

## Model WE Energy Recovery Ventilators (300 to 8,000 CFM)

Model WE Energy Recovery Ventilators provide affordable outside ventilation by combining an exhaust fan, make-up air handler and Carnes Energy Recovery Wheel into a compact package that minimizes capital investment and maximizes payback for heating and cooling equipment. Units available for both inside and outside mounting.

### BENEFITS:

- Low investment with maximum payback.
- Easy to use in new construction or renovation.
- Flexible, convenient installation and startup.
- AHRI certified.

### AVAILABLE OPTIONS INCLUDE:

- ETL/CSA Listing for quick Building Code approvals.
- Corrosion Protective Media coating and edge coating.
- 4 Duct arrangements with Weather Hoods, Dampers and Roof Curbs.
- Temperature and Enthalpy Economizers, Preheat or Defrost Controls.
- Remote panels, Time Clocks, BMS interface for effective control.
- Rotation Detector, Dirty Filter Switches for operation assurance.
- Double Wall Construction, Airflow Gauge for airflow quality.
- Optional 5 Year Warranty.



**▼ PRODUCT OVERVIEW**

Carnes Model WE\_C is a packaged energy recovery ventilator (ERV) suitable for 300 to 8,000 CFM that allows the designer or building owner to economically provide fresh outside air at near indoor conditions for commercial or institutional construction. First cost requirements for cooling and heating capacity are minimized. The total energy

wheel is the only recovery technology that passively corrects humidity levels (latent energy) and temperature (sensible energy) while pre-conditioning outside makeup air. The WE\_C unit builds on Carnes thirty-plus years of manufacturing quality, commercial total energy recovery products.

**▼ APPLICATION BENEFITS**

Carnes model WE\_C helps designers economically meet ASHRAE Standard 62 Ventilation for Acceptable Indoor Air Quality guidelines for minimum fresh air ventilation of 15 to 20 CFM per person. ASHRAE Standard 62 guidelines require dramatically increased outside air intake to avoid sick building syndrome and related problems from indoor air contaminants. Adherence to ASHRAE Standard 62 is generally considered the best possible defense against liabilities related to design ventilation rates. Increased outside air intake necessarily demands increased

cooling capacity or preconditioning of outside air. ASHRAE 90.1 often requires energy recovery as well.

In many cases, a realistic design credit for energy recovery will result in lower first costs due to reduced cooling equipment requirements. In most middle latitude climates with moderate to high summer humidity levels, payback periods range from immediate to one year. Additional annual operating savings calculations are available by consulting the factory.

**Benefits**

- Improves comfort via humidity control
- Reduces peak capacity requirements by 75%
- Reduces first cost of conditioning equipment
- Reduces HVAC energy cost by up to 50%
- Reduced humidity improves duct conditions, with better health and less maintenance
- Reduces peak energy demand and utility service
- Reduces climate extremes to air handlers

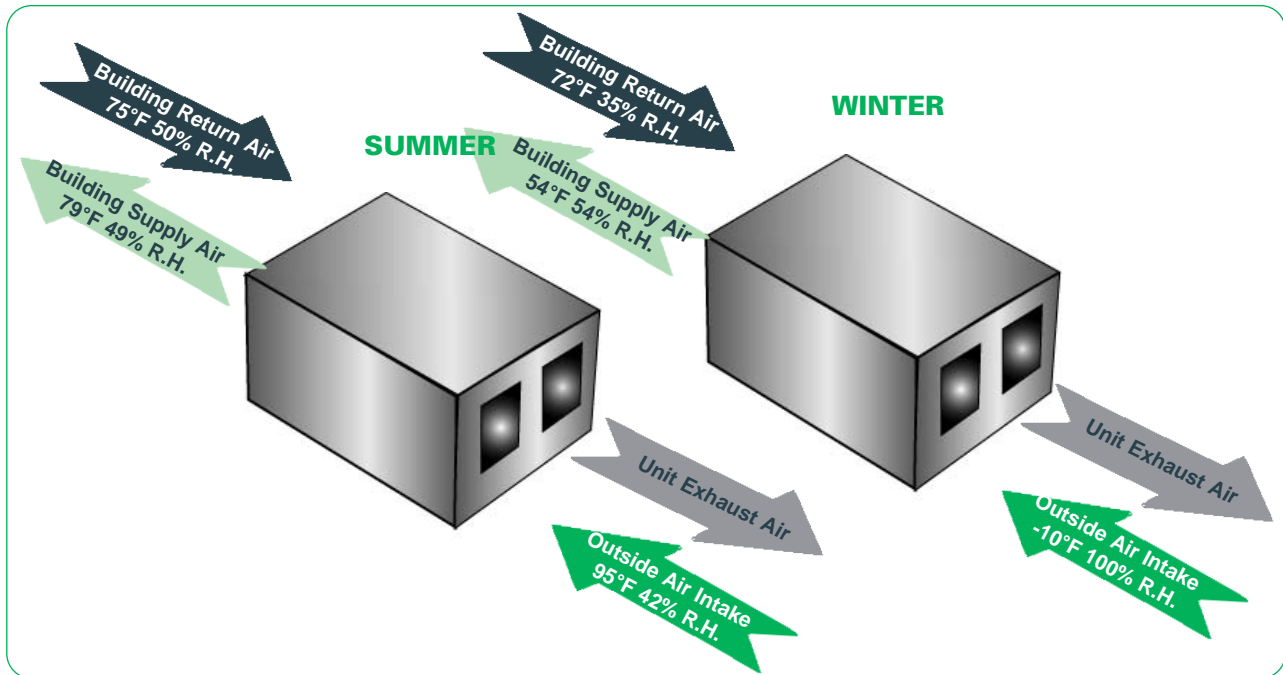
**Typical Applications**

- Hospitals
- Nursing Homes
- Animal Laboratories
- Pharmaceutical Manufacturing
- Casinos and Bars
- Smoking Lounges
- Schools
- Office Buildings
- Hotels/Motels
- Government Buildings, Prisons
- Military

▼ APPLICATION EXAMPLE — Indianapolis, IN

A school requires fresh air ventilation for 4 classrooms containing 100 students and staff. ASHRAE Standard 62 requires 15 CFM per person, or 1,500 CFM total of outside air supply. Conventional air conditioning required to cool the outside air supply to 55°F is 10 tons. Applying a Carnes WE\_C Energy Recovery Ventilator preconditions outside air to 79°F @ 49% RH, reducing cooling load by 5 tons.

Recovery Ventilator



Applying a 75% design credit, the required cooling capacity is reduced by 3.75 tons, reducing installed system cost by \$3,750, minus the cost of the Carnes WE\_C unit. In addition, annual energy cost savings total approximately \$3,000. Net benefit is no first cost increase, continuing annual energy cost savings for the life of the unit, and compliance with design target for fresh air ventilation.

**▼ CONSTRUCTION DETAILS**

The energy recovery wheel in Carnes model WEHC features durable 8 inch (203mm) thick corrugated aluminum construction with a permanently bonded 3 augstrom molecular sieve desiccant media. Corrosion protection is standard on the enthalpy wheel.

Carnes WEHC is designed for simple installation and maintenance. Wiring is via a single point exterior disconnect. Factory wheel control options include constant speed drive or a heating and cooling mode for economizer operation using either outside air temperature or enthalpy setpoints. Drain pans and

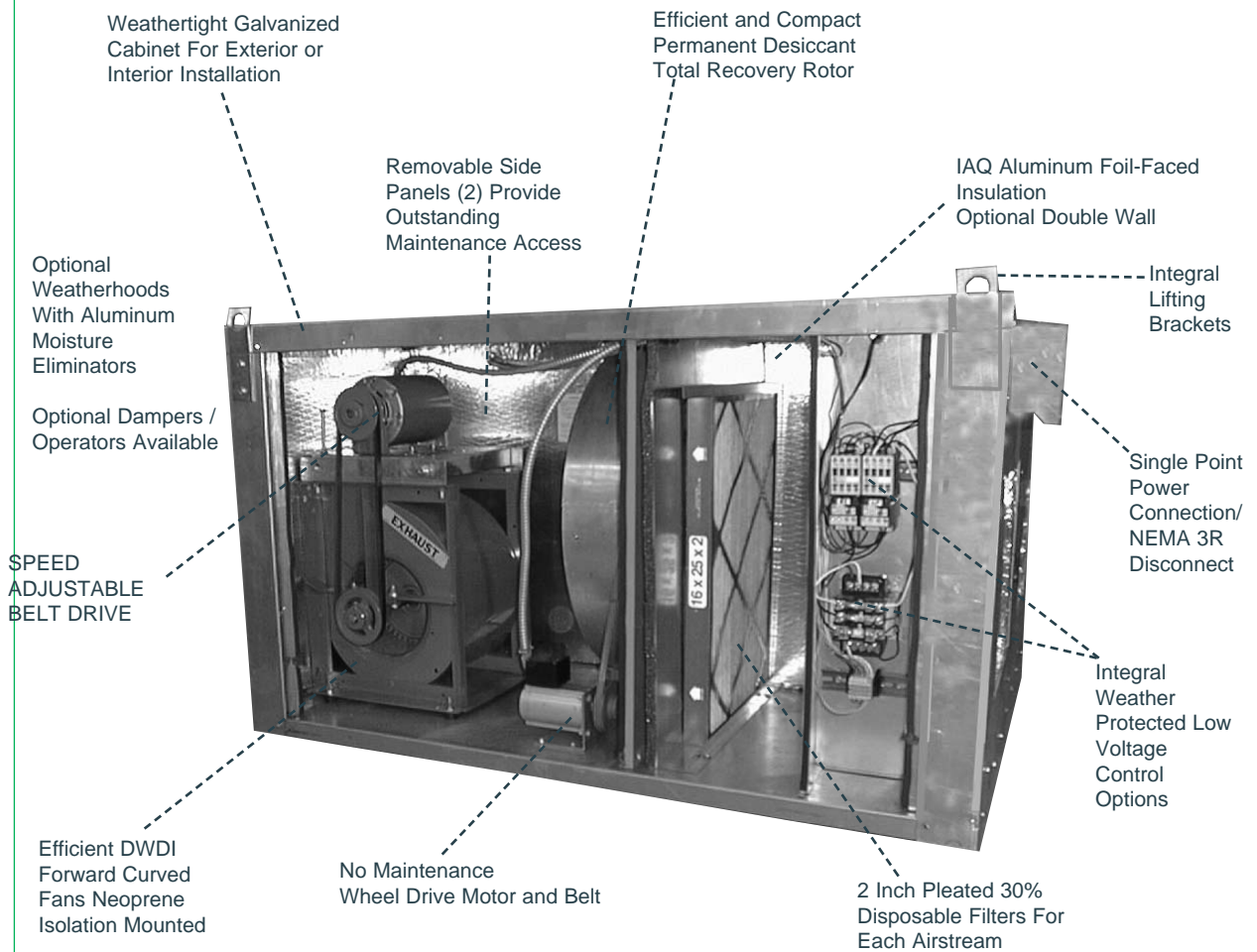
associated field plumbing are not required as all moisture is transferred in the air streams without condensation.

The recovery wheel is self cleaning. Because the wheel alternates between opposite direction supply and exhaust air streams, any particulate matter too large to pass through the wheel corrugations will be removed by the opposite airstream. Disposable 2" pleated filters are standard.

A variety of standard duct orientations make this product suitable for new or retrofit

**WE SIZES 01 - 03**

**300 to 2,800 CFM — Up To 1.5 Inch w.g. E. S. P. —  
Compatible with all Energy Management Systems!**



**Model WEHC Energy Recovery Ventilator**

## ▼ CONSTRUCTION DETAILS

construction wherever supply and exhaust ductwork can be co-located. Units can be exterior or interior mounted. Standard unit construction is galvanized steel mill finish exterior.

Installation options include:

\* Independent fresh air ventilation. This method provides constant quantities of fresh outside air to each space independent of variable heating and cooling requirements. This technique provides assurance of fresh

air ventilation goals without regard to variable room heating and cooling loads.

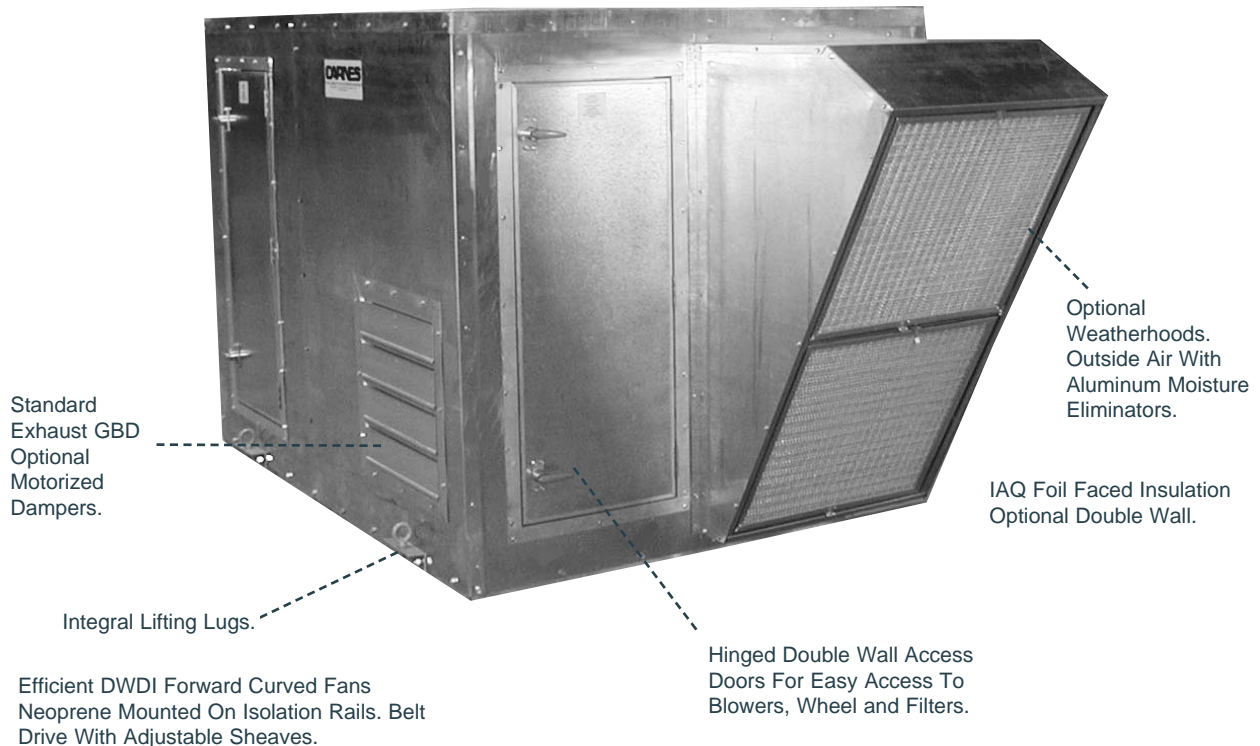
\* Integrated with an existing or new duct system. This configuration intercepts room exhaust and preconditions fresh air supplied to a system air handler, rooftop unit or similar system device. Outside air is delivered to the air handler at near room neutral conditions of temperature and humidity.

### WE SIZES 04 - 08

1,600 to 8,000 CFM — To 1.5 Inch w.g. E. S. P.

Weatherproof Heavy Gauge Galvanized Cabinet For Exterior or Interior Installation.

Single Point Power Connection. NEMA 3R Disconnect.



## Model WEHC Energy Recovery Ventilator

### ▼ UNIT SELECTION PROCEDURE

Carnes provides equipment selection and performance calculation software for the Energy Recovery Ventilators (Energy-C-Lect). This powerful tool is the simplest and fastest way to perform energy recovery performance, unit selection, and submittals. The latest Energy-C-Lect version is available upon request from the Carnes website.

The following manual selection guidelines are provided primarily so that you may understand the underlying assumptions and calculations behind the selection software. Use Energy-C-Lect for actual unit selection, performance, and submittals.

1. Determine the type of recovery media required. Total recovery (sensible + latent transfer) is recommended for most HVAC comfort to comfort ventilation applications to gain the maximum benefit for precooling. Under normal circumstances total recovery media will not result in condensation within the cabinet.
2. Determine the minimum unit size from the Performance Data Charts that provides the required airflow at the design external static pressure, and the desired wheel efficiency. Determine the desired horsepower for each fan. Note the drive range selection for the Product Identifier Description.
3. Determine the desired duct configuration for unit arrangement. Check for compliance with any dimensional limitations. Verify minimum clearance on unit sides for filter and service access. Special duct configurations are available only on Model WM MiniSystems.
4. Select the desired options and accessories for the installation.

### ▼ FROST CONSIDERATIONS

Frost formation on energy recovery devices is a function primarily of outside air temperature (O.A.T.) and return air relative humidity (%RH). Typical frost formation temperatures with total recovery media range from 0 to 15 Degrees F. O.A.T. Frost control is not normally required if outside air temperatures are not less than 15°F. more than a few hours per year.

Consult Energy-C-Lect to determine expected condensation and frost temperatures and determine a suitable control strategy.

Consider the following factors to decide which option is most suited to the application utilizing total recovery media.

**Unit On/Off Frost Control** shuts the unit off whenever the outside air temperature falls below an adjustable setpoint temperature. The unit returns to normal operation when the outside temperature rises above the setpoint. This option is suitable for climates

with limited hours below 0°F, and such that supply air is not required during those hours. Buildings occupied during daytime only may experience such low temperatures for very limited times when occupied.

**Exhaust Only Defrost** shuts off the supply blower for a customer adjustable interval when frost is detected on the wheel to defrost the wheel with warm exhaust air, then restarts the supply air blower. The defrost cycle only occurs when frost is detected, and thus minimizes supply air shutoff. This option is suitable for applications where momentary stoppages of supply air are acceptable, and where temperatures are below 15°F. for extended occupied periods.

**Variable Speed Defrost** slows the enthalphy wheel to allow a customer adjustable timed defrost cycle.

**Electric Preheat** is suitable where temperatures will be below 15°F. for extended peri-

## ▼ FROST CONSIDERATIONS

ods of occupied time and supply air must be continuously provided. An electric coil is provided to heat outside air above the expected frost temperature via a customer adjustable temperature setpoint. Independent mounting support at supply air inlet to be provided by others. A separate power circuit may be

required. Optional ETL Listing is not available.

Typical preheat design temperature rises are less than 20°F, with relatively low initial and operating expense in most climates.

## ▼ OPTIONS

### • WHEEL CONTROLS

**Constant Speed Drive** Wheel continuously operates at constant speed. An external on/off wheel control circuit is supplied.

**Temperature Controlled Economizer Mode** Adjustable temperature actuated thermostats operate wheel for heating and cooling, and stop wheel for “free cooling” economizer mode. Most appropriate for low humidity climates.

**Enthalpy Controlled Economizer Mode** Adjustable enthalpy controller operates wheel for cooling, and stops wheel for economizer mode. Ideal for use in high humidity climates where latent recovery is the major contributor to total energy savings. Override circuit for heating mode is required.

**Wheel Variable Speed Drive** external speed signal varies wheel speed to control supply air temperature.

### • UNIT OPTIONS

**Double Wall Construction** securely isolates insulation to prevent damage and air supply contamination.

**Dirty Filter Sensors** provide adjustable setpoint pressure drop indication for supply and exhaust air streams.

**Rotation Detector** provides output signal for remote alarm (by others) upon rotation failure.

**ETL Listing** Available listing shows tests for conformity to UL Standard 1812, and certification to CAN/CSA C22.2 No. 236.

### 7-Day Programmable Time Clock

**Remote Panel** with customer selected display is available to be field installed and wired.

**Security Cables** are available on Sizes 01-03 to prevent loss or damage to access panels.

**Painted Cabinets** are available to match existing building equipment.

**Airflow Monitor Gage** allows reading of actual supply or return airflow at the unit.

### • EXTENDED WARRANTIES

- Standard wheel warranty - 5 years.

- Optional mechanical only extended warranties are available for up to 5 years from shipment.