 battery.

Steam Generator Cylinder For Low Conductivity Water (HCSteam-35 Model Only)

Normal water conductivity range is 350-1250 µS/cm. For low conductivity water conditions (125-350 µS/cm range) order optional Steam Generator Cylinder.

MAINTENANCE SUPPLIES

Replacement Steam Cylinders

Steam cylinders are available for annual replacement (no more than 2500 operating hours).

SPECIFICATIONS

		Model No.	HCSteam-16	HCSteam-35
Performance	Duct Steam Injection	US gallons per day	15	35
		lbs. per hour	5.5	12
		Steam pressure	3.81 in. wg	3.81 in. wg
Input Water Type			Potable water	Potable water
Conductivity Range			125-1250 µS/cm	[1] 350-1250 µS/cm
Ambient Conditions		Operating Temperature	34°F to 104°F	34°F to 104°F
		Operating Humidity	10 to 60% RH	10 to 60% RH
Connections		Water fill connection	3/4 in. NPT	3/4 in. NPT
		Drain connection	1.25 in. OD	1.25 in. OD
		Steam Hose	1-1/4 OD, 7/8 in. ID	1-1/4 OD, 7/8 in. ID
Drain		Water Temperature	< 140°F	< 140°F
		Drain Pump Flow	2.16 US GPM	2.16 US GPM
Weight Data - lbs.		Shipping	22	22
		Empty	18	18
		Installed with water	26	26

ELECTRICAL DATA

	HCSteam-16	HCSteam-35
[2] Voltage	115V-1ph	230V-1ph
Amps	16.40	16.95
Maximum overcurrent protection	25	25
Power relays (amps)	(2) 20	(2) 20
Ground connection	Wire Nut	Wire Nut
Electrode power cables	10 AWG	10 AWG

OPTIONAL ACCESSORIES

	HCSteam-16	HCSteam-35
icomfort Wi-Fi® Thermostat	10F81	10F81
icomfort Wi-Fi® Thermostat and Equipment Interface Module (EIM) Bundle	99W24	99W24
[3] **Remote Outdoor Air Temperature Sensor** (for dual fuel, Humiditrol® and outdoor temperature display)	X2658	X2658
[4] **Discharge Air Temperature Sensor**	88K38	88K38
ComfortSense® 7000 Thermostat	Y2081	Y2081
[5] **Remote Outdoor Temperature Sensor** (for dual fuel and Humiditrol)	X2658	X2658
Healthy Climate® Digital Automatic Humidistat	Y3760	Y3760
Healthy Climate® Water Conductivity Test Kit	Y3480	Y3480
[1] **Steam Generator Cylinder for Low Conductivity Water (below 350 µS/cm)**	- - -	Y3484

MAINTENANCE SUPPLIES

	HCSteam-16	HCSteam-35
Replacement Steam Generator Cylinders	Y3481	Y3482
For HCSteam-35 (low conductivity water models)	- - -	Y3484

[1] For low water conductivity conditions (125-350 µS/cm range) order optional Steam Generator Cylinder for Low Conductivity Water (**Y3484**).

[2] Extremes of operating range are plus 10% and minus 15% of line voltage.

[3] Remote Outdoor Sensor may be used with an icomfort®-enabled outdoor unit for a secondary (alternate) sensor reading. Sensor may also be used with a conventional outdoor unit.

[4] Optional for service diagnostics.

[5] Remote Outdoor Temperature Sensor for ComfortSense 7000 Thermostat must be connected directly to the thermostat.

HUMIDIFICATION LOAD REQUIRED - GALLONS PER DAY

(Reference: AHRI Guideline F-2008)

Type of Construction	Volume of Building ft³ (approximate)							
	8000	**10,000**	**12,000**	**16,000**	**20,000**	**24,000**	**32,000**	**40,000**
Tight	4.3	5.3	6.4	8.5	10.6	12.7	17.0	21.2
Average	8.6	10.6	12.8	17.0	21.3	25.4	34.0	42.6
Loose	12.7	15.9	19.1	25.5	31.8	38.1	51.0	63.6

Legend:	
	HCSteam-16
	HCSteam-35
	Exceeds capacity of one HCSteam unit

NOTES - Tight = 1/2 air change per hour.
            Average = 1 air change per hour.
            Loose = 1-1/2 air changes per hour.

DIMENSIONS - INCHES (MM)
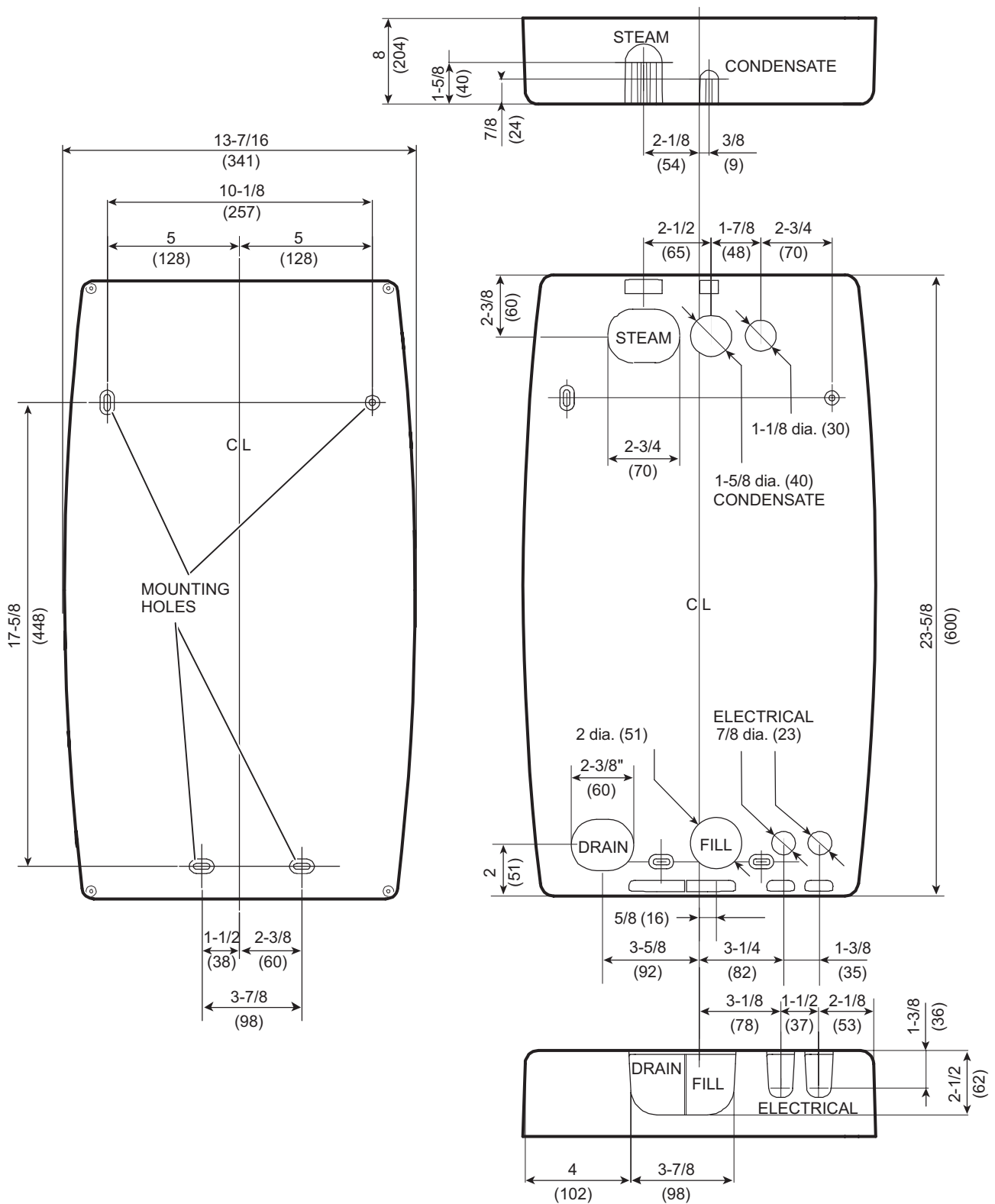
INSTALLATION CLEARANCES - INCHES	
Top	6 in.
Bottom	6 in.
Left Side	6 in.
Right Side	6 in.
Front	24 in.

Sections	Description of Change
Optional Accessories	New icomfort Wi-Fi® Thermostat catalog number. Added Equipment Interface Module (EIM).
Specifications	Revised electrical specifications.

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