



ENGINEERING DATA



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, not softened or demineralized.

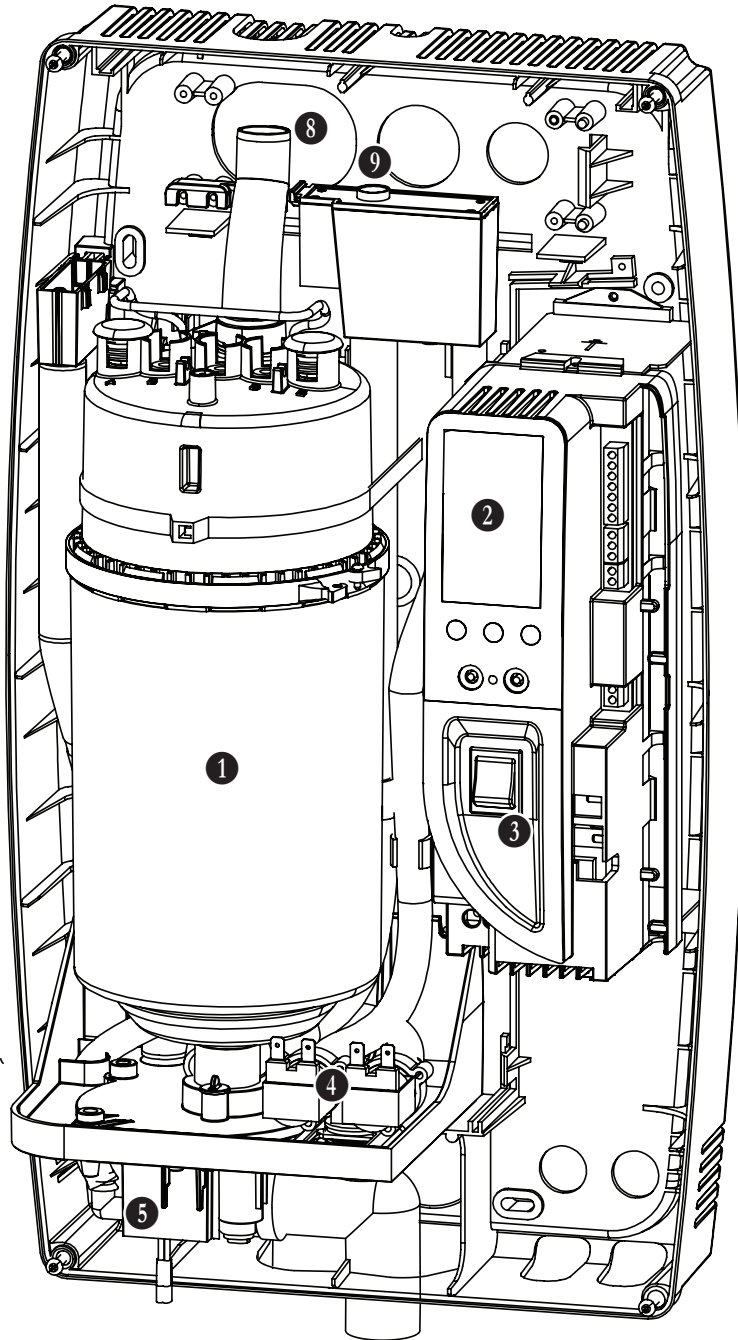
The water converted into steam is automatically replaced through an electric fill valve. Periodically, based on the water quality, the unit will also drain and add some water to dilute the build-up of minerals in the Steam Generator Cylinder.

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.

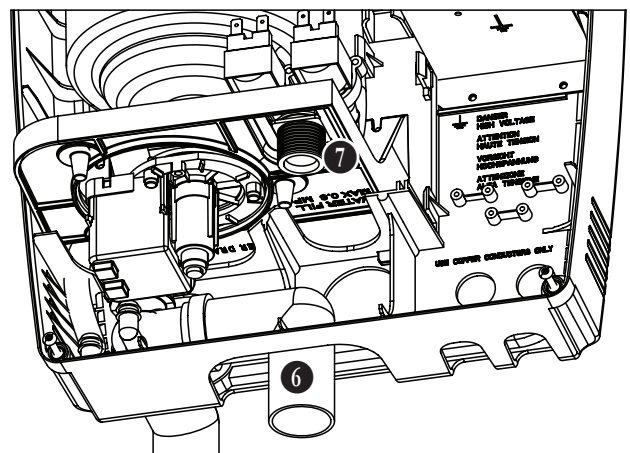
Included with the humidifier:

- Steam nozzle
- Steam hose (10 ft.)
- Steam nozzle condensate drain hose (10 ft.)
- Water fill hose (6 ft.)
- Air proving pressure switch (required)

FEATURES



- 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



FEATURES

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 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 ppm³ of calcium carbonate (CaCO₃)
- 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 softened water.

Refer to the Installation Instructions for detailed information.

Required Items

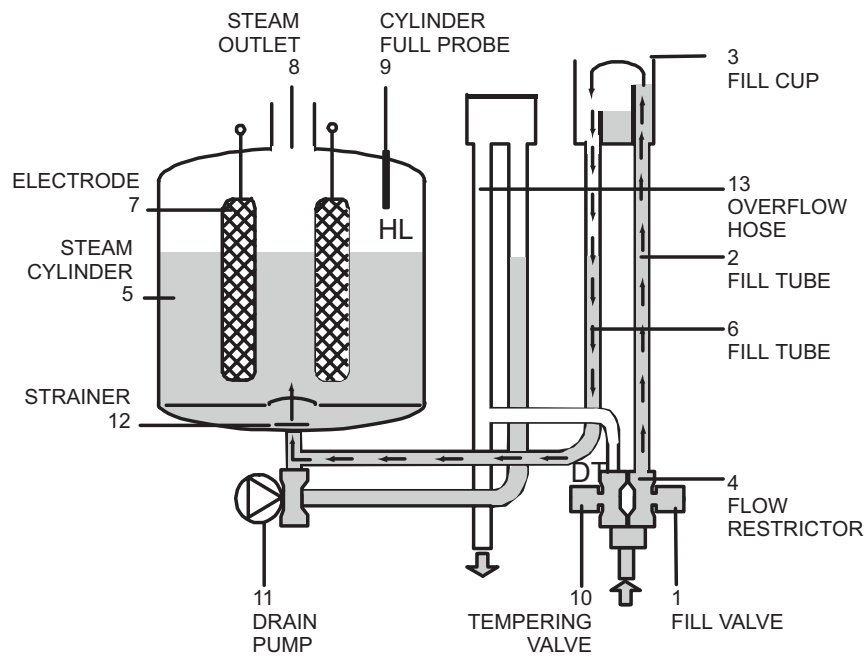
1/2 inch water line.

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 140° 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 140°F 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.

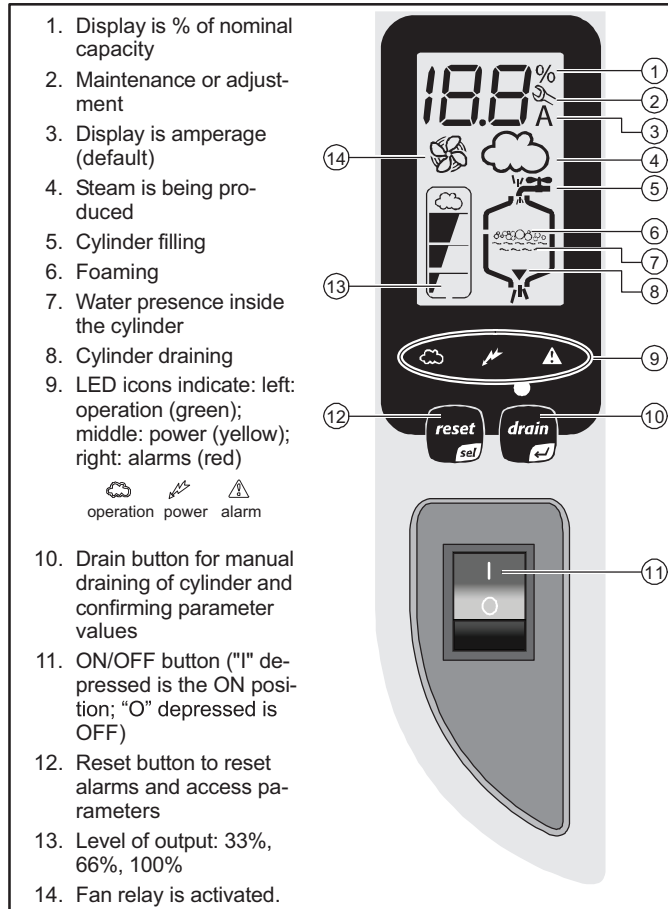
If there is no water in the cylinder, there will be no current flow and no steam production. The electrodes do not burn out, but they will eventually become coated with mineral deposits and the cylinder will require replacement.

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

FEATURES

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.



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 garden 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.

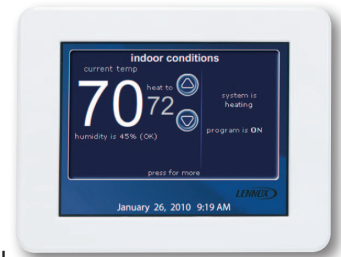
Removable front cover (4 Phillips head screws) for easy access for servicing and maintenance.

OPTIONAL ACCESSORIES

icomfort Touch® Communicating Thermostat (part of the icomfort™ Residential Communicating Control System)

The **icomfort Touch®** Communicating Thermostat

recognizes and connects to all icomfort™-enabled products to automatically configure and control the system (based on user-specified settings) for the highest level of comfort, and performance. Also recognizes model and serial number information for icomfort™-enabled products to simplify installation.



Large full color touchscreen - no hidden buttons or doors.

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

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

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

A tabbed interface lists all programming options on the screen.

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 Touch® Communicating Thermostat Engineering Handbook bulletin in the Controls section for more information.

FEATURES

OPTIONAL ACCESSORIES (CONTINUED)

ComfortSense® 7000 Touchscreen Thermostat

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

4 Heat/2 Cool.

Auto-changeover.

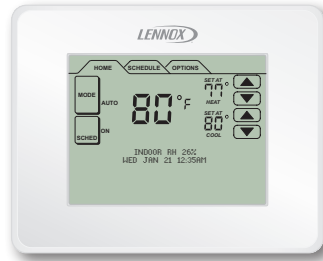
Controls humidity during cooling mode.

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 Engineering Handbook 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 $\mu\text{S}/\text{cm}$. For low conductivity water conditions (125-350 $\mu\text{S}/\text{cm}$ 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 μ S/cm | ¹ 350-1250 μ S/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 |
| Storage Conditions | Temperature Storage | | 14°F to 158°F | 14°F to 158°F |
| | Humidity Storage | | 5 to 95% RH | 5 to 95% 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

| | | | | |
|--|--------------------------------|--|--------------|--------------|
| | Voltage | | 115/120V-1ph | 220/240V-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

| | | | |
|--|--|--------------|--------------|
| icomfort Touch® Communicating Thermostat | | 49W95 | 49W95 |
| ² Remote Outdoor Temperature Sensor (for dual fuel, Humiditrol® and outdoor temperature display) | | X2658 | X2658 |
| ³ Discharge Temperature Sensor | | 88K38 | 88K38 |
| ComfortSense® 7000 Thermostat | | Y2081 | Y2081 |
| ⁴ 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 μ S/cm) | | --- | Y3484 |

MAINTENANCE SUPPLIES

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

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

² 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.

³ Optional for service diagnostics.

⁴ Remote Outdoor Temperature Sensor for ComfortSense 7000 Thermostat must be connected directly to the thermostat.

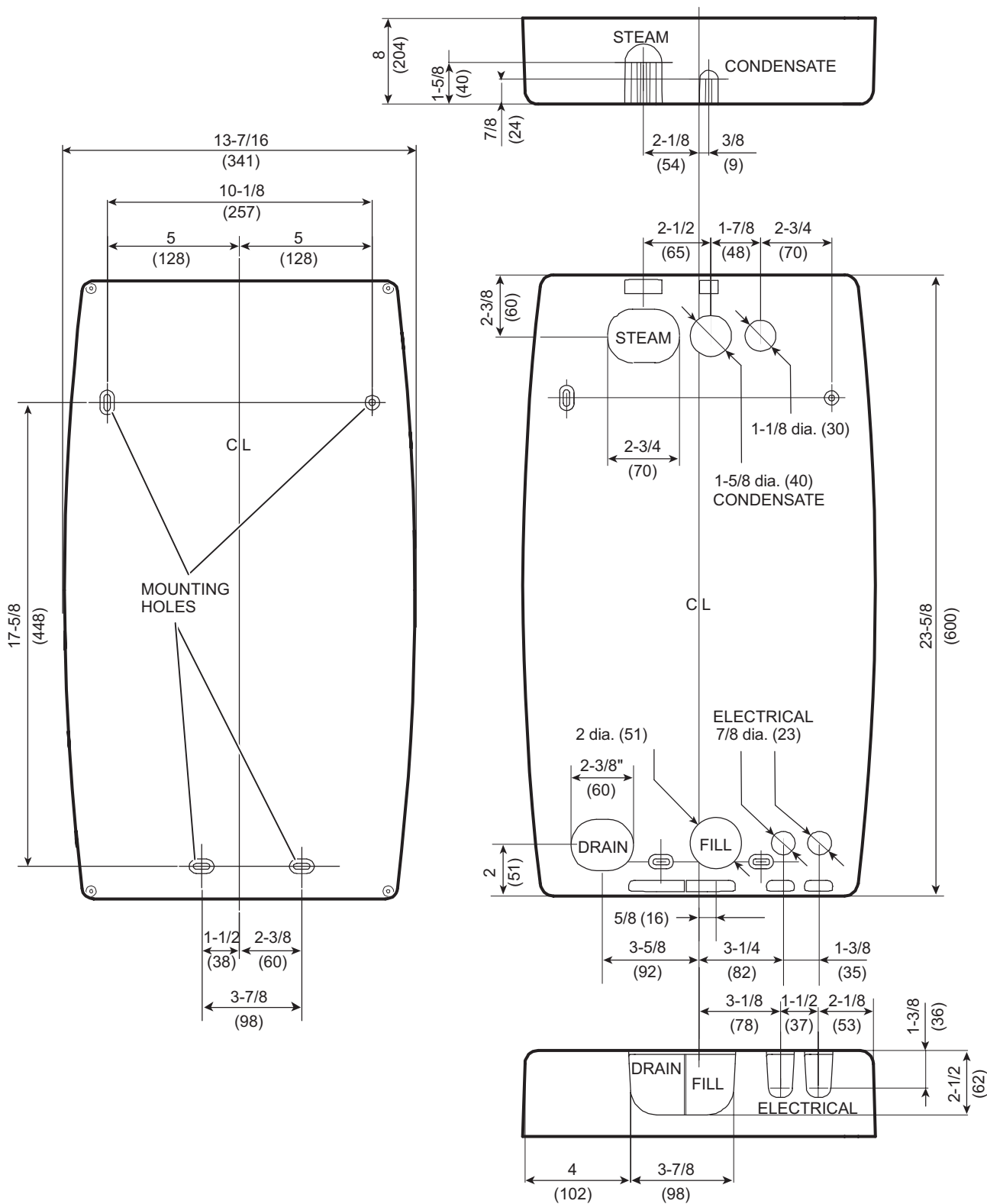
HUMIDIFICATION LOAD REQUIRED - GALLONS PER DAY

(Reference: AHRI Guideline F-2008)

| Type of Construction | Volume of Building ft ³ (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. |

REVISIONS

| Sections | Description of Change |
|----------------------|--|
| Maintenance Supplies | New Section - Added replacement steam cylinders. |



Intertek

Visit us at www.lennox.com

For the latest technical information, www.lennox.com

Contact us at 1-800-4-LENNOX

NOTE - Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice and without incurring liability. Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury. Installation and service must be performed by a qualified installer and servicing agency.

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