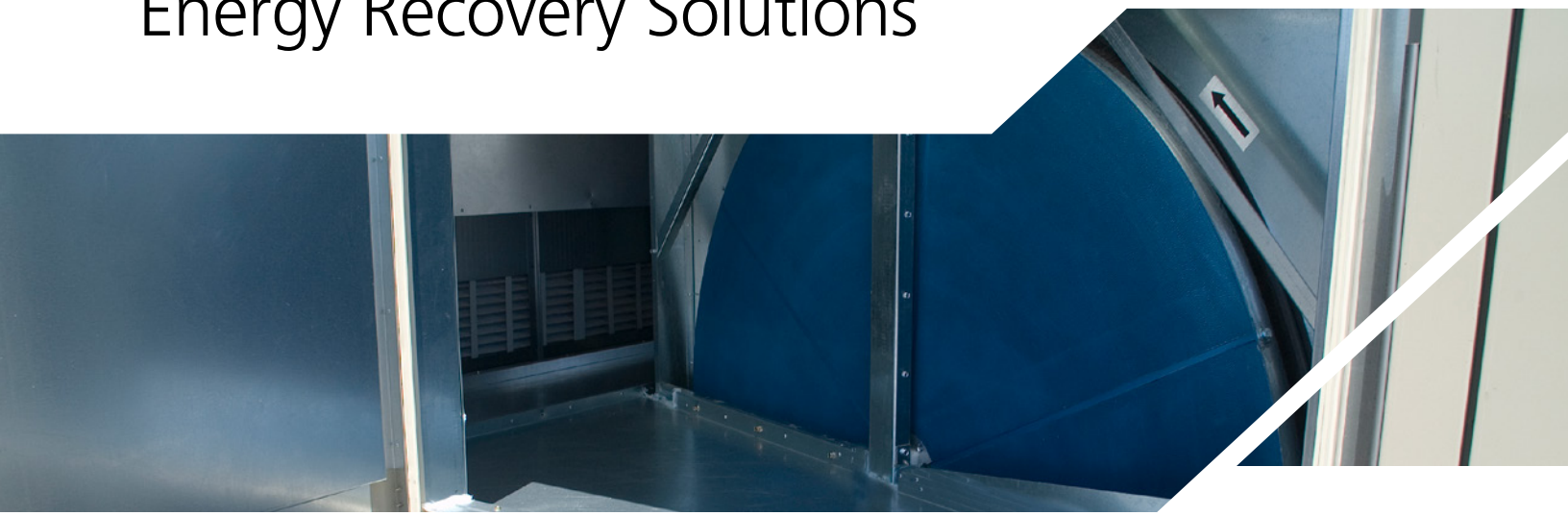
Energy Recovery Solutions



Controlling Energy Costs and Complying with ASHRAE Standard 62.1

The energy cost to condition ventilation air is a major part of total building energy costs. Ventilation air can account for 30% of the total cooling load and 50% of the total heating load for a school building. Because proper ventilation is a necessity – not an option – a method of conserving energy, while simultaneously meeting the current requirements of ASHRAE Standard 62.1 is essential.

The solution is a factory-installed and tested energy recovery system available in Daikin Rebel®, Maverick® II, RoofPak® applied rooftop systems and Vision® and Skyline® air handlers.

Daikin Energy Recovery Systems

Our energy recovery device transfers both heat and moisture energy between the exhaust and ventilation air. In doing so, it conditions the incoming ventilation air. This total energy device offers a cost-effective and efficient method for containing energy costs while meeting the ventilation requirements of ASHRAE Standard 62.1.

Factory-Installed and Tested Package

Daikin energy recovery systems (with an AHRI certified wheel, exhaust fan, optional bypass dampers and controls) are provided as a one-piece, factory-installed and tested package. This eliminates field coordination and leakage problems associated with field installation.

The outdoor and exhaust air flows are arranged in counter-flow for better efficiency, and to reduce field cleaning requirements. Exhaust contaminants cannot enter the ventilation air because the exhaust air static pressure is always less than the ventilation air static pressure. Frost protection and purge options are also available.

Factory-installed and tested controls provide proper operation for:

Integrated cooling, heating and recovery control – Mechanical heating and cooling are supplied as necessary to supplement the wheel and maintain space conditions.

Free cooling – Units with economizers include bypass dampers that are opened when "free cooling" is available. The wheel is simultaneously turned off.

Proper exhaust – Exhaust fan speed is controlled using a factory-installed Variable Frequency Drive (VFD) and space building pressure sensor for proper exhaust.

Solutions from people & ideas you can trust.

Features

- Recovers both heat and moisture energy
- Factory-installed and tested prior to shipment
- Available in 100% outdoor air (OA) or economizer configurations, both with exhaust fans
- AHRI-certified and UL-recognized wheel

Benefits

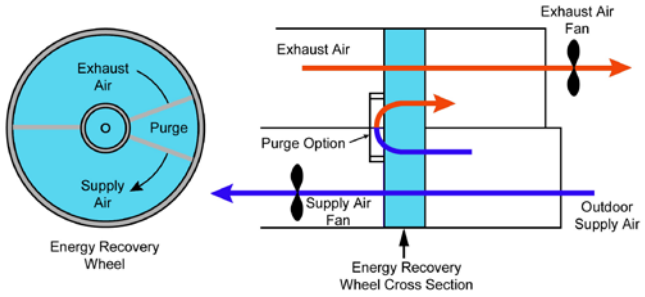
- Recovers approximately 70-75% of the energy from exhaust air stream
- Allows mechanical refrigeration, heating, and humidifying capacities to be reduced, offsetting the initial cost of the energy recovery wheel
- Cuts winter humidification energy costs by up to 60%
- Provides 100% more summer energy recovery than sensible-only energy recovery devices
- Helps provide a comfortable and affordable indoor environment
- Satisfies ASHRAE Standard 90.1 requirements for energy recovery on applications. Much of the country requires energy recovery if minimum ventilation air is more than 40% of design air flow and total cfm exceeds 4500 cfm.

How Energy Recovery Works

In the figure below, the wheel (aluminum or synthetic) provides energy recovery by drawing outside air across half of the wheel while drawing exhaust air across the other half. This allows for both heat and moisture to be captured and transferred from one airstream to another as the wheel rotates.

During summer conditions with humid outside supply air, the rotating wheel captures heat and moisture from the supply airstream and transfers it to the exhaust airstream.

During winter conditions with humid indoor exhaust air, the rotating wheel captures heat and moisture from the exhaust air and transfers it to the supply airstream.



Efficient Winter Humidification

Low space humidity is a common problem in the winter and can cause both discomfort and health problems for tenants. It also leads to increased static electricity, which can be damaging to computer equipment. However, mechanical humidification requires 1,100 Btu per pound of humidity. Our energy recovery system provides the added benefit of significantly raising the humidity level of outdoor air in the winter. Not only can this have a dramatic impact on the first cost and operating cost of an HVAC system, it can also dramatically improve indoor air quality and level of comfort for building occupants.

Winter Performance: Beating "Jack Frost"

Frost build up can occur whenever the exhaust air stream is near 100% relative humidity (RH) and the wheel surface temperature is below 32°F. Optional factory-installed and tested controls help prevent frost by measuring the exhaust air temperature and humidity, slowing down the rotation of the wheel as required.

Summer Performance: It's Not Just the Heat, It's the Humidity

Enthalpy wheels provide twice as much summer energy recovery as sensible devices because summer ventilation air involves as much latent load as sensible load. In fact, our wheel normally cools outdoor air down to 67°F wet bulb as normally required by 100% dedicated outdoor air systems (DOAS). Therefore, terminal unit systems like fan coils and heat pumps can be used in combination with our energy recovery rooftop units to provide excellent dehumidification on the most demanding applications.

For more information about our energy recovery solutions, contact your local Daikin representative or visit www.DaikinApplied.com to find an office near you.