



Dehumidification Systems

FOR COMMERCIAL ROOFTOP
UNITS AND SPLIT SYSTEMS



LENNOX
Innovation never felt so good.®

Superior humidity and temperature control every day of the year

With the Humiditrol® dehumidification system from Lennox, you can easily reduce humidity levels regardless of room temperature. The unique dehumidification-on-demand design removes moisture based on relative humidity levels—not the temperature—so it's easy and efficient to create a better indoor environment.

HUMIDITROL® DEHUMIDIFICATION AT A GLANCE:

Integrated dehumidification system that controls humidity independent of room temperature

Available on rooftop units and small split systems

Efficiently improves indoor air quality (IAQ) and comfort

Reduces spread of allergens such as mold, mildew and dust mites

Helps control mold-related repair and maintenance costs

*Rooftop unit system removes up to eight times more moisture than standard rooftop units**

Advanced system is available for 3- to 25-ton Energence® rooftop units

*Split system version is twice as energy-efficient as standard dehumidifiers***

Why the Humiditrol® dehumidification system is more effective

The Humiditrol dehumidification system is different from standard dehumidification products that use cooling to remove moisture. This method can backfire by overcooling the space and leading to condensation and mold growth, even damaging building materials. The Humiditrol system removes moisture with minimal effect on temperature, avoiding problems with overcooling.

Reduced humidity is better for business

High humidity levels can make people feel sticky and may create a breeding ground for mold, mildew, dust mites and bacteria. This environment can affect customer comfort, as well as the integrity of computers, building materials and stocked items.

Maintaining relative humidity levels between 30% and 60% (as recommended by ASHRAE 62-2001 standards) will help improve comfort and reduce the spread of allergens that may lead to absenteeism and long-term health problems such as asthma.

Controlling humidity is more important than ever

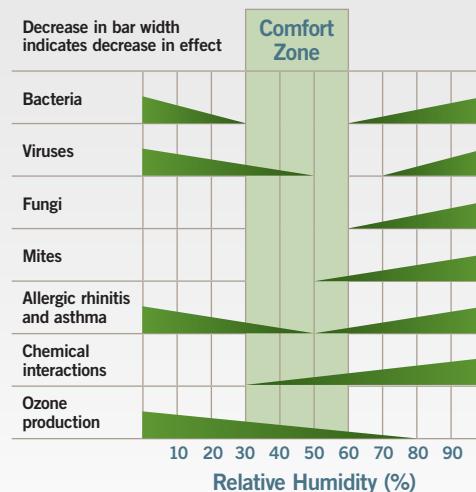
Today's buildings feature tight construction to reduce the amount of air leakage. While that may reduce sensible cooling loads, moisture levels may actually increase as a result of the minimal exchange with outside air. Additionally, ASHRAE standards require fresh-air ventilation based on occupancy regardless of outdoor conditions. The result is that when outdoor humidity is high, the latent load can exceed the sensible load, increasing the need for independent humidity control.

Indoor air quality productivity costs

Estimated number of employees	65
Salary cost (per average employee)	\$30,000
Total staff (yearly)	\$1,950,000
Productivity losses due to poor thermal comfort, absenteeism, comfort, etc. (average %)	3%
Total lost productivity	\$58,500

Information from "Humidity Control, IAQ and You" Engineered Systems magazine, January 2001.

Optimal comfort zone



Source: ASHRAE, adapted from Sterling et al., 1985

*At 65°F, the Humiditrol® dehumidification system for rooftop units removes more than 1.44 gallons of water per hour.

**Performance information is for 82°F outdoor temperature and indoor conditions per ANSI/AHAM dehumidifier test standard DH-1 for split system Humiditrol® dehumidification system.

Humidity control for rooftop units



Prodigy® Unit Controller

The Humiditrol® dehumidification system for Emergece® rooftop units uses a patented design to help ensure the best comfort control.

Operation is driven by the Prodigy® control system featuring an intuitive user interface that makes setup, troubleshooting and servicing easier than ever. Each unit tracks the runtime of every major component and records the date and time when service or maintenance is performed. The control system intelligently operates the rooftop unit to help ensure reliability, maximum efficiency and comfort while reducing start-up issues.

Innovative yet simple design

- Only three components are added to the standard cooling system for a simple, reliable design
- Allows one rooftop unit to independently control temperature and reduce humidity
- Activation is based on input from the humidity sensor, dehumidistat or third-party signal
- Several convenient options for monitoring and controlling humidity:
 - At the unit through the Prodigy control system via today's most popular open protocols such as BACnet and LonTalk®
 - Through the L Connection® Network control pane
 - Even from a computer or remote location by using L Connection Network software

Easy access to system components

- The three-way valve and check valve can be easily accessed in the unit's compressor section
- The Humiditrol add-on board is located on the Prodigy control system
- The reheat coil is installed downstream next to the evaporator coil and is accessible via hinged toolless access panels

An integrated dehumidification system with your rooftop unit

The Humiditrol dehumidification system is factory-installed with Emergece rooftop units. This lowers installation and maintenance costs of separate dehumidification systems. Operation requires only the addition of a humidity sensor, further simplifying installation and lowering service and repair costs. On multiple-compressor systems, rooftop units with the Humiditrol dehumidification system can vary their sensible-to-latent ratio based on patented technology to match space requirements, delivering just the right amount of cooling and/or dehumidification.

Competitive comparison

Feature	Humiditrol® Dehumidification System	Standard Rooftop Unit	Comment
Dehumidification without cooling demand	Yes	No	Thermostat-initiated latent capacity limited on cooler days
Improved dehumidification over temperature-initiated dehumidification systems	Yes	No	Humidity removal initiated by humidity level, not temperature
Full-load dehumidification with part-load cooling	Yes	No	Humiditrol dehumidification system allows all compressors to provide full-load dehumidification and part-load cooling
Improved latent capacity over cooling operation	Yes	No	Additional subcooling yields colder evaporator, greater latent capacity over standard AC circuit

Energy-efficient dehumidification

The advanced Humiditrol® dehumidification system is available for Energence® 3- to 25-ton high-efficiency rooftop unit models.

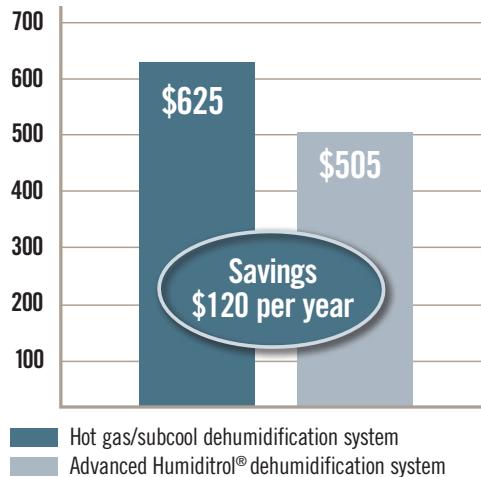
The advanced system reduces power consumption in dehumidification mode by:

- Lowering the indoor airflow while increasing latent capacity
- Lowering the outdoor fan speed



Energence® 3- to 5-ton unit

Energy cost/year

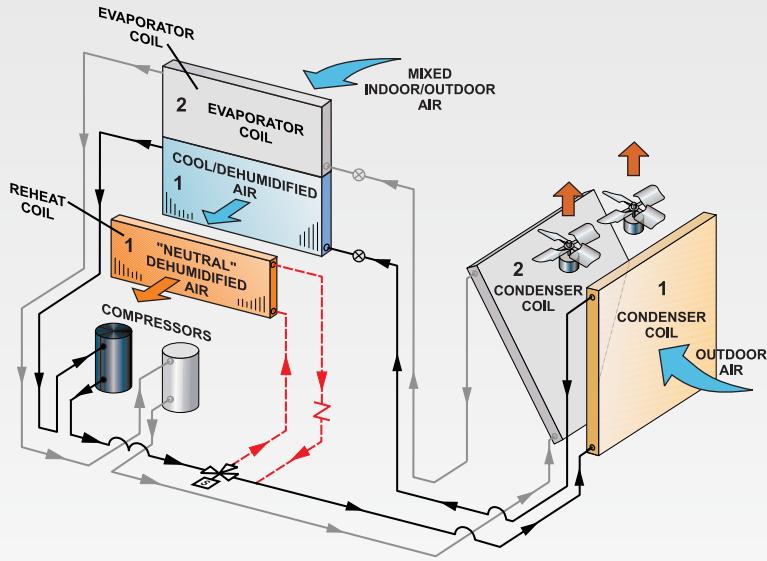


Calculations based on 1,460 hours of dehumidification per year on 5-ton rooftop unit. Energy cost estimated at \$0.13 per kWh.

Two-compressor Humiditrol® model*

Dehumidification and part-load cooling operation for a two-compressor model

1. The Prodigy® control system initiates the dehumidification cycle when it senses that both room temperature and humidity level are above the desired setpoint, or if just the humidity level is above the setpoint.
2. If there is only a humidity demand, the fans, compressor, and evaporator and reheat coils of circuit number one are activated. If there is a demand for both temperature and humidity, then the fans, compressor and evaporator coil of circuit number two are also activated.
3. The mixed indoor/outdoor air is cooled and dehumidified as it passes through the active evaporator coils.
4. The cooled and dehumidified air is heated back to near room temperature if there is only a dehumidification demand or is partially reheated if there is a demand for both dehumidification and cooling.
5. This patented sequencing of the two-compressor system allows the unit to provide part-load dehumidification and no cooling or full-load dehumidification and part-load cooling. This operating sequence is ideal for mild-temperature, high-humidity times of the year.



1	REFRIGERANT CIRCUIT 1	REHEAT VALVE
2	REFRIGERANT CIRCUIT 2	CHECK VALVE

⊗ EXPANSION VALVE

*To see complete sequence of operation information for one-, two-, three- and four-compressor models, please reference our Energence® rooftop unit gas-electric and electric-electric engineering handbooks.

Humidity control for split systems

The Humiditrol® dehumidification system is available as a field-installed accessory for S-Class® and T-Class™ commercial air conditioner and heat pump split systems from Lennox, as well as selected residential models.

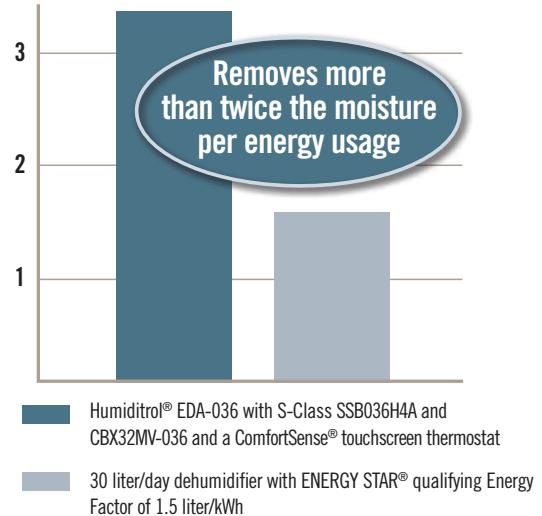
Installation and operation require no additional control boards or sensors, which reduces the cost of parts, installation and maintenance for a lower total cost of ownership.

Minimum Humiditrol® system requirements

- Humiditrol dehumidification system
- Lennox® variable speed furnace or air handler
- Lennox air conditioner or heat pump
- ComfortSense® 7000 Series touchscreen thermostat

Operating efficiency*

Liters per kilowatt hour (kWh)



*Performance information is for 82°F outdoor temperature and indoor conditions per ANSI/AHAM dehumidifier test standard DH-1.

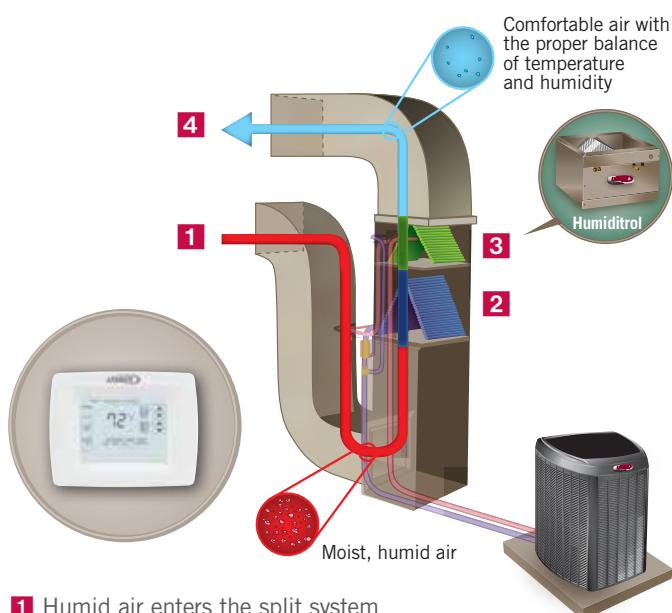
Higher-performance humidity control

Adding the Humiditrol dehumidification system to split systems provides independent humidity and temperature control in one easy-to-use device, with moisture removal that significantly outperforms conventional dehumidifiers. Because S-Class and T-Class units are ENERGY STAR® qualified, they also control energy usage for lower utility costs.* By reducing humidity, they also help your building feel cooler.

Add the ComfortSense® 7000 Series touchscreen thermostat

The addition of the Humiditrol dehumidification system requires a ComfortSense touchscreen thermostat, which is easily integrated into your heating and cooling system to regulate moisture levels and temperature. The system's seven-day programming can be programmed for different settings at different times, up to four time periods per day, every day of the week.

Precision humidity and temperature control in one easy-to-use device



- 1 Humid air enters the split system
- 2 Humidity is removed at the evaporator coil
- 3 Air is adjusted to the desired temperature using the patented Humiditrol system technology
- 4 Air with appropriate temperature/humidity levels makes the space more comfortable and helps improve IAQ

*See S-Class and T-Class split system product brochures for details on efficiency and energy usage.

Solutions for customized comfort

Don't just choose a Lennox® product—choose a Lennox Commercial Comfort System.

These complete packages of HVAC solutions provide tools to create a healthy and comfortable environment.



Packaged Units

- Energence® Rooftop Units
- Strategos® Rooftop Units
- Landmark® Rooftop Units
- Raider™ Rooftop Units



Commercial Controls

- Systems Integration Solutions
- Commercial Thermostats
- L Connection® Network



Solar Ready

- SunSource® Commercial Energy System



Indoor Air Quality

- Humiditrol® Dehumidification System
- Demand Control Ventilation
- Air Filters
- UVC Lamps



Split Systems

- S-Class® Air Conditioners/Heat Pumps
- T-Class™ Air Conditioners/Heat Pumps
- Air Handlers
- Indoor Coils



Heating

- Unit Heaters
- Duct Furnaces
- Furnaces



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