

Humidi-MiZer™ Adaptive Dehumidification For Packaged Rooftop Units



Turn to the Experts.™



Humidi-MiZer™ Adaptive Dehumidification System

Unitary Rooftop Part-Load and Dehumidification Control

Introduction

Carrier Corporation has a century-old heritage of engineering leadership — developing the most technologically advanced, innovative equipment and systems in the industry. Our latest addition is no exception — the Humidi-MiZer™ Adaptive Dehumidification system for packaged rooftop units.

As a direct result of more cost effective systems, packaged rooftop units are currently being implemented in expanded applications, many of which require the highest degree of indoor comfort and humidity control.

Maintaining indoor space humidity levels can be increasingly difficult depending on the time of year, location of the installation, and the ability of the equipment to provide reliable, flexible operation to meet indoor part load sensible and latent load requirements. Standard rooftop performance often cannot meet these variable requirements, as the unit's sensible heat ratio is typically fixed and the unit is generally controlled from sensible loads only via a thermostat.

Carrier's Humidi-MiZer Adaptive Dehumidification system is an all-inclusive factory-installed option, available on Carrier's 2-25 ton unitary rooftop units. It meets the demand for a cost effective, yet flexible and high performing solution to these humidity and part-load issues.

The innovative Humidi-MiZer Adaptive Dehumidification system expands the envelope of operation of Carrier's unitary rooftop products to provide unprecedented flexibility in year round comfort conditions.

How it works:

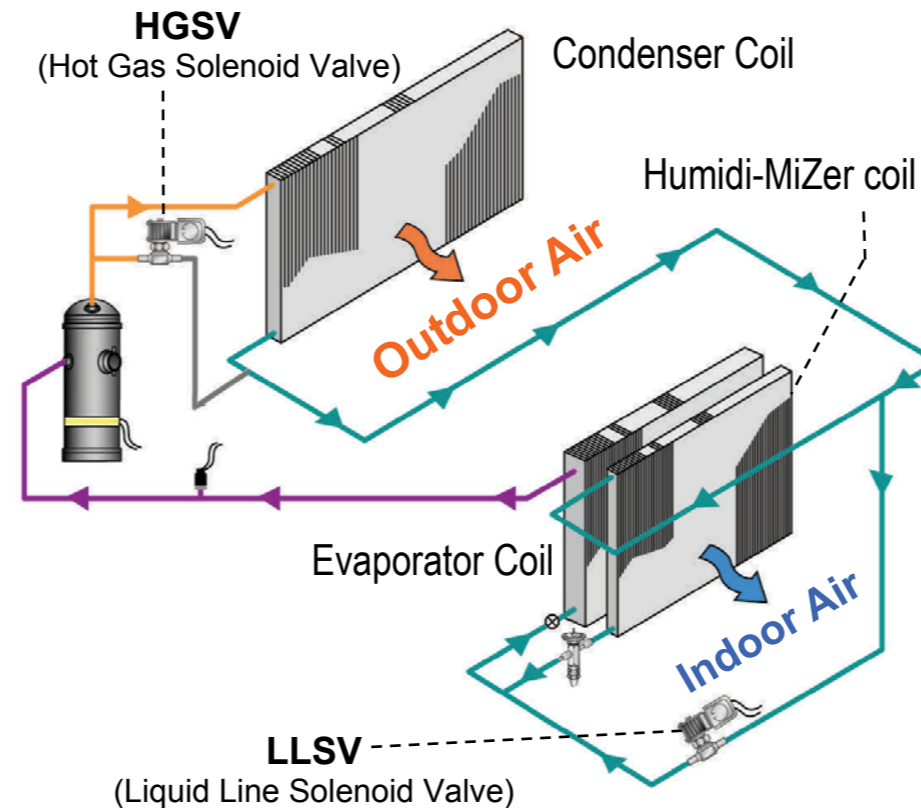
Using a simple space thermostat and humidistat input, the Humidi-MiZer Adaptive Dehumidification system changes the refrigerant flow by adjusting the position of the refrigerant solenoid valves. There are three modes of operation: Normal, Sub-Cooling and Hot Gas ReHeat. For units with two refrigerant circuits, each circuit can operate in each of the three modes independently, giving the unit the ultimate flexibility to satisfy space temperature and humidity loads.

Normal Mode (HGSV closed, LLSV open)

When there is a call for cooling only, the dehumidification system is inactive and the refrigerant circulates per a typical packaged system.

Sub-Cooling Mode

(HGSV closed, LLSV closed) During part load conditions when the room temperature and humidity are above the setpoint, the unit will initiate the sub-cooling mode of operation; a call for cooling and dehumidification. In this mode, the liquid refrigerant leaves the condenser and is routed through the Humidi-MiZer coil, downstream of the condenser, and then through the evaporator. The indoor air stream passes over the evaporator first then over the Humidi-MiZer coil, further sub-cooling the refrigerant. This highly sub-cooled refrigerant is then fed to the evaporator coil, creating a colder evaporator coil surface. At the same time, the air leaving the evaporator is partially reheated to prevent over-cooling the space. Because the supply air temperature is approximately 5 to 7 degrees higher than normal supply air temperatures, the end result is a conditioned space that is cooled and significantly more dehumidified, but not over-cooled. This also helps eliminate short cycling of the rooftop unit and improves space temperature and humidity control.



Hot Gas ReHeat Mode

(HGSV open, LLSV closed) When there is a call for dehumidification without a call for cooling, a portion of the hot gas from the compressor bypasses the condenser coil and is fed into the liquid line. At this point, it is mixed with the sub-cooled refrigerant leaving the condenser coil. This two-phase mixture is routed through the Humidi-MiZer coil and then the evaporator. Additional sub-cooling of the refrigerant occurs in the Humidi-MiZer coil, and when this refrigerant is fed into the evaporator, the result is a colder coil surface. The air is cooled and dehumidified as it flows across the evaporator and is then reheated to neutral conditions by the Humidi-MiZer coil.

Features & Benefits

The Humidi-MiZer™ Adaptive Dehumidification system provides a greater degree of operational flexibility and enhances humidity control for consistently maintaining year round indoor comfort temperature and humidity levels with a packaged rooftop unit. Benefits include:

Maximum Flexibility — Using three operational modes, for multiple Sensible Heat Ratios (SHR) per unit, the system is better able to adapt to peak and part load outdoor temperature and humidity conditions. This results in up to 35% more moisture removal capability than typical conventional hot gas reheat systems, and the ability to operate without any restrictions on the unit's normal CFM range.

Consistent Comfort — System flexibility allows the rooftop unit to maintain both indoor temperature and humidity comfort conditions consistently year round.

Superior Humidity Control — Using compressors for active dehumidification, the system can boost the latent capacity of our standard rooftop unit by up to 40%, in the sub-cooling mode, and still allow the capability for dehumidification without a call for cooling, when required by the space.

Cost Effective — Available as a factory installed option on 2 to 25 ton unitary rooftop products, the Humidi-MiZer Adaptive Dehumidification system provides a cost effective packaged alternative for meeting latent load intensive applications and variable SHR requirements. System installation costs are simplified and minimized by using Carrier's exclusive Thermidistat™ or a humidistat device with a thermostat for combined temperature and humidity sensing in the space. Factory Installed & Warranted — The Humidi-MiZer Adaptive Dehumidification system is a factory designed, tested and installed option, specifically engineered for optimum performance and reliability with Carrier rooftop units. The Humidi-MiZer is backed by the roof-top unit's factory warranty.

Typical Applications

Many applications can benefit from the Humidi-MiZer™ Adaptive Dehumidification system. The following applications exhibit conditions in which the Humidi-MiZer Adaptive Dehumidification system would be an ideal cost-effective enhancement to a packaged rooftop unit.

Schools — Due to variable student occupancy with constant changes in ventilation air change requirements in each classroom, the proportion of latent load may be high, and humidity may rise. High humidity levels can damage computer equipment or building structural materials. In addition, students entering and leaving classrooms may result in a variation in latent load for each room, which requires maximum part load dehumidification control.

Restaurants and Fast Food

Chains — The high degree of variable occupancy, along with kitchen areas of restaurants that have many humidity producing activities, such as dish washing and cooking, can easily result in humidity control problems and over cooling by conventional packaged rooftop units.

Convenience Stores and

Supermarkets — High humidity levels can cause inefficient operation of refrigeration and freezer systems. Over cooling can cause significant discomfort for customers.

Churches — Like schools, the high degree of variable occupancy and ventilation requirements can result in humidity control problems and over cooling situations by a conventional packaged rooftop unit.

Health Clubs — Shower areas and human perspiration can cause uncomfortable and higher humidity space conditions. In addition to human discomfort, these conditions can propagate the growth of mold and mildew.

Museums and Libraries — These applications require a tighter degree of tolerance to maintain part load conditions, since high humidity levels can cause substantial damage to priceless books and artifacts.

Humid Climates — In climates along the coast, when the temperature drops, the outdoor wet bulb may remain the same or higher. This results in a need to reduce the sensible capacity but yet provide more latent capacity to prevent humidity levels from increasing in the space.

Benefits at a Glance

For Building Owners & Managers

- Advanced occupant comfort by multiple modes of operation
- Prevent space over-cooling and over-heating
- Industry leading dehumidification and part-load performance in a packaged rooftop unit
- Simple controls requirements
- Reduced compressor cycling

For Consulting Engineers

- Factory Installed Option
- Uses active dehumidification (compressors)
- Design operation within normal unit parameters
- Simple controls requirements
- Industry leading Latent capacity via sub-cooled refrigerant
- Up to four stages of SHR (Sensible Heat Ratio)
- Compatible with Energy Recovery devices

For Contractors

- Easy to start up and operate
- Simple controls installation
- No refrigerant components to install
- Simple to service
- Factory warranty coverage

Turn to the Experts

Whatever your HVAC needs, from specifying and purchasing to installation and maintenance, Carrier has the solution. As the world leader in heating, ventilation and air conditioning, Carrier is committed to continually improving the quality of comfort for our customers.

From concept to finished product, your local Carrier sales representatives walk with you every step of the way.

Whether you have one building, multiple sites nationwide, or special equipment and facility requirements, Carrier sales representatives will recommend a solution that fits your scope and budget.



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